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Editor’s note

The spending and revenue activities of the Government – often known as ‘fiscal policy’ – can have an important bearing on the path of the economy, particularly when major new initiatives occur. When assessing the economic outlook for monetary policy purposes, the Reserve Bank must take these activities into account. In the first article of this issue, Ashley Dunstan, David Hargreaves, and Ozer Karagedikli of the Economics Department explain the importance of fiscal policy to the business cycle and set out a framework for considering how changes in fiscal policy affect the economy. The authors also review the available empirical evidence. A key message is that the effects of various fiscal measures can vary greatly and their impact partly depends on the state of the economy at the time they occur. The article concludes by noting that fiscal policy could be a significant source of stimulus to the New Zealand economy over the next few years.

New Zealand’s longer-run growth prospects and standard of living depends critically upon its productivity performance. Traditional aggregate measures of productivity for New Zealand have tended to reveal a relatively poor performance. In our second article, Aaron Drew of the Economics Department examines the country’s productivity record, drawing on new data recently released by Statistics New Zealand. Aaron shows that the measurement of productivity is very sensitive to which sectors are included in the analysis. The new data suggests that when ‘hard-to-measure’ sectors are excluded, New Zealand’s productivity performance appears to have been better than hitherto believed and compares favourably with Australia’s. But this finding raises another issue – by implication, productivity in the hard-to-measure sectors appears to have been particularly poor. Whether this reflects reality or is due to measurement issues remains an unresolved question.

In our third article, Chris Hunt of the Economics Department considers how emerging Asia has affected inflation in advanced economies over recent years. Chris notes a pronounced decline in consumer goods prices over this period, but shows that higher commodity prices arising from rapid growth in the region has recently created some inflationary headwind.

In our fourth article, Andrew Coleman from the Economics Department undertakes a comparison of price movements in New Zealand with those in Australia, drawing on detailed data from each country’s Consumers’ Price Index. The main finding is that price movements in both countries follow a similar medium-term path. Sectors that have had large price increases in New Zealand have tended to have large price increases in Australia, and sectors that have had small price increases in New Zealand have tended to have small price increases in Australia.

Finally, we include in this Bulletin a chronology of economic and financial events for New Zealand over 2006, prepared by Gina Williamson, a summer student in the Economics Department. A chronology for the full period since 1993 can be accessed on the Reserve Bank’s website at http://www.rbnz.govt.nz/about/bankhistory.html.
ARTICLES

The impact of fiscal policy on the business cycle
Ashley Dunstan, David Hargreaves, and Ozer Karagedikli

This article sets out theoretical and empirical evidence on the impact of fiscal policy on the business cycle. Our analysis suggests that fiscal policy has a significant influence on cyclical conditions in New Zealand. Simple measures of the stance of fiscal policy, such as the Treasury’s measure of fiscal impulse, are useful, but the details of fiscal initiatives also need to be analysed to determine macroeconomic impact. For example, tax changes can have very different effects: tax cuts designed to spur savings could be mildly contractionary, while company tax cuts will tend to be expansionary. The significance of fiscal changes for monetary policy also depends partly on other factors driving the business cycle.

1 Introduction

The spending and taxation plans of the government are often collectively described as fiscal policy. Fiscal policy is generally shaped by factors other than stabilising the business cycle – the government’s main focus is to take in tax revenue to pay for services like hospitals and schools, and also fund superannuation and other transfer payments. These activities may help to stabilise the business cycle through so-called ‘automatic stabiliser’ effects. Beyond that, one conventional view is that the role of macroeconomic stabilisation should be left primarily to monetary policy.

Fiscal policy is one of a range of factors the Reserve Bank considers when assessing the economic outlook. Thus significant fiscal policy changes can lead to changes in monetary policy stance, and the Public Finance Act’s provisions on fiscal reporting and transparency help ensure that the Reserve Bank has the information it needs in assessing the potential impact of fiscal policy. While there is no formal mechanism for coordination of monetary and fiscal policy in New Zealand, in practice, there is regular discussion between the Treasury or Minister of Finance and the Reserve Bank about the economic outlook. At the time of the mid-1990s tax cuts, the Bank was asked to provide advice on the potential implications of tax cuts for monetary policy. The Bank’s subsequent review of that business cycle concluded that “the tax cuts and resulting rise in spending pressure further prolonged the period of restrictive monetary policy” (Drew and Orr, 1999). This experience highlights the important effects fiscal policy can have on the business cycle and thus monetary policy. These effects are the focus of this article.

Increased government spending directly adds to the total expenditure on goods and services in the economy (which is referred to as ‘aggregate demand’). Furthermore, the government’s policy on taxation and transfer payments will directly affect the disposable income available to consumers. Policies that increase disposable income will tend to increase consumption, thus adding to aggregate demand. Analogously, fiscal policy can increase the after-tax profits of firms, which may in turn increase investment and aggregate demand.

In spite of these links to aggregate demand, there is no consensus on the importance of the cyclical impact of fiscal policy. One traditional strand of fiscal policy analysis (stemming from the work of John Maynard Keynes) suggests that a one-dollar expansion in fiscal policy (ie, increased spending or reduced taxes) may well increase economic activity by more than a dollar. In contrast, some strands of modern macroeconomic analysis reach the conclusion that,

\footnote{Amongst others, the authors would like to particularly thank Aaron Drew, Bernard Hodgetts and John Janssen for comments and suggestions – naturally, remaining errors are the authors’ responsibility.}
\footnote{Fiscal policy is set by the Government in accordance with the Public Finance Act. The Public Finance Act provides for the business cycle to be taken into account in the setting of fiscal policy, but it is one of a range of objectives: “decisions are made with a view to goals such as the optimal allocation of resources, economic stabilisation, and the longer term stability of public finances” (Treasury 2005).}
\footnote{There are challenges to this view. For example, some commentators have suggested that formal mechanisms for coordinating monetary and fiscal policy could aid in macroeconomic management. Along these lines, the Reserve Bank and The Treasury’s 2006 Macroeconomic Policy Forum heard suggestions from external participants on how fiscal instruments could potentially be used to aid in cyclical stabilisation. For a summary of the forum, see Buckle and Drew (2006). Although this is an important area for future research, policy coordination is outside the scope of this article.}
in some circumstances, fiscal policy will have no effect on the real economy at all. Regardless of the different conclusions reached by various theoretical approaches, empirical work on fiscal policy has generally found that expansionary fiscal policy does increase aggregate demand (see section 3). This implies that taking account of fiscal policy is important when forecasting economic developments and setting monetary policy.

Recent work has emphasised the important long-run effects of fiscal policy on the economy's ability to supply goods and services. While these effects are undeniably important, in the short-to-medium run, it is likely that supply-side effects will be outweighed by the impact on aggregate demand. For example, a cut in company tax would probably spur investment. This investment would lead to greater productive capital in the long term, but, in the short term, the investment will boost aggregate demand as capital is purchased and put in place. In other words, the demand-side effects tend to be the most crucial for monetary policy.

Discussion of the effects of fiscal policy often treats various policies as if they have similar effects on the economy. Indeed, the impact of fiscal policy decisions on aggregate demand is often summarised in measures of 'fiscal impulse' that weight various policies as if they have the same dollar-for-dollar impact on the economy. However, this article explains why different fiscal initiatives may have quite different effects on economic activity. The implication is that any analysis of the effects of a given change should carefully consider the particular policy at hand.

In section 2, we examine the theoretical literature on the effects of fiscal policy and in section 3, we go on to quantitative empirical estimates of those effects. In section 4, we look at New Zealand's recent fiscal history and outlook. Section 5 discusses some special fiscal policies such as savings incentives, and section 6 concludes.

2 The literature on the cyclical effects of fiscal policy

Macroeconomic theory about the cyclical role of monetary policy has advanced a lot in recent years. However, there has been less recent research on fiscal policy, and there remain disagreements about the effect of fiscal policy on the business cycle. This section provides a very brief summary of some of the key ideas in this literature. A longer treatment can be found in Hemming, Kell, and Mahfouz (hereafter HKM (2002)).

Prior to the work of Keynes (1936), the classical tradition suggested that government spending (which was generally substantially smaller before World War One at any rate) did not have a stabilisation role because resources would be expected to be fully utilised. For example, a level of aggregate demand that was below the economy's productive capacity should lead firms to cut prices, thus raising demand. This instantaneous process should ensure that demand and supply are always equal. Say's law (that supply creates its own demand) was a classic statement of this position. Fiscal expansions were thought to simply divert resources from the private sector. This view still remains at the core of economic thinking about the demand-side effects of fiscal policy in the long run. When prices are free to adjust, government policy cannot perpetually stimulate aggregate demand beyond the level that is consistent with the full utilisation of resources.

Keynes' General Theory introduced the idea that there could be a lack of effective demand for prolonged periods, leading to unemployment and idle resources. In other words, the evolution of the economy could be driven by aggregate demand. Keynes' argument had particular potency in the context of the depression in the 1930s, when economic activity was well below the level consistent with full utilisation of resources. Fiscal policy that stimulates aggregate demand would then have an important role. Idle resources could be used up by government spending and aggregate demand could further be bolstered by expansionary tax and transfer policies. Within this framework, the effect of a change in fiscal policy on aggregate demand could be derived as

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4 See, for example, Frenkel and Razin (1996). This literature is also reviewed in the work of Hemming, Kell and Mahfouz (2002).

5 See, eg, Spencer and Yohe (1970) – the classical formulation is traced by these authors back to Smith and Mill as well as Say.
Reserve Bank of New Zealand: 
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Box 1
Fiscal policy multipliers

If the government purchases $1000 worth of services from a New Zealand worker, GDP will be increased by that $1000, assuming that worker is able to undertake that job without crowding out other jobs (by working extra hours). To the extent that the additional revenue is spent by the worker, there will also be second round effects on Gross Domestic Product (GDP). The individuals who the worker buys things from will tend to spend some of that additional income, and so on. If people tend to spend a given percentage of any additional income (denoted the marginal propensity to consume, or MPC), the ultimate impact on GDP will turn out to be $1000/(1-MPC). For example, if MPC is 0.8, the ultimate increase in GDP from the initial increase in spending will be $5000. The term multiplier is commonly used to denote (1/(1-MPC)) which in this case equals 5.

Total increase in demand = $1000 + $800 + $640 + .... + = $5000

This analysis ignores imports and taxes. In reality, spending that accrues to foreigners does not circulate in the economy, and taxes paid to the government will not be circulated unless they prompt new spending initiatives. If 25 percent of all spending is on imports (MPM) and the average tax rate is 30 percent (t), the correct multiplier will be 1/(1-MPC(1-t)+MPM). This turns out to be approximately 1.4, which is considerably lower than 5, reflecting that imports and taxes stop money from circulating.

If the government instead cuts taxes by $1000, the initial impact on household spending should be about $800 (given that some of the tax cut will be saved by assumption). Moreover, some of that additional initial spending will be on imports. It is possible to derive various tax multiplier formulae under various precise assumptions, but it will generally be the case that the tax multiplier is lower than the multiplier on government spending. Thus, a balanced budget government expansion (where government spending is increased and funded by an increase in taxes) might expand output, but by less than an expansion funded by borrowing.

The role of imports in the multiplier implies multipliers are likely to be smaller in open economies like New Zealand. Conversely, the role of the marginal propensity to consume suggests multipliers might be relatively large in countries like New Zealand with relatively low savings rates (although savings rates represent an average propensity to consume, which may be quite different to the marginal propensity).

As noted below, pressure to expand output will also put some upward pressure on prices, interest rates, and the exchange rate. These effects, which could be called real and financial crowding out, further reduce the multiplier effects that can be expected in reality. This is reflected in the empirical and model-based results we describe in section 3.

Some of these caveats come out of the classical tradition, and were acknowledged in the General Theory. Even over relatively short time horizons, some relative prices adjust to account for the effects of changes in fiscal policy. For example, stimulatory fiscal policy will tend to bid up the interest rate (government spending may require more borrowing, and the competition between the government and the private sector for funds could put upward pressure on the interest rate). This, in turn, would tend to crowd out some consumption and investment spending that would otherwise have occurred.

In an open economy, increases in demand (and consequent shortages of domestically produced goods and services) may lead some households and firms to spend a greater proportion of their income on products from foreign...
suppliers. If the economy has a floating exchange rate, expansionary fiscal policy and rising interest rates will tend to cause an exchange rate appreciation that will also encourage this effect. As a result, falling net exports can be an additional channel for crowding out demand. However, this effect may be limited if, as seems likely, some of the new demand can only be fulfilled by local firms.

Government spending can also crowd out private spending by acting as a substitute for it. For example, an increase in public health spending may displace private spending on health care. On the other hand, some government spending (such as a new road) could be complementary and lead directly to increased private consumption or investment.

Some subsequent strands of economic research have more fundamentally questioned the behavioural assumptions underlying multiplier analysis, suggesting it can lead to misleading conclusions about the effects of fiscal policy. This approach has placed a new emphasis on intertemporal decision-making and expectations.

One early, and dramatic, result was the so-called ‘Policy Ineffectiveness’\(^6\) proposition. Under certain fairly strong assumptions, this held that systematic policy changes would be predicted and factored into household and business behaviour and pricing and therefore have little or no effect on the real economy. A fiscal policy application of this reasoning is known as Ricardian Equivalence. Suppose the Government is known to try to smooth the business cycle by cutting taxes in recessions, without any corresponding reduction in spending. Rational, forward-looking consumers would save any extra income in recognition of the fact that taxes are likely to increase again at some future date. Thus the policy would be unlikely to have an economically important effect.

To summarise, since the work of Keynes, macroeconomic analysis has provided a number of reasons why the impact of fiscal policy on real activity might be small:

- A fiscal expansion might crowd out private spending by increasing interest rates and prices, and causing an appreciation in the exchange rate;
- a fiscal expansion might act as a substitute for some private spending;
- households may choose to save tax cuts to pay for future tax liabilities; and
- the fiscal expansion may be anticipated and factored into decisions in a way that stops real activity from responding (eg, to cyclical movements in tax rates).

All of these insights are important to the analysis of fiscal policy changes. For example, in a macroeconomic model such as the Reserve Bank's Forecasting and Policy System (FPS), an increase in government spending puts upward pressure on interest rates and the exchange rate, so that there is some crowding out of the impact of the spending on output. Some of the expectation effects discussed above also apply (eg, forward-looking consumers are aware of the likely

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\(^6\) Sargent and Wallace (1976).

\(^7\) For a more detailed overview, see Ganelli (2006), which describes recent IMF work in this area.
increase in future tax liability). However, the central point of multiplier analysis – that expansionary fiscal policy tends to lead to an increase in aggregate demand – remains valid in FPS, and most other macroeconomic models. Furthermore, this simple prediction has been validated in a number of empirical studies, which we review below.

3 Model-based and empirical literature

A variety of empirical and analytic techniques have been used to consider the potential impacts of fiscal policy on the economy, and we review some of that literature in this section. Many of the studies we describe below attempt to calculate multipliers (see box 1 for a definition) at various horizons following a change in fiscal policy. As a guide to interpretation, an estimate of a spending multiplier of 0.8 implies that raising government spending by $1 billion would increase New Zealand GDP by around $800 million over the relevant time period.

Empirical literature

There is a large empirical literature on the cyclical effects of fiscal policy, though it is fairly limited in New Zealand. Recent international studies can be divided into a few strands. Some studies look at the impact of tax policy changes on the consumption plans of individual consumers, and are typically able to demonstrate fairly substantial effects, even if the policy changes are pre-announced. The evidence is consistent with many people using windfalls like temporary tax cuts to facilitate additional spending. The UK Treasury’s 2003 study Fiscal Stabilisation and EMU describes this literature in some detail (see box 3.3 of that document).

There are also macroeconomic event studies; these look at the impact of special identified fiscal policy shocks (eg, large spending increases or tax cuts) but analyse national macroeconomic variables rather than the behaviour of individual consumers. Blanchard and Perotti (2002) summarise several papers that use large military spending increases as ‘events’. These reveal a significant (positive) effect on aggregate demand. Another event study approach by Romer and Romer (1994) found similar results.

On the other hand, other work (some references are listed in Ganelli, 2006) has documented the possibility of the expansionary fiscal contraction. Giavassi and Pagano (1990), for example, document that fiscal reform packages leading to reductions in spending predicted significant consumption booms in Denmark and Ireland. HKM (2002) analyse the fiscal contraction literature in some detail and conclude that while this is a genuine possibility in certain circumstances (eg, if the country has a debt sustainability problem that the contraction mitigates), “caution is needed in drawing more general conclusions about the design of fiscal policy from those episodes”.

Other empirical studies work with full econometric models, generally of a class known as structural VARs. Two heavily cited studies are Blanchard and Perotti (2002) and Perotti (2004). Both papers disaggregate fiscal policy into government spending and net taxes (tax revenue minus transfer payments) and estimate the effect of an increase in these variables on economic activity (GDP). The approach allows the authors to calculate the multiplier associated with spending and net tax at various horizons.

Perotti (2004) follows this approach, coming up with the following conclusions from a study of the US, UK, Australia, Germany and Canada:

- The peak impact of an extra dollar of government spending on aggregate demand is frequently less than one, and the corresponding measure for the effect of changes in net tax is considerably weaker again; and
- under plausible assumptions, increases in government spending lead to increases in prices, and have a significant effect on nominal and real interest rates.

On balance, as discussed in HM Treasury (2003), structural VAR evidence is consistent with weaker impacts of fiscal policy than have traditionally been expected (eg, using the macroeconomic models discussed below).

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8 Alan Blinder’s paper at the Federal Reserve Bank of Boston conference (June 2004) describes several papers from this literature.

9 Perotti (2002) also controls for the effect of fiscal policy on interest rates and inflation.
Claus et al. (2006) apply this approach using New Zealand data. Although their results are sensitive to the statistical approach they use, there are some general points that emerge. First, consistent with the above evidence, they find that, for up until 12 quarters after the policy change, spending has a positive impact on economic activity and net taxes have a negative one. In terms of peak impact, spending is associated with a stronger effect. Second, these multipliers are considerably smaller in New Zealand than in other, larger, economies. This could possibly reflect the fact that New Zealand is a small, open economy where ‘leakages’ are likely to be more prevalent.10

Model-based studies
Another strand of analysis of the macroeconomic consequences of fiscal policy works with existing macroeconomic models. The estimates of fiscal-policy effects that come from these studies are obviously influenced by the philosophical and empirical design of the model. However, to the extent that they summarise institutional opinion on the effects of fiscal policy, they may be quite useful.

Fiscal-policy effects in the macroeconomic models in use at the Treasury and the Reserve Bank have been compared in internal work. The results suggest that the fiscal sector is quite similar in the two models, with the differences in simulation properties more attributable to the behaviour of the exchange rate and other non-fiscal issues. In both models, expansionary fiscal policy had a stimulatory effect, and an increase in spending was significantly more stimulatory than a tax cut. In the current version of FPS, the peak annual impact on GDP from a ten-dollar increase in spending is approximately six dollars, suggesting a multiplier of around 0.6. This relatively low multiplier reflects a number of factors. First, a proportion of government spending (around 20 percent) is assumed to be imported. Second, the impact of the increased government spending on household income is constrained because wages are sticky and slow to adjust. Finally, financial crowding out (due to rising interest rates and a rising exchange rate) is quite significant.

Church et al. (2000) compare the demand effects of fiscal policy in a number of models of the UK economy. While we have not attempted a comprehensive review of international studies,11 Church et al. is quite relevant, particularly as the openness of the UK economy is fairly similar to New Zealand (which will tend to make the fiscal multipliers more comparable). Table 1 presents the multipliers associated with an increase in government spending and a reduction in taxes, respectively, at horizons of one, three and five years after the expansion begins. Along with the five models presented in Church et al, we have calculated corresponding multipliers for the Reserve Bank’s FPS.

Table 1
Spending and tax multipliers in five UK macro models, and FPS

<table>
<thead>
<tr>
<th>Percentage difference in GDP from base value in year</th>
<th>Spending simulation</th>
<th>Income tax simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LBS</td>
<td>NIESR</td>
</tr>
<tr>
<td>1</td>
<td>0.94</td>
<td>0.98</td>
</tr>
<tr>
<td>3</td>
<td>0.9</td>
<td>0.47</td>
</tr>
<tr>
<td>5</td>
<td>0.79</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Simulations involve an increase in government spending, or reduction in the income tax rate, lasting for five years and scaled to 1 percent of GDP; FPS estimates produced by RBNZ, UK estimates from Church et al.

10 Such leakages include the tendency for additional spending generated by fiscal initiatives to be reflected in higher imports rather than higher domestic production. Consistent with this line of reasoning, the multipliers are also relatively small for Australia.

11 HKM (2002) survey earlier studies using models across a wider range of countries. They find ‘that most expenditure multipliers are in the range 0.6 to 1.4 and most tax multipliers in the range 0.3 to 0.8.’
Table 1 shows that there are significant fiscal multipliers on spending in all of the models, with the first-year effects from FPS within the range of the UK estimates. However, the models have quite different views on the longevity of the fiscal effects (in FPS, the effects are not very persistent, and eventually become negative). These differences may relate to the speed and strength of the monetary-policy response to the fiscal easing, and how the models handle expectations of the ultimate fiscal-policy rebalancing (when the shock ends, the government must tighten fiscal policy to return to its debt target).

The tax multipliers across the models are more varied, even in the first year of the shock. In some models (like FPS), the tax multiplier is relatively small, reflecting that some consumers ‘look through’ the temporary changes in tax rates. The COMPACT model has a similar assumption about this to FPS (which explains the similarly low tax multiplier), while some other UK models have significantly larger and more prolonged effects. It seems likely that some of the other models (NIESR, CUSUM) assume consumers respond to current income (and therefore current tax rates) more. We caution that the results from FPS are contingent on the tax cut being temporary and known to be so. In general, we think uncertainty about future policy reversals would probably make the tendency to spend out of current tax cuts more significant than the FPS or COMPACT results imply.

Overall, the evidence in this section suggests that fiscal policy can have a material impact on the business cycle, but that spending and tax changes can have quite different effects.

4 New Zealand’s recent fiscal history and outlook

Fiscal policy stance, in New Zealand and overseas, is often analysed with reference to a measure called fiscal impulse, which is defined and discussed in box 2.

Box 2
The Treasury fiscal impulse measure

It is often convenient to summarise the effects of fiscal policy (whether fiscal policy is acting to expand or contract the economy) in a single indicator variable. Philip and Janssen (2002) is a very useful New Zealand analysis of how to measure fiscal impulse, which is a measure of the impact of fiscal policy on aggregate demand. Loosely speaking, an expansionary fiscal impulse implies that government spending on New Zealand-produced goods and services grew faster than tax revenue throughout a given year.

More specifically, the authors begin with the change in a cash-based measure of fiscal balance, which measures the difference between growth in government spending (excluding capital expenditure) and growth in taxation revenue. This measure is then adjusted to remove the effects of the business cycle on tax revenue and benefit payments. Finally, the authors add back capital expenditure items that are likely to represent genuine expenditure on NZ GDP (eg, roading construction, but not the purchase of imported goods or of existing New Zealand entities). The Treasury measure of Fiscal Impulse, based on Philip and Janssen (2002), is published twice each year. The figure from the December 2006 Half-Yearly Economic and Fiscal Update (HYEFU) is shown in the main text.

There are a number of points that need to be considered in interpreting this measure. Firstly, fiscal impulse is a measure of the change in fiscal stance. A policy that involves spending 10 million dollars per annum from this year on will increase the measured fiscal impulse in this year, but not in subsequent years. Implicitly, using a ‘change’ measure as an indicator of the impact of this year’s fiscal policy on this year’s economy implies that the economy adjusts to a fiscal change over the course of a year. In practice, the impact of these changes in fiscal stance may be more gradual, so that fiscal impulse from a previous year may still be affecting the economy at any point in time.

(continued on p12)
Secondly, the Treasury measure seeks to exclude the impacts of the business cycle on fiscal stance. The estimates are based on the assumption that the fiscal balance/GDP ratio is 0.5 percent better (because of reduced transfer payments and increased tax receipts) when demand is 1 percent higher than the economy’s sustainable capacity (ie, the ‘output gap’ is 1 percent). This elasticity estimate is based on the work of Tam and Kirkham (2001) and broadly fits with international evidence. However, there is uncertainty about the correct value of the elasticity and also about the magnitude of the ‘output gap’ at any point in time.

Thirdly, this method effectively weights most items of cash expenditure and taxation equally. However, Philip and Janssen note that different proposed policies may not have the same macroeconomic effects, dollar for dollar. For example, an increase in the top marginal tax rates to fund a new road would probably be expansionary (people paying top tax rates will typically not adjust their consumption patterns a great deal in response to the higher taxes, whereas the government will spend the money fairly quickly on domestic goods and services). However, higher spending and higher taxes would offset each other in the measured fiscal impulse, which would remain unchanged.

**Figure 1**

Estimated fiscal impulse (change in fiscal stance)

The current measure of fiscal impulse suggests that fiscal policy has been relatively tight over the past six years. This has mainly been a consequence of robust tax receipts, which have risen as a share of GDP while government spending has, until recently, been relatively stable as a share of GDP.

The relatively tight measures of fiscal impulse over 2003-2006 have partly reflected stronger-than-expected company tax revenues. In comparison to other fiscal initiatives, these surprises might be expected to have had a relatively limited impact on private sector demand in New Zealand.

The impulse measure suggests fiscal policy shifted to a broadly neutral stance in 2006 but is expected to be significantly expansionary in 2007-2009. The shift to expansionary policy over the 2007 June year reflects an increase in government spending. This is comprised of a range of spending initiatives

<table>
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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Security and Welfare</td>
<td>14,682</td>
<td>15,598</td>
<td>16,970</td>
<td>16%</td>
</tr>
<tr>
<td>Health</td>
<td>8,813</td>
<td>9,547</td>
<td>10,673</td>
<td>21%</td>
</tr>
<tr>
<td>Education</td>
<td>7,930</td>
<td>9,914</td>
<td>9,640</td>
<td>22%</td>
</tr>
<tr>
<td>Transport and Communications</td>
<td>1,635</td>
<td>1,818</td>
<td>2,481</td>
<td>52%</td>
</tr>
<tr>
<td>Total Core</td>
<td>46,234</td>
<td>49,900</td>
<td>53,963</td>
<td>17%</td>
</tr>
<tr>
<td>Memo: Nominal GDP (production basis, RBNZ estimates)</td>
<td>150,600</td>
<td>157,300</td>
<td>164,600</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: Half Yearly Economic and Fiscal Update (HYEFU), December 2006

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15 Tam and Kirkham (2002) report earlier OECD work that suggests an elasticity of around .6 for New Zealand. The OECD average elasticity in that study was 0.5.

16 There are several reasons for this. First, some shareholders in New Zealand firms are overseas residents. Second, the higher tax is to some extent a result of a faster-than-expected using up of accumulated tax losses. The ‘using up’ of historical tax losses was always going to increase corporate tax payments, it just happened surprisingly fast. This tax surprise is temporary and thus probably unlikely to have a huge effect on firms’ investment plans or greatly alter the spending of many shareholders. It is very different to the planned cuts to the statutory company tax rate discussed in section 5.
including increased allocations to Education, Health and Transport, as well as the introduction of the Working for Families package (see table 2).

Core Crown spending (on an accrual, or GAAP basis) is expected to grow at around the same rate as GDP over 2008-2011, but the new spending has generally not yet been allocated to functional areas. Beyond 2007, Core Crown (government) spending is thus expected to remain around 32 percent of GDP. However, the Treasury’s forecasts for actual cash disbursements grow more quickly over 2008-2011. This partly reflects the fact that some spending budgeted for 2007 is expected to actually occur in future years. The stimulatory fiscal impulse in figure 1 uses cash-based forecasts of government spending that reflect this timing.

After 2007, the HYEFU forecasts suggest that revenue will fall slightly as a share of GDP. The fall in revenue is partly cyclical, with a slowing economy reducing the expected company tax take in particular. There is some cyclical adjustment of the impulse measure but, given the unusual behaviour of company tax in the recent cycle, it may not be sufficient to completely remove the cyclical decline in tax revenue from measured fiscal impulse. In any case, there is also a policy element to the revenue reduction, including initiatives such as the business tax review and planned adjustment to personal tax thresholds in 2008.

5 Spending versus taxes: considering the disaggregate effects of fiscal policy changes

In this section, we aim to qualitatively consider how different sorts of spending or tax cuts can lead to quite different macroeconomic results, for a given size of fiscal impulse. Our views are summarised in table 3, which considers (in a stylised way) the potential impact of different fiscal policies on a range of macroeconomic variables. We begin (in the first row) by thinking about the impact on domestic demand. The conceptual framework is based on the multiplier approach described in box 1, but we consider some additional dimensions such as the ones below:

- Does a given fiscal initiative lead directly to a change in output (eg, by increasing government spending)?
- Will there be a private-sector response to that spending (eg, will a government-constructed apartment block cause a private sector alternative to be cancelled)?
- Will increased income from the initiative accrue to individuals with relatively high propensities to save, or tend to accrue to individuals who are likely to spend most of their income?
- Supply-side effects: will the fiscal initiative quickly increase the resources available for production (eg, by encouraging more people into the workforce)?

It is likely that spending on transfer programmes or new government initiatives (columns A, B, and C) will tend to be more stimulatory (dollar for dollar) than personal tax reductions. We also note that tax reductions that directly stimulate savings (column E) might have impacts on aggregate demand that are quite different from the way they alter measured fiscal impulse. Savings incentives are treated as expansionary in a fiscal impulse measure, but may well have a contractionary effect on demand. Finally, corporate tax reductions (column F) are likely to have a relatively large impact on aggregate demand.

In the remainder of this section, we consider very briefly some of these ‘special’ effects that can be caused by certain topical initiatives. These include the potential impact on work incentives of changes to the tax and transfer system, the effect of company tax cuts on investment and the potential effects of savings incentives. This is not an attempt to quantify the impacts of announced Government policy – instead we intend to highlight the issues that need to be considered when assessing the impact of any changes and the associated uncertainties.

Tax, transfers and labour supply

Many fiscal initiatives (such as tax changes and transfer payments) have an effect on the disposable income available to certain consumers. One recent example of such an initiative was the Working for Families package, which increased weekly payments made to eligible families.
## Table 3

Stylised representation of likely effects of fiscal initiatives (spending increases or tax cuts)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect on domestic demand</td>
<td>Immediate strong boost to consumption.</td>
<td>Unless buying imports, immediate increase in demand.</td>
<td>Unless buying imports, immediate increase in demand. If complements private activity (eg, new road), may stimulate private investment. If competes, may contract private investment.</td>
<td>Boosts consumption, but less than transfers, especially if high income tax rates are involved.</td>
<td>In short term, may encourage savings (reduce domestic demand). But uncertain: if it mostly leads to a reallocation of existing savings, could be expansionary.</td>
<td>Likely to stimulate investment significantly, especially in export-oriented industries.</td>
</tr>
<tr>
<td>Potential output</td>
<td>Small. May encourage/discourage labour supply depending on design.</td>
<td>Small in short term. Upgrading of human capital (eg education) may have long-term benefits.</td>
<td>Small in short term. Depends on nature of investment; eg, roading investment may stimulate other productive activity.</td>
<td>Potential to encourage labour supply, but effects generally thought to be small.</td>
<td>Small. Unlikely to affect investment much (since capital market open).</td>
<td>Small in short term (capital stock should increase but less in short term than aggregate demand rises).</td>
</tr>
<tr>
<td>Savings and current account</td>
<td>Current account likely to deteriorate in near term.</td>
<td>Current account likely to deteriorate in near term.</td>
<td>Current account likely to deteriorate in near term.</td>
<td>Current account likely to deteriorate in near term.</td>
<td>Unclear but effects likely to be small.</td>
<td>Current account likely to deteriorate in near term, particularly as investment goods often imported.</td>
</tr>
</tbody>
</table>

Assumptions: Initiative is relatively permanent and perceived as such, is not large enough to alter fiscal credibility, and is introduced fairly abruptly.
By boosting disposable income available to these families, the package could have powerful effects on aggregate demand. The Bank’s own estimates suggest households eligible for Working for Families support are likely to see disposable income gains of around 6 percent on average as a result.

Such policies, however, can also affect supply-side decisions. In particular, declining income tax rates, or transfer schemes that reduce effective marginal tax rates (EMTRs), can increase labour supply by increasing the marginal benefit of an additional hour of work. As payments made in the Working for Families are contingent on a certain amount of hours worked, the initiative could have this effect. An increase in labour supply would increase the supply of productive resources, thereby potentially reducing the ‘excess demand’ pressures associated with this kind of fiscal easing.

In reality, the effect of the Working for Families package on the incentive to work is more complex. The ‘In Work Payments’ that are made to families working for more than 30 hours a week or single parents working more than 20 hours a week will generally create financial incentives to work at least that amount. However, in other cases where one family member is already working full time, the In Work Payment may reduce the incentive for the other to take on employment because the abatement of the In Work Payment reduces the net additional income. Thus, the incentive effects of the initiative are likely to be largest for single parents or individuals who are the sole provider for the family.

The impact of these changes ultimately depends on how responsive a family’s labour supply is to changes in the incentive to work. A priori, there is actually no reason to expect that increases in the incentive to work will increase labour supply. This is because the increase in the incentive to work has opposing effects on labour supply – the ‘income effect’ (people being made wealthier and thus potentially choosing to work less) and ‘substitution effect’ (people getting more cash in the pocket per hour of work and thus potentially choosing to work more) are in conflict. The balance of available evidence suggests that workers are not very responsive in this respect. The net effect of the increase in incentives to work on labour supply tends to be very small and is sometimes even found to be negative (Pencavel, 1986). Female labour supply, however, is generally found to be much more responsive to incentives (Killingsworth and Heckman, 1986). This analysis suggests that the Working for Families initiative is likely to have the largest effect on the labour supply of single, female parents. New Zealand studies of Domestic Purposes Benefit recipients found that decreasing EMTRs significantly increased labour supply.

If labour-supply effects are relatively small, the key effect of tax cuts or increased transfers will still be on aggregate demand. Even holding supply fixed, there is substantial uncertainty surrounding the effects on aggregate demand. However, in general the empirical evidence is consistent with the notion that increases in current disposable income tend to increase consumption (see HM Treasury, 2003). As shown in the table (columns A and C), we assess that tax cuts or increased transfers tend to have a significant stimulatory impact.

**Investment, investment incentives, and company tax**

Recently, the Government has announced a review of the tax treatment of businesses, to be implemented in the 2008 Budget. Various policies have been proposed, but in general the intention of the review is to stimulate investment (often in specific activities such as research and development) by reducing the cost of a marginal unit of capital to firms. If the review had this effect, it could substantially increase

---

17. Furthermore, because labour supply is a decision that depends on the entire future path of wage changes (ideally, individuals would like to work more hours when they are paid more) the immediate effects on labour supply can be small.

18. For example, Wilson (2000) found that DPB recipients increased their labour force participation significantly after benefit changes cut their EMTRs.

19. Initial documentation suggests that the outcome of the review will be small cuts to the corporate tax rate, changes to the tax treatment of depreciation and the introduction of various initiatives designed to reduce compliance costs. The Government is also considering targeted tax relief for investments in research and development, export market penetration and skills development. For more information, see Policy Advice Division of the Inland Revenue Department (2006).
aggregate demand and inflation pressures over the medium term.

This impact of corporate tax policy on investment is usually summarised with reference to how the policy affects the user cost of capital, which measures the total cost to the firm of holding a piece of capital for one period. Money used to buy capital could instead have earned interest, and the capital item will also tend to depreciate (ie, become less productive over the period). The total cost imposed by these various factors depends on the amount of money that firms must set aside to purchase the unit of capital which, in turn, is influenced by tax policy.\(^{20}\) For example, an increase in the amount that firms can deduct from their tax burden for depreciation results in firms requiring a smaller net outlay to purchase capital, reducing the user cost.

For a given change in the user cost, the transmission to investment will ultimately depend on how responsive firms are to changes in the net return to investing. The frequency with which the governments of most industrial countries use various fiscal policies to stimulate investment suggests an implicit belief that firms are quite responsive in this regard. However, substantial uncertainty surrounds the nature of this response, and economists have only recently been able to establish a significant relationship between the user cost and the level of the capital stock. Recent estimates imply that a 1 percent reduction in the user cost increases the level of the capital stock by between 0.5 and 1 percent (Hassett and Hubbard, 2002).

Some indicative calculations suggest that a 10 percent reduction in the overall corporate tax bill (which would cost about 1 billion dollars per annum, the forecast cost of the review) might reduce the user cost by around 2.3 percent, which could in turn increase the capital stock by 1.15 to 2.3 percent. To achieve this new level of the capital stock, investment (as a share of output) must be significantly higher over the medium term, and also somewhat higher over the long run (to cover the increased depreciation of capital assets).\(^ {21}\) Such changes can have substantial effects on long-run production possibilities. However, the increase in investment demand will generally increase inflationary pressure while new capital is built.

An important issue regarding the tax treatment of investment is its effect on the amount of the capital stock owned by foreign firms, which is known as the stock of foreign direct investment (FDI). Tax policy can have large effects on FDI, and FDI is generally thought to be much more responsive to tax policy changes than domestic investment (De Mooij and Everdeen, 2003). However, the inflationary pressures arising from FDI are likely to be smaller, dollar for dollar, than a similar increase in domestic investment. The primary reason for this is that a large proportion of FDI into New Zealand involves foreigners purchasing existing domestic capital rather than building new capital (Boston Consulting Group, 2002). This would involve a transfer of resources from domestic to foreign residents, rather than an increase in aggregate demand.\(^ {22}\) For this reason, we put more weight on the estimates of tax changes on physical investment (which incorporate the FDI involving new capital anyway) rather than the FDI literature.

Besides stimulating investment, corporate tax reductions will increase after-tax profit passing into the hands of shareholders, and this will probably have some stimulatory effect on consumer spending. Overall, corporate taxes are thus likely to have a relatively large multiplier effect on aggregate demand.

\(^ {20}\) There are other channels by which tax policy could influence investment. One prominent one is the so-called 'financial accelerator'. Essentially, tax policy affects the net worth of firms, which in turn influences the amount that firms can borrow. For example, if a firm is credit constrained and then a reduction in tax increases its net worth, then the tax reduction is likely to lead to an increase in available funds, some of which may be invested. This channel is particularly important for small firms.

\(^ {21}\) For example, in FPS a percentage point increase in the desired capital stock, which is certainly within the range of plausible changes that could be induced by the review, would make investment permanently higher, with a peak response over the medium term of six percent.

\(^ {22}\) Given the geographic isolation of New Zealand, this international evidence may overstate the response of inbound FDI to New Zealand to tax policy. Most of the FDI into New Zealand is motivated by proximity to Australasian and/or Asia-Pacific markets (Scott-Kennel, 2006). Many other countries have proximity advantages to the latter markets, and there is only limited capacity for expansion in the Australasian region.
Savings and savings taxation

The Kiwisaver scheme, which will be introduced this year, is a fiscal initiative designed to encourage private savings for retirement. There are various incentives to make contributions to the scheme. One key incentive is that up to 4 percent of income can effectively be shielded from income tax if it is used to make an employer contribution to the employee’s Kiwisaver account.\footnote{To receive a benefit of this size, the employee must effectively be contributing at least 8 percent of their total income to their Kiwisaver account.}

To the extent that these fiscal incentives increase the total stock of domestic savings, rather than just causing consumers to reduce other savings to offset their Kiwisaver contributions, these policies could substantially reduce consumption over the medium term. The question is how much of this saving will be new savings, rather than savings reallocated into the Kiwisaver scheme. For instance, a homeowner may choose to make Kiwisaver contributions but reduce their mortgage repayments by a similar amount (so their net saving has not actually increased).

There has been a fair amount of international research into the effects of fiscal incentives on domestic savings, centred on the US economy. Hubbard and Skinner (1997) describe the literature as showing a wide variation in empirical estimates of the effect of fiscal incentives on saving, but, based on their survey, they argue there is likely to be a moderate effect. Their analysis suggests that something in the order of 2 dollars in extra private saving is stimulated by forgoing one dollar in income tax through savings incentives.

However, there is a high degree of uncertainty about this estimate. Moreover, across countries, the institutional details are likely to be quite different. US savings incentives use tax-deferred savings plans where the investment returns made on funds in the account are also shielded from tax until they are withdrawn from the plan. Households may respond to the Kiwisaver tax preference (which is effectively smaller, but occurs immediately) in a different way. Overall, it seems likely that the fiscal impulse created by savings incentives will have a significantly less stimulatory effect, and could be mildly contractionary.

6 Conclusions

In this article, we have analysed the impact of fiscal policy on the business cycle, and reached a number of conclusions related to this issue:

1. There is evidence that positive fiscal impulses are expansionary, particularly where they do not create fiscal credibility issues and are expected to be sustained. Fiscal multipliers are likely to be around or below 1 for spending changes, and are generally lower for tax policy changes. While fiscal policies can have significant effects on the supply side of the economy, these take long enough that, at the horizons, monetary policy is concerned with this effect will tend to be outweighed by the more immediate demand effects.

2. To some extent, the measured fiscal impulse may have understated the expansionary effects of fiscal policy in recent years because rising spending has probably had more effect (dollar for dollar) than rising taxes (especially in the case of company tax). More generally, the details of fiscal policy initiatives will affect their macro-economic impact.

3. The announced fiscal plans of the Government imply a significant fiscal expansion over the 2007-2009 June years, with spending and transfers increasing over 2007 and tax revenue falling slightly as a share of GDP over the period. Overall, this reduces the Government surplus and causes a substantial measured fiscal impulse.

This analysis suggests that fiscal policy could be a significant source of economic stimulus in the next couple of years. While this could put some upward pressure on interest rates and the exchange rate, whether these injections prove to be assistance or a difficulty for monetary policy will depend on how other driving forces for the business cycle (like the terms of trade) evolve. There is value in continuing to take the business cycle into account when considering substantial fiscal initiatives.
References
New Zealand’s productivity performance and prospects
Aaron Drew

New Zealand’s medium-to-longer-run growth prospects and general standard of living critically depend upon its labour productivity performance. Relative to most OECD countries, the level of labour productivity in New Zealand is low and, when measured as GDP per worker, the historic growth performance has also been relatively poor. The apparently poor performance is a key concern for policymakers and has attracted much research attention. The focus has been to understand why performance has not been better, given that cross-country indicators of New Zealand’s economic environment broadly suggest New Zealand should be amongst the highest performers, not a laggard. In this article, the research is synthesised and recent official productivity data released by Statistics New Zealand (SNZ) is analysed. A key conclusion is that the historic productivity performance has in fact been significantly better than is suggested by looking at the aggregate measures of productivity in isolation, and there is some cause for optimism that this will continue.

1 Introduction
As in many OECD countries, fiscal and monetary policies in New Zealand are cast within medium-term frameworks that oblige policymakers to consider how current and projected policy settings will impact on medium-term goals. One of the key considerations in this regard is the assessment of New Zealand’s underlying supply capacity, often called trend or potential output. At the Reserve Bank of New Zealand, the difference between actual output and potential output — the output gap — is a key input into the Reserve Bank’s forecasts, given its empirical linkage to inflation. In the New Zealand Treasury, the view taken on trend output underpins the extent to which fiscal expenditure and revenue programmes are assessed as consistent with medium-to-longer-term fiscal sustainability goals.

Trend or potential output is often estimated as the sum of two forces — the accumulation of inputs (principally, labour and capital) and the underlying efficiency of how those inputs are being employed in producing goods and services. Most estimates suggest that New Zealand has enjoyed a pick-up in trend output over the last decade or so, consistent with a notable improvement in actual GDP growth. The improved growth performance has been accompanied by very solid employment growth, sourced from both increases in the working-age population and increased employment rates. However, measures of productivity growth for the economy as a whole have tended to fall well below average rates for the OECD group of countries, and offer only a modest improvement over the longer-term historical experience.

Examining New Zealand’s labour productivity performance has been a rich area of investigation by both domestic and international researchers. All measures of productivity suggest there is a large gap between the level of labour productivity in New Zealand and that of upper-income OECD countries. It has been a challenge to explain why New Zealand’s productivity growth rate has been so low, given open capital market, and the widespread agreement that macro and structural policy settings should be conducive to, if anything, above-average productivity performances, thereby reducing the productivity levels gap. Notably, New Zealand’s closest neighbour, Australia, has seen a marked improvement and internationally superior productivity performance over the last decade or so, following a roughly similar set of reforms and a roughly similar period of labour market deepening (albeit from a much less depressed starting point). Moreover, New Zealand’s economy is deeply

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1 This article draws upon a paper prepared for the “Perspectives on Potential Output and Productivity Growth” workshop hosted by the Bank of Canada and Banque du France. The workshop was held at Enghien-Le-Bains, Paris, April 24-25, 2005.

2 Formally, the linkage is known as a “Phillip’s curve”, named after the New Zealand economist, Bill Phillips, who first demonstrated the relationship in 1958. A recent Bulletin article by Hargreaves et al. (2006) describes how a Phillips curve is used to model inflation in the Reserve Bank’s core macro model.

3 For example, see The Treasury (2006).

4 For example, see OECD (2005a).
integrated with that of Australia, most obviously with many well-known firms operating at the trans-Tasman level.

The sub-par total economy productivity growth performance has also been a key concern for policymakers, as, over the medium-to-longer-term, labour productivity growth is usually seen as the key determinant of raising living standards. And, over the short-to-medium run, lifting New Zealand’s labour productivity performance would seem to offer the best means for relieving inflation pressure in the economy, at least from a ‘supply-side’ perspective. In contrast, the scope for boosting supply capacities through further increases in employment rates would appear more limited, with participation rates at record levels (and near the highest in the OECD) and unemployment rates also at comparatively low levels.

The Reserve Bank, along with other policy agencies, does indeed project a significant pick-up in trend labour productivity growth rates, to levels that might seem optimistic relative to New Zealand’s recent history. In the following section, these estimates are examined along with a brief discussion of New Zealand’s historic growth performance. In section 3, the literature on New Zealand productivity is reviewed with the aim of assessing whether the projected productivity pick-up is at least plausible. Finally, section 4 offers conclusions from the literature and identifies where gaps and uncertainties still remain.

2 Overview of New Zealand’s growth trends

Historical overview

GDP growth in New Zealand has outpaced OECD average levels over much of the past decade (table 1). This pick-up is a marked improvement over the experience of the 1970s and 1980s, and while GDP growth measured on a per-capita basis has not been quite as impressive, it has at least been sufficient to arrest a long-term trend decline in New Zealand’s relative international living standards (figure 1).

Nevertheless, New Zealand’s present GDP per-capita level still lags OECD average levels by around 15 percent, Australian levels by around 20 percent, and US levels by around 40 percent.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Economic growth over the last 20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average annual percent change</strong></td>
<td><strong>New Zealand</strong></td>
</tr>
<tr>
<td><strong>Period</strong></td>
<td></td>
</tr>
<tr>
<td>1985-1995</td>
<td>1.8</td>
</tr>
<tr>
<td>1995-2005</td>
<td>3.3</td>
</tr>
<tr>
<td>2001-2005</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Source:</strong> OECD, Statistics New Zealand.</td>
<td></td>
</tr>
</tbody>
</table>

5 Reserve Bank estimates of the output gap have been positive for some time (see RBNZ 2006), implying positive inflation pressure. Relieving this inflation pressure requires that the rate of GDP growth in the economy is slowed to sub-potential growth rates. Over recent years, the Reserve Bank has been working to relieve inflation pressure from the ‘demand side’ by applying a restrictive monetary policy stance. Boosting the economy’s relative supply capacities may also significantly assist monetary policy in this task, although generally it is thought that such relief occurs fairly gradually.

6 The usual caveats regarding the usage of GDP per capita as a proxy for living standards apply. One caveat that is particularly relevant for New Zealand is that with the second-highest level of net foreign debt-to-GDP ratio to service in the OECD, domestic per-capita income levels lags behind per-capita production levels by around 8 percent of GDP. As the focus of this paper concerns potential output and productivity trends, the impact of this (and other factors) on welfare, such as New Zealanders’ access to relatively uncrowded beaches and forests, are not considered.
A useful starting point for analysing the gap in GDP per capita between New Zealand and the OECD is to break it down into the contributions from labour utilisation and labour productivity. This and other common growth decompositions seen in the productivity literature are described in box 1. The GDP per-capita break-down reveals relatively high labour utilisation rates compared to the OECD average and most countries, and relatively low labour productivity levels, especially relative to the upper-income-earning countries (figure 2).

Figure 1
New Zealand’s per-capita GDP performance 1970-2005

Source: OECD Factbook 2006. GDP per capita adjusted for purchasing-power parities. OECD figures exclude The Czech Republic, Hungary, Poland and The Slovak Republic.

Figure 2
Differentials in GDP per capita and their decomposition, 2004†
Percentage point differences in PPP-based GDP per capita with respect to the OECD

† Based on total hours worked per capita. OECD figures exclude The Czech Republic, Hungary, Poland and The Slovak Republic.
The high labour utilisation rates currently seen in New Zealand reflect over a decade of improvements in employment rates, to the point where New Zealand now has one of the lowest unemployment rates in the OECD and a participation rate that is also fairly high (table 3). If we regard the highest employment rate in the OECD (Switzerland) as a ‘natural limit’, New Zealand may be able to achieve further small increases in relative per-capita incomes through boosting employment rates further. It is clear, however, that the more substantive gains are to be had from lifting labour productivity growth to rates higher than that observed in the advanced OECD economies.\(^7\)

Unfortunately, the historical data does not appear to offer much support for New Zealand lifting its relative living standard via high labour productivity growth (table 2). Over the 15-year period from 1991-2005, labour input growth averaged 1.8 percent per annum, while labour productivity growth, measured as GDP per worker, averaged only 1.1 percent per annum. This labour productivity outcome represents an improvement over the previous 10 years (1985-1995), when growth averaged only around 0.7 percent. However, it still falls considerably short of long-term average OECD labour productivity growth rates of roughly 1.6 percent per annum. In addition, the more recent data (2005-2006) suggests that labour productivity growth in New Zealand has fallen further off the pace, while in the productivity leader, the US, a marked acceleration has occurred.

### Table 2

**New Zealand and OECD output, employment, and productivity growth**

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP</th>
<th>Labour Productivity</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991-1995</td>
<td>2.2</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td>1996-2000</td>
<td>2.9</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>2001-2005</td>
<td>3.4</td>
<td>0.8</td>
<td>2.6</td>
</tr>
<tr>
<td>Average</td>
<td>2.9</td>
<td>1.1</td>
<td>1.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OECD Total</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-1995</td>
<td>2.9</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
<td>1996-2000</td>
<td>3.3</td>
<td>1.8</td>
<td>1.5</td>
</tr>
<tr>
<td>2001-2005</td>
<td>2.1</td>
<td>1.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Average</td>
<td>2.8</td>
<td>1.6</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: OECD, *Economic Outlook* No. 80.
Labour productivity measured on a total economy basis.

\(^7\) The only plausible alternative to significantly lifting New Zealand’s relative living standards would be an ongoing improvement in the terms of trade. This has certainly occurred in New Zealand’s history; for example, during the 1950s New Zealand’s relative per-capita incomes expanded on the back of booming wool prices. And today, New Zealand is also enjoying relatively high commodity prices (particularly for dairy products) and relatively low prices for many imported goods as lower-cost production expands in the Asian region. However, history has also shown that commodity price booms tend to be followed by busts as supply capacities eventually adjust. That being so, improving labour productivity levels would seem the more certain and enduring route to lifting per-capita incomes. See Borkin (2006) for further discussion on New Zealand’s terms of trade.
Table 3
Employment, participation, and unemployment rates in selected OECD countries, 2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Unemployment rates*</th>
<th>Employment rates†</th>
<th>Participation rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>5.1</td>
<td>73.2</td>
<td>77.1</td>
</tr>
<tr>
<td>Denmark</td>
<td>4.8</td>
<td>77.1</td>
<td>81.0</td>
</tr>
<tr>
<td>Germany</td>
<td>9.5</td>
<td>71.1</td>
<td>78.2</td>
</tr>
<tr>
<td>Japan</td>
<td>4.4</td>
<td>74.6</td>
<td>78.0</td>
</tr>
<tr>
<td>Korea</td>
<td>3.7</td>
<td>65.9</td>
<td>68.5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.8</td>
<td>74.0</td>
<td>77.9</td>
</tr>
<tr>
<td>New Zealand</td>
<td>3.7</td>
<td>76.2</td>
<td>79.1</td>
</tr>
<tr>
<td>Norway</td>
<td>4.6</td>
<td>75.4</td>
<td>79.1</td>
</tr>
<tr>
<td>Switzerland</td>
<td>4.5</td>
<td>82.6</td>
<td>86.3</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>4.8</td>
<td>72.3</td>
<td>76.0</td>
</tr>
<tr>
<td>United States</td>
<td>5.1</td>
<td>71.2</td>
<td>75.1</td>
</tr>
</tbody>
</table>

OECD total    6.6          66.5          71.1

* Standardised civilian unemployment rates.
† Participation in the workforce of 15 to 64 year olds.
Source: OECD.

Box 1
Common economic growth decompositions and terminology

Output or GDP in per-capita terms is simply calculated as GDP divided by the population. Labour productivity measures the efficiency with which labour is employed in producing output. It is often the starting point for analysing GDP per capita, making use of the identity:

\[
\text{GDP/population} = \text{GDP/employment} \times \text{employment/population}
\]

Or alternatively:

\[
\text{GDP/population} = \text{GDP/hours worked} \times \text{hours worked/population}
\]

The first term on the right-hand side of equations 1 and 2 are alternative measures of labour productivity, commonly referred to as output per worker and output per hours worked respectively. The second terms are corresponding measures of labour utilisation. In cross-country comparisons, this distinction can be quite important. For example, labour productivity per hours worked in many European countries is relatively high, while labour productivity per worker tends to be somewhat lower. In the case of New Zealand, however, the distinction makes little difference – labour utilisation rates on both measures are relatively high, while productivity levels are relatively low.

Labour productivity can be further decomposed into improvements in the efficiency of its use via changes in the amount of capital available per worker and improvements in efficiency via the application of improved technologies or organisational processes (the latter is sometimes called labour-augmenting technological progress). This decomposition is calculated by assuming a production function of some form for the economy. For example, in the case of the Reserve Bank’s core macro model, FPS, the functional form is Cobb-Douglas. In log terms, this form implies GDP can be expressed as:

\[
y = \text{mfp} + S_L l + S_K k
\]

where \(y\) is a measure of output, \(\text{mfp}\) is multi-factor productivity (MFP), the combined efficiency with which labour and capital are employed in producing output; \(l\) is a measure of the labour input; \(k\) is a measure of the capital stock and \(S_L\) and \(S_K\) are labour and capital’s share of value added (or output) respectively.

(continued on p24)
By rearranging equation 3 and noting that \( S_L + S_k = 1 \), it can be shown that:

\[
\Delta (y/l) = \Delta mfp + S_k \Delta (k/l)
\]

where \( \Delta \) denotes the change in any of the variables in (4) over some set period of time.

That is, the change in labour productivity can be decomposed into changes in MFP and changes in the capital-to-labour labour ratio. When the latter is increasing, the economy is said to be experiencing capital deepening.

Note that, in practice, MFP cannot be observed; it can only be calculated residually given estimates of the capital stock, the labour input and output itself. As discussed in section 3, these estimates can vary widely depending on the functional form used (especially if increasing returns to scale are permitted), the coverage of output and the conceptual basis for measuring the labour and capital inputs.

**Reserve Bank estimates of trend output and productivity**

As is common in most international agencies, projections for potential output at the Reserve Bank of New Zealand are constructed using a ‘production function approach’, as outlined in box 1. This approach affords a decomposition of growth into factor inputs (capital and labour) and efficiency measures (both labour productivity and multi-factor productivity, which captures the combined efficiency with which labour and capital are employed in producing output). Historic and projected trend estimates of the factor inputs and efficiency measures are seen in figure 3. A marked slowdown in trend employment growth is seen, consistent with a view that labour absorption limits may be approaching. In contrast, trend labour productivity growth rates pick up substantially, heading towards OECD average levels at the end of the projection period.

**Figure 3**

*RBNZ estimates of key supply-side trends*

![Graphs showing employment growth, labour productivity growth, capital-to-labour ratio, and total factor productivity growth over time.](image)


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Over history, a multivariate filter approach described in Conway and Hunt (1997) is employed to estimate potential output.
The pick-up in trend labour productivity might be seen as optimistic in light of the historical data presented above however, most of the pick-up reflects a view that firms will meet demand by favouring capital over labour accumulation in the projection period (ie, capital deepening). Trend MFP only shows a fairly modest pick-up from current levels to levels that it is estimated were achieved in the mid-1990s. Hence the Bank’s projections could also be seen as a continuation of existing trends, which suggest that the capital-to-labour ratio has been rising since the mid-1990s. This is a qualitatively similar outlook to recent projections of the New Zealand Treasury and the OECD.

4 Review of the recent literature

Research on New Zealand’s growth experience suggests there is broad agreement on several aspects. Namely, that per-capita GDP growth has improved over the 1990s but, in level terms, there is still a large gap with average OECD income levels and this gap can be ‘explained’ (in an accounting sense) by relatively poor labour productivity levels. There is less agreement, however, on the exact decomposition of labour productivity into its sources, given specification and measurement issues that plague such exercises, and whether recent performances are consistent with productivity levels catching up or not. In line with the international literature, identifying the determinants of labour productivity is also a contentious issue.

Measurement of productivity

Recent papers that consider the level of New Zealand labour productivity and a basic decomposition into the contributions from MFP and changes in the capital-to-labour ratio include: IMF (2004), Bollard (2005), Hall and Scobie (2005), Ministry of Economic Development and The Treasury (2005), and Schreyer (2005). As a whole, the results paint a picture that suggests New Zealand has both a relatively low level of capital per unit of labour and a low level of MFP. However, there are some significant differences in the results across these studies, principally reflecting a difference in the measurement of capital stocks, and to a lesser extent, employment inputs. There are also several papers that focus more on the growth of New Zealand’s labour productivity and the contributions from MFP and additions to the capital stock. Drawing from index number techniques in Diewert and Lawrence (1999), a study by Black, Guy, and McLellan (2003) estimates that MFP growth in the economy has been fairly good over recent years, largely matching Australia’s between 1998 and 2002. However, growth in the capital-to-labour ratio has lagged. If we take the view that the lagging performance of the capital-to-labour ratio is simply the mirror image of an impressive employment growth performance, then it follows we should not expect an ongoing drag on labour productivity growth from this source as labour market deepening runs its course. However, other evidence points to a slightly different conclusion. Using a production function approach, the OECD (2005b) estimates that New Zealand’s trend MFP growth rate increased over the period 1980-2000, but that this still remains in the lower quartile of OECD countries and significantly lags Australia’s performance. Consistent with Black et al., OECD figures also suggest capital accumulation has lagged.

At face value, the difference between the OECD (2005b) and Black et al. (2003) figures has stark implications – the former suggests New Zealand faces an uphill battle lifting living standards to OECD levels, while the latter suggests the process is under way. Part of the reconciliation of these differences concerns measurement of ‘the economy’. In both cases, effort is made to exclude non-market activities, as productivity growth in this sector is usually not captured (inputs largely equal outputs). However, the Black et al. approach probably goes further in this regard, implying

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9 This assessment is based on Reserve Bank estimates of the net capital stock in ‘market sectors’ of the economy. A similar pick-up in the capital-to-labour ratio is seen in estimates by Hall and Scobie (2005) and in official SNZ data.

10 See OECD (2006a) and The Treasury (2006).


12 For example, capital stocks are often distinguished by whether they are measured on a total economy or some measure that excludes non-market activities, whether they are gross or net measures, and whether they have been estimated using perpetual inventory (or other) methods, or instead, are survey measures from national statistical agencies.

13 Qualitatively similar results are seen in the total economy measures produced by the OECD.
productivity growth should be measured at a higher level than the OECD figures.\textsuperscript{14}

A recent set of data released by SNZ highlights the above point.\textsuperscript{15} Updating the Black \textit{et al.} approach, SNZ provides official estimates of labour and MFP productivity growth in the ‘measured sector’, consisting of industries where estimates of inputs and outputs are independently arrived at, measured in constant prices. This is a narrower definition of the economy than Black \textit{et al.} consider,\textsuperscript{14} excluding, for example, some business services. To provide a snapshot of the effects of changing economic definitions, table 4 reports labour productivity and MFP growth on measures of the economy that are increasing in the incorporation of services and the public sector as we read across the columns from left to right.

The table shows that productivity growth is lower in the total economy than in narrower measures of the market sector, particularly when services are excluded. This is also the experience of other OECD countries, given similar treatments of services and/or the non-market sector. That being so, in order to assess the figures above, we need to compare with similar measures in other OECD countries. Unfortunately, such data are not widely available. However, a broadly similar measure is reported by the Australian Bureau of Statistics (table 5). This data suggests that New Zealand’s labour productivity and MFP growth performance has, in fact, outpaced Australia’s in these sectors, although the average output growth rate in the measured sector has been around 0.5 percentage points lower. The data also shows that capital accumulation has been lower in New Zealand (in absolute terms and relative to growth in labour inputs).

\textbf{Table 4}

\textbf{Alternative growth accounting measures}

\textbf{Average annual percent change}

\begin{center}
\begin{tabular}{|c|c|c|c|c|}
\hline
 & SNZ & Black \textit{et al.} & OECD & Total economy
 & \textit{‘Measured sectors’} & \textit{‘Market sectors’} & \textit{‘Business sectors’} & OECD official put measures \\
\hline
Output & 2.8 & 2.6 & 2.7 & 2.6 \\
Labour inputs & 0.2 & 0.5 & 1.4 & 1.2* \\
Capital inputs & 2.5 & 1.9 & 2.7 & 3.6 \\
Labour productivity & 2.6 & 2.1 & 1.3 & 1.4 \\
Multi-factor productivity & 1.8 & 1.4 & 1.3 & 0.5 \\
\hline
\end{tabular}
\end{center}

Source: Statistics New Zealand, Black \textit{et al}. (2003), OECD.

* 1988-2004

\textsuperscript{14} In Black \textit{et al}. (2003), measures of the market sector are constructed from disaggregated industry data. Their measures exclude central government administration and defences, local government services, and ownership of owner-occupied dwellings. In contrast, the OECD figures are constructed as the difference between total economy measures of output, employment, hours and investment and their government counterparts. As such, this definition excludes industries that are government owned but compete in the market place (mainly utilities), but includes residential investment.

\textsuperscript{15} The data release is available at: http://www2.stats.govt.nz/domino/external/pasfull/pasfull.nsf/7ef46ae26dc6800ce256a62000a2248/4e2567e002476ace25713e000ah7533OpenDocument

\textsuperscript{16} Accounting for approximately 65 percent of total GDP, sectors excluded are: government administration, defence, education, health, personal and other services, and property and business services.
Table 5
Growth in the measured sector: New Zealand versus Australia
Average annual percent change (1988-2005)

<table>
<thead>
<tr>
<th></th>
<th>New Zealand</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured sector output</td>
<td>2.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Labour inputs</td>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Capital inputs</td>
<td>2.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Labour productivity</td>
<td>2.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Capital productivity</td>
<td>0.3</td>
<td>-0.4</td>
</tr>
<tr>
<td>Multi-factor productivity</td>
<td>1.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Capital-to-labour ratio</td>
<td>2.3</td>
<td>2.7</td>
</tr>
</tbody>
</table>


Through the lens of the SNZ split of the economy into the ‘measured’ and ‘difficult-to-measure’ sectors, three factors can be offered to explain why New Zealand’s aggregate (i.e., total economy) labour productivity growth performance has lagged Australia’s:

1. Relative to Australia, growth in New Zealand has been more concentrated in the difficult-to-measure sectors wherein the recorded (if not actual) productivity gains tend to be lower, given the difficulty of adequately measuring inputs and outputs independently.

2. Relative to Australia, aggregate productivity growth in New Zealand is biased downwards because the Australian statistics better capture productivity gains in the difficult-to-measure sectors.\(^{17}\) In table 6 below, this calculation is seen for New Zealand and Australia. It shows that, on average, productivity growth in the non-measured sector (NMS) in New Zealand has been negative at around minus 1.5 percent per annum (and negative in most years) while the rate in Australia has been positive at around 0.7 percent. This discrepancy is very large and suggests that there may well be significant bias in the difficult-to-measure sector – at a minimum, if outputs were measured as inputs, we would expect the productivity residual to average around zero.

3. Alternatively, New Zealand’s (unobserved) productivity growth rate in the difficult-to-measure sector is genuinely lower than what Australia is able to achieve.

At the present time, it is not possible to definitively address all of these possibilities, given data limitations.\(^{18}\) However, in line with the first factor, growth in the measured sector in New Zealand has broadly matched growth in the total economy over the past 10 years, while in Australia growth in the measured sector has outpaced growth in the total economy. Second, previous work by Diewert and Lawrence (1999) suggests that at least some of the difference may be due to the Australian data better capturing productivity gains in difficult-to-measure in areas such as business services.

A rough indication of the empirical significance of these aspects can be had from calculating productivity in the difficult-to-measure sector as a residual between total economy productivity and productivity in the measured sector.\(^{19}\) In table 6 below, this calculation is seen for New Zealand and Australia. It shows that, on average, productivity growth in the non-measured sector (NMS) in New Zealand has been negative at around minus 1.5 percent per annum (and negative in most years) while the rate in Australia has been positive at around 0.7 percent. This discrepancy is very large and suggests that there may well be significant bias in the difficult-to-measure sector – at a minimum, if outputs were measured as inputs, we would expect the productivity residual to average around zero.

In summary, research on the measurement of productivity trends in New Zealand is fairly unequivocal that a large gap exists with Australia and upper-income OECD countries, but that MFP growth has picked up over the last decade. There is less agreement, however, on whether the growth pick-up is sufficient to return New Zealand towards average OECD income levels, given differences between measurement of the economy and factor inputs. Recent data released by SNZ suggests that the catch-up hypothesis is plausible. However,

\(^{17}\) This would also imply that GDP levels are biased downwards.

\(^{18}\) Ongoing work in SNZ on estimating productivity in the harder-to-measure sectors in a way that is broadly consistent with the the ABS approach will be informative once complete.

\(^{19}\) We should not expect the residual to be a good indicator of productivity in the non-measured sector in any single year, given differences in measures of labour inputs and possible compositional shifts between and within the sectors. However, over longer periods of time, the average growth rate in the residual should be more informative.
the data suggests that capital accumulation has not been at the pace of that observed in other OECD countries. The latter issue is explored further below.

Determinants of productivity

There has been a huge literature on the ultimate drivers of productivity, the ‘usual suspects’ including various measures of: institutions, openness, knowledge and innovation, infrastructure, and geographic features such as population densities. A recent survey of this literature and its applications to New Zealand is seen in The Treasury (2004). As Davis and Ewing (2005) note, there appear to be at least four strands of thought regarding why New Zealand’s labour productivity lags OECD country levels:

1. The general quality of policies and institutions.
2. Country-specific features of New Zealand.
3. ‘Impediments’ to physical capital accumulation in New Zealand.
4. Labour absorption dynamics.

These are briefly discussed in turn.

### General quality of policies and institutions

There is a substantial international literature that attempts to explain productivity differences across countries in terms of policy differences (see Easterly, 2001, for a broad perspective). Much of the literature tends to define ‘policies’ as broad macroeconomic and institutional frameworks (particularly legal and regulatory systems) and has focused on the effects of different institutional settings between industrialised and developing countries. At this broad level, the New Zealand experience supports the hypothesis that institutions matter - productivity levels are high relative to developing countries, consistent with institutional settings that are also relatively good.

A smaller body of work has focused more on explaining differences between developed (mainly OECD) countries, potentially a greater challenge, given institutions and economic outcomes are much more homogenous. Notably, a series of OECD papers establish the empirical linkage that even within this group, policy settings help explain outcomes such as productivity differences, capital accumulation, trade and FDI openness, and employment rates (see Nicoletti and

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**Table 6**

Proxy of productivity growth in the difficult-to-measure sector: New Zealand versus Australia

<table>
<thead>
<tr>
<th></th>
<th>New Zealand</th>
<th></th>
<th></th>
<th>Australia</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Market</td>
<td>Residual</td>
<td>Total</td>
<td>Market</td>
<td>Residual</td>
</tr>
<tr>
<td></td>
<td>economy</td>
<td>sector</td>
<td>NMS proxy</td>
<td>economy</td>
<td>sector</td>
<td>NMS proxy</td>
</tr>
<tr>
<td>1991</td>
<td>-0.1</td>
<td>2.5</td>
<td>-4.9</td>
<td>1.1</td>
<td>1.7</td>
<td>-0.1</td>
</tr>
<tr>
<td>1992</td>
<td>0.4</td>
<td>1.9</td>
<td>-2.4</td>
<td>3</td>
<td>3.2</td>
<td>2.6</td>
</tr>
<tr>
<td>1993</td>
<td>3.1</td>
<td>1.8</td>
<td>5.5</td>
<td>3.5</td>
<td>2.3</td>
<td>5.8</td>
</tr>
<tr>
<td>1994</td>
<td>1.5</td>
<td>5.2</td>
<td>-5.4</td>
<td>1.9</td>
<td>2.2</td>
<td>1.3</td>
</tr>
<tr>
<td>1995</td>
<td>-0.2</td>
<td>1.9</td>
<td>-4.1</td>
<td>-0.3</td>
<td>0.9</td>
<td>-2.5</td>
</tr>
<tr>
<td>1996</td>
<td>0.7</td>
<td>1.6</td>
<td>-1.0</td>
<td>2.7</td>
<td>3.9</td>
<td>0.5</td>
</tr>
<tr>
<td>1997</td>
<td>1.5</td>
<td>3.0</td>
<td>-1.3</td>
<td>2.9</td>
<td>3.2</td>
<td>2.4</td>
</tr>
<tr>
<td>1998</td>
<td>0.4</td>
<td>3.1</td>
<td>-4.6</td>
<td>3.4</td>
<td>4.2</td>
<td>1.9</td>
</tr>
<tr>
<td>1999</td>
<td>2.8</td>
<td>0.5</td>
<td>7.1</td>
<td>2.7</td>
<td>3.7</td>
<td>0.8</td>
</tr>
<tr>
<td>2000</td>
<td>1.6</td>
<td>6.5</td>
<td>-7.5</td>
<td>0.7</td>
<td>1.2</td>
<td>-0.2</td>
</tr>
<tr>
<td>2001</td>
<td>0.4</td>
<td>0.7</td>
<td>-0.2</td>
<td>1.1</td>
<td>0.5</td>
<td>2.1</td>
</tr>
<tr>
<td>2002</td>
<td>1.8</td>
<td>1.2</td>
<td>2.9</td>
<td>1.9</td>
<td>3.7</td>
<td>-1.5</td>
</tr>
<tr>
<td>2003</td>
<td>1.4</td>
<td>2.0</td>
<td>0.3</td>
<td>1.1</td>
<td>2.5</td>
<td>-1.5</td>
</tr>
<tr>
<td>2004</td>
<td>1</td>
<td>1.7</td>
<td>-0.3</td>
<td>1.3</td>
<td>3.1</td>
<td>-2.0</td>
</tr>
<tr>
<td>2005</td>
<td>-0.5</td>
<td>1.9</td>
<td>-5.0</td>
<td>-0.3</td>
<td>-1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Average</td>
<td>1.1</td>
<td>2.4</td>
<td>-1.4</td>
<td>1.8</td>
<td>2.3</td>
<td>0.7</td>
</tr>
</tbody>
</table>
Scarpa 2005a and 2005b for a recent review). At this level, New Zealand's productivity performance is more of a puzzle. Institutions and policies for New Zealand tend to be assessed very favourably within the OECD group. With such settings, and New Zealand's relatively low level of MFP, cross-country panel data regression results suggest that New Zealand should experience above average MFP growth rates.

The assessment that institutional settings are favourable in New Zealand yet MFP growth has not performed as well as might be expected, at least on a total economy basis, has led most to a focus on other factors that may explain New Zealand's productivity gap (for example, Skilling and Bowen (2005), Davis and Ewing (2005)). Of course, there may be certain small but important policies that contribute substantially to the gap; indeed, each of the other “strands of thought” outlined below also have policy dimensions.

**Country specific features**

A popular argument for explaining at least part of New Zealand's productivity gap is that the productivity of New Zealand firms is dampened by the relatively small scale of domestic markets and poor access to international markets, due to distance, trade barriers and transaction costs (for example, see Skilling (2001), IMF (2004), Skilling and Bowen 2005). Diewert (2004) makes a related argument that increasing scale is very important for boosting New Zealand's MFP. Recent research by Law, et al (2006), and Maré and Timmins (2000), using New Zealand firm-level data, lend tentative support to increasing returns to scale effects.

Moreover, Battersby (2006) estimates that roughly half of the productivity levels gap between Australian States and states of the US is due to proximity and size effects. This suggests that distance and/or size may also be quite important for New Zealand. However, the hypothesis is yet, to our knowledge, to be exhaustively tested within a standard panel regression framework for New Zealand, controlling for other factors. Instead, proponents of the scale and distance argument tend to appeal to the gravity trade model literature, then use the empirical linkages between trade openness and growth to argue New Zealand must be detrimentally affected by its location and small economic size.

Critics of the distance and scale factor arguments point out that from a longer-term perspective, New Zealand's per capita incomes were amongst the highest in the OECD in the mid 20th Century, at a time when population levels were only around half of the current size and urbanisation rates were much less than today, implying less scope for agglomeration forces. In addition, traditional “distance effects” may have become less onerous over time. First, there has been a secular decline in all transport costs over the last few decades, particularly shipping and airfreight costs. Second, trade with the United Kingdom and Europe has declined markedly over the past few decades, towards trading partners are geographically closer (principally Australia, Asia and the United States). Finally, as Leeper (2006) notes, both New Zealand and Australia are long-standing “outliers” from an economic geography perspective – productivity, trade and income levels are all much higher than what would be expected given the distance from world markets and relatively small population sizes.

An alternative viewpoint is that New Zealand's sectoral-specific production structure is an important determinant of the aggregate productivity outcomes. Sectoral comparisons reveal a relatively large (but stable) agricultural sector in New Zealand, and a relatively small manufacturing sector that, common to many OECD economies, has been declining as the services sector has rapidly expanded as a share of

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20 OECD indicators of “burdensome” product, labour and financial market regulations tend to place New Zealand, along with Australia, in a group of countries that have the least onerous regulatory stances (Conway et al, 2005, OECD 2006b). In addition, more “mixed” indicators of policies and performance, such as The World Economic Forum's global competitiveness measures, consistently places New Zealand amongst the 20 most competitive nations.

21 The studies find a positive association between labour productivity and labour inputs. This may reflect increasing returns to scale. However, to be more certain, other factors (notably capital) would need to be controlled for. A related literature uses the micro-data to study firm “creation and destruction”. This suggests there are no obvious impediments to a good productivity performance at the firm level (see Law and McLennan (2005) and MacMillan (2004)).

22 It could be argued that the shift in trading patterns was partly due to increasing distance effects. However, it is clear that the “centre of gravity” is shifting towards New Zealand given the ongoing growth out-performance of the US, Australia and especially the Asian region relative to Europe.
total output. Across OECD countries, manufacturing tends to be associated with relatively high productivity growth rates, particularly in the ICT sector over recent times.\textsuperscript{23} Productivity levels in New Zealand’s agricultural sector are at or near the best in the OECD, as might be expected given our comparative advantage in the sector and the fact that protection rates in agriculture are quite low relative to those seen in most industrialised economies (excepting Australia).\textsuperscript{24} In this sense New Zealand’s relatively large agricultural base cannot be considered as a “drag” on absolute productive performances. However, being near the frontier presents a challenge for future productivity expansion given that further gains from this position may be harder to achieve.\textsuperscript{25}

\textbf{“Impediments” to capital accumulation}

The fact that labour market absorption has been so strong in New Zealand over the past decade, while New Zealand’s capital stock per-worker remains low (albeit increasing over recent years), has prompted the question of whether New Zealand suffers from impediments to capital accumulation. Hall and Scobie (2005) examine the possibility that New Zealand suffers from impediments to capital accumulation that suppress its capital-to-labour ratio. The analysis is based on a simple model that allows for countries to have different levels of MFP and capital per unit of labour in equilibrium; the return to capital is equalised across countries unless some impediment (for example, capital taxation policy) drives a wedge. The authors find some evidence of an elevated return to capital in New Zealand compared to Australia and OECD countries, suggesting New Zealand suffers from some kind of impediment (ie, under perfect capital mobility the elevated return would have been eliminated as marginal products are equalised). However, the authors also find that New Zealand’s price of labour relative to capital has historically been low, indicating it has been cheaper on the margin for New Zealand firms to expand production through hiring labour. Given that the relative price of labour can not decline indefinitely, they estimate substitution elasticities at the aggregate and disaggregated level to examine whether the capital-to-labour mix in New Zealand (and Australia) is responsive to changes in relative prices. Results suggest substitution effects in New Zealand fall within the range of international studies,\textsuperscript{26} although the responsiveness of Australian firms appears much higher.

Overall, the results of the Hall and Scobie study suggest that the labour market outcomes in New Zealand has been a rational response to relative price signals, and when these signals change New Zealand firms should start accumulating capital at a faster pace, all else equal raising labour productivity levels. As discussed in section 2, this view has been explicitly built into the Reserve Bank’s recent projections.

\textbf{Labour-absorption dynamics}

A few recent commentators on New Zealand’s productivity performance suggest that New Zealand’s labour productivity has been held back by the rapid increase in labour input, based on the premise that new workers drawn into the labour force tend to be less efficient than those previously employed (Parham and Roberts 2004), Davis and Ewing (2005) and IMF 2005).\textsuperscript{27} On the other hand, Skilling and Boven (2005) note that several OECD countries (Ireland, Australia and Luxembourg) achieved both above average OECD level employment and productivity growth over the last decade and question the importance of a short run trade-off between employment growth and labour productivity growth.

\textsuperscript{23} See Scarpetta \textit{et al.} (2001) and Pilat \textit{et al.} (2002). The role of ICT in explaining productivity growth has been the subject of some debate, with recent analysis suggesting that while ICT production industries are associated with rapid productivity gains, actual ICT usage in an economy may be at least as important in boosting productivity levels. In this regard, OECD indicators suggest New Zealand tends to fare well in basic ICT usage, however, broad-band take up rates and speeds are comparatively poor.

\textsuperscript{24} See OECD (2005a).

\textsuperscript{25} Research by Hall and Scobie (2006) suggests the agricultural sector has experienced an increase in MFP growth since the reforms of the 1980s, in part through successful integration of domestic and foreign research and development.

\textsuperscript{26} For example, Claro (2002) and Balisteri \textit{et al.} (2002).

\textsuperscript{27} Note that the increase in economic welfare arising from boosting employment rates would likely considerably exceed the loss in welfare from any temporary decline in aggregate productivity growth.
The IMF’s assessment relies upon a cross-country panel data study by Belorgey et al. (2004) on the determinants of labour productivity growth. This study estimates that the short-run elasticity of labour productivity growth with respect to growth in the participation rate is around -0.5. The IMF takes this estimate at face value and notes that if the New Zealand employment rate ceases to rise (or more specifically, reduces from the 1 percent annual growth rate achieved over 1992-2004 to zero in the medium term) then the annual growth rate of labour productivity should increase by half a percentage point. This would put New Zealand labour productivity growth near 2 percent per annum, a rate consistent with upper income OECD countries.

A preliminary analysis conducted by Drew et al. (2005) suggested that a half-a-percentage-point annual dampening of labour productivity between 1998 and 2005, as would be suggested from the Belorgey study, is well within the bounds of plausibility. The study showed that around two-thirds of the 1998-2005 net employment growth can be attributed (in an accounting sense) to growth in labour participation, reduction in long-term unemployment and natural population increase. These components can loosely be associated with relatively inexperienced workers, who might have lower levels of productivity than the incumbent workforce. On the other hand, there is some evidence that there has been a significant upskilling of the labour force over the period in question (Hyslop et al. 2003). Overall, the difficulty with coming to any firm view on the role of labour absorption dynamics in New Zealand is that formally testing the hypothesis requires an in-depth study of the relevant micro-level data.

5 Summary and conclusions
A review of the recent literature on New Zealand’s labour productivity performance suggests that ‘measurement issues’ surrounding New Zealand’s labour and MFP growth are very important and are very sensitive to which sectors of the economy are captured in the analysis. At the total economy level, labour productivity growth appears poor relative to other OECD economies, implying little prospect of income levels converging towards average (or higher) OECD levels. When non-market and/or hard to measure sectors are excluded from productivity measures the picture appears more rosy. Recent data released by Statistics New Zealand brings home this point forcefully. In sectors where productivity growth can be inferred from independent data on inputs and outputs, productivity growth rates have in fact been above Australia’s. However, by implication, this data suggests a very poor and puzzling productivity growth performance in the “difficult to measure” sectors. The ongoing program at Statistics New Zealand to expand coverage of the official productivity statistics should help in reconciling these differences.

Another finding of the recent literature is that the labour market outcomes in New Zealand appear to have been a rational response to relative price signals, and when these signals change, New Zealand firms adjust their capital-labour mix in line with what is observed in other countries. There are tentative signs that this has begun to happen over the past few years and the Reserve Bank, amongst others, projects the process will continue. In addition, there is some international evidence that suggests a short-run trade-off between rapid expansion in employment rates, as New Zealand has experienced over the past decade, and productivity growth outcomes. Further research on this issue would build the case for New Zealand having experienced a similar trade-off.

Overall, much of the recent data and literature suggests that there is scope to be optimistic about New Zealand’s medium-term labour productivity growth prospects, and that being so, the pick-up in labour productivity growth rates in the projections of the Reserve Bank does not appear implausible. However, given the uncertainty surrounding the outlook, there is probably no room to be complacent about this outcome.

28 For example, as in Gregg and Wadsworth’s (2000) study of UK wages. Under their approach, wages are estimated as a function of standard variables (eg, age, gender, region, education) and a dummy variable indicates whether a worker is a new entrant. This approach allows for an estimate of the effect that new workers have on average wages, wherein the average wage is used as a proxy for average productivity.
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Emerging Asia and global inflation
Chris Hunt

The integration of emerging markets such as China into the global economy has had a profound effect on the inflation process in advanced economies. This article examines the relationship between the integration of emerging Asia into the global economy and the inflation process in New Zealand, highlighting both the downward and upward pressures on inflation emanating from the region. Monetary policymakers appear to have benefited from the protracted deflationary impulse from lower import prices, which may have made the achievement of domestic inflation objectives easier to achieve than might otherwise have been the case. However, this positive supply shock has more recently been matched by the headwinds of higher commodity prices.

1 Introduction
A remarkable feature of the global economic landscape over the past decade has been the shift to a low and stable inflation environment, notwithstanding the more recent increases in headline inflation driven by higher prices for oil and other commodities. Consumer price inflation has averaged 2 to 3 percent since the early 1990s for industrialised economies, while the mean inflation rate for emerging markets is slightly higher at 5 percent (IMF 2006b, pp. 98-102). The current low-inflation environment is a consequence of a significant period of disinflation following the high inflation rates of the 1970s. Since that time, inflation has fallen 10 percentage points on average for developing economies, while the decline for developing economies has been even larger at 20-30 percentage points (Melick and Galati 2006, p 2).

A number of factors have been put forward to explain this fall in inflation. These include: more effective monetary policy and decisive efforts to target low inflation; fewer negative domestic shocks in most economies; positive productivity shocks associated with technological progress; greater fiscal discipline; and structural reforms. In addition, it is also recognised that the integration and growing importance of emerging market economies has been instrumental in keeping global inflation low. As Ken Rogoff states, “globalisation – interacting with deregulation and privatisation – has played a strong supporting role in the past decade’s disinflation” (2003, p 54).

The primary channel by which emerging economies such as China affect inflation in the advanced economies is trade. The integration of China into the global economy has added 800 million people to the global labour supply (Fisher 2006). This additional global capacity has been reflected in a secular decline in the price of manufactured goods produced by China and emerging Asia. The consumption basket of advanced economies has increasingly been made up of these low-cost imported manufactured goods, previously manufactured locally or imported from traditional suppliers.

Of course, the falling price of imported manufactures is, on one level, simply a change in a relative price. Depending on how people form expectations of inflation and elect to price other items in the CPI (such as the costs of home ownership), and how the central bank responds, it is not necessarily the case that a falling relative price will directly lead to a fall in inflation. But, as argued by Rogoff (2006), it is likely that the pace of China’s development and the scale of downward pressure on import prices has represented a series of relative price surprises that are likely to have led to somewhat lower overall inflation.

More recently, however, the downward pressure arising from lower import prices of manufactured goods has been offset to varying degrees by higher prices for imported intermediate inputs. Rapid industrialisation in China and other emerging economies has resulted in upward pressure in the price of key commodity inputs into the production process.

This article examines the relationship between the integration of emerging Asia into the global economy and the inflation process in New Zealand, highlighting both the downward and upward pressures on inflation emanating

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1 For example, faced with falling import prices, a central bank could, in principle, target higher rates of domestic inflation, thereby leaving aggregate inflation unchanged.
from the region. The next section sketches the broad impact of emerging Asia on the global economy. The impact has been profound in terms of the region’s contribution to global growth and the demand for resources required to support this growth. Section 3 traces the major channels through which emerging Asia is affecting global inflation – focusing in particular on the trade channel. Cross-country empirical evidence is reviewed to identify the magnitude of this ‘globalisation’ effect.

In section 4, the inflation process in New Zealand is viewed through the globalisation lens, noting that the integration of China and other emerging economies into the world economy – and the greater share of New Zealand imports being sourced from this region – has helped lower inflation outcomes. The article concludes by highlighting a number of implications for the conduct of monetary policy arising from greater trade integration.

2 Emerging Asia and the world economy
The integration of China and other developing economies in the Asian region into the global economy has had profound consequences not only for these countries themselves, but also for the very structure of the global economy. Emerging Asia’s share of world trade has doubled since 1970 (IMF 2006b, p 77). At 6.6 percent of the global total, China is now the third-largest exporting nation behind the US and Germany. In terms of the global share of output, China’s performance is even more impressive. China is now the second-largest individual economy in the world measured on a purchasing power parity (PPP) basis. China’s share of global GDP has increased from 3 percent in 1980 to 16 percent in 2006 (figure 1).3

Not surprisingly, given this dramatic increase in the share of world output, it is emerging Asia in general and China in particular that has driven world growth (table 1). Just over a quarter of the increase in world growth since 2000 has come from China alone.

Figure 1
Composition of world GDP
Share of global GDP (PPP-based) – 1980

![Composition of world GDP - 1980](chart)

Source: IMF World Economic Outlook, Sept 2006.

A corollary of emerging Asia’s enhanced role in world trade has been that a greater share of the imports of advanced economies are now sourced from this region as well as other emerging markets. According to the Organisation for Economic Cooperation and Development, OECD (2006a), imports to OECD countries from non-OECD countries doubled to 6 percent of GDP between 1990 and 2005 (p 6). In addition, the overall level of imports-to-GDP for advanced economies has increased markedly over the last decade (figure 2). New Zealand’s import-penetration ratio increased 13 percentage points to 37 percent of GDP between 1990 and 2006.4 The finished goods New Zealand consumes

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2 ‘Emerging Asia’ is defined loosely here as the group of Asian economies that have begun rapid convergence towards the level of incomes associated with more mature economies – China and India are the key examples. They are distinct from the NIEs, or newly industrialised economies of Asia: Hong Kong, Singapore, South Korea, and Taiwan.

3 Data for 2006 are estimates. The US is the world’s largest economy with 20 percent of global GDP.

4 The penetration ratio for goods imports has increased from 17 percent in 1990 to 29 percent in 2006.
are increasingly sourced from abroad, while the import content of goods and services produced in New Zealand and elsewhere has also increased.\(^5\)

As the next section will highlight, the higher share of imported low-cost manufactured goods in the consumption basket of the advanced economies is an obvious channel for emerging Asia to impact global inflation. Another important channel is the cost of intermediate inputs into the production process. New Zealand, like many other advanced economies, imports most of the raw materials necessary for production. The rapid growth of China and emerging Asia has placed significant upward pressure on commodity prices in recent years.

### Table 1
**Contribution to world growth**

<table>
<thead>
<tr>
<th></th>
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<td>100</td>
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<td>100</td>
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<td><strong>Developing Asia</strong></td>
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<td>40.2</td>
<td>28.0</td>
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<tr>
<td><strong>China</strong></td>
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<td>20.3</td>
<td>25.9</td>
<td>16.2</td>
</tr>
<tr>
<td><strong>Newly industrialised Asian economies</strong></td>
<td>3.3</td>
<td>4.4</td>
<td>3.2</td>
<td>3.3</td>
</tr>
</tbody>
</table>

* Data for 2006 are estimates.
Source: IMF World Economic Outlook, Sept 2006, RBNZ calculations.

All economies require inputs to grow, and economies at earlier stages in the development process tend to be more resource-intensive in the composition of their output. China’s rapid industrialisation, massive infrastructure development and ongoing urbanisation have created a massive demand for energy and other raw material resources. The Asian Development Bank notes that the intensity of resource use starts to slow at GDP per-capita rates between USD 15,000-20,000 (PPP-basis) as an economy becomes more service oriented (Park and Zhai 2006). With GDP per capita currently standing at USD 6,400 in PPP terms, China has some way yet to go along its development path. China’s consumption of raw materials is tracking the earlier industrialisation profile of Japan and South Korea (IMF 2006b, p. 143). This is shown below for aluminium and copper in figures 3 and 4 respectively.

### Figure 2
**Import penetration**

Source: Datastream, Statistics New Zealand.

\(^5\) Rising import penetration ratios across the developed world reflect both trade liberalisation – the lowering of tariffs and quotas on imported goods – and the shift in consumer preferences towards relatively cheaper goods produced elsewhere.

### Figure 3
**Per-capita consumption of aluminium**

The current demand pressure on global resources relative to supply has seen a range of commodity prices increase over the past few years. The IMF's primary commodity price indices (figures 5 and 6) are indicative in this regard. The energy index (crude oil, natural gas and coal) has increased 170 percent since the beginning of 2002, while the non-energy index has doubled. Within the non-energy sub-index, metals prices (copper, aluminium, iron ore, tin, nickel, zinc, lead, and uranium) have increased 230 percent over the same period, reflecting in part, the impact of emerging Asia's industrialisation.

The Asian Development Bank (ADB) calculates that emerging Asia was responsible for 60 percent of the growth in the world demand for oil between 1990 and 2005, while the Group of 7 (G7) advanced economies contributed just 13 percent (Park and Zhai 2006, p 5). The region's share of total global demand for oil now stands at 22 percent and this is expected to increase to 27 percent by 2015. Much of this demand comes from China, which is currently the second-largest consumer of oil behind the US with 8 percent of the global total. China is also now the world's largest consumer of aluminium, copper and nickel.

The growing demand for commodities described above suggests that Asia has been an important driver of the prices of oil and other raw materials recently. The OECD (2006a) calculate that if the world trade share of emerging economies had been held constant from 2000 to 2005, and their GDP growth had been no higher than the OECD average over this period, then real oil prices would have been 40 percent lower than the level actually prevailing at the end of 2005. This would have removed most, but not all, of the price gains over this period (p 13). It is estimated that real metals prices would have been 10 percent lower, explaining a much smaller fraction of the price gains.\(^7\)

Going forward, it is likely that Asia will command a growing share of the world’s resources as industrialisation continues. The ADB forecasts that Asia will be responsible for 61 percent of the increase in demand for all commodities between now

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\(^6\) Note, higher energy prices have also contributed to the increases in non-energy commodities, given the energy-intensive nature of production of many of the commodities that constitute the sub-index.

\(^7\) This suggests factors other than Asian economic growth explain the price increases in metals, such as demand from other parts of the world, or speculative behaviour.
However, both the ADB and the IMF expect some softening in commodity prices from the current high levels over the medium term despite this continued robust demand growth. The IMF argues that rising supply will meet higher demand across a number of commodities as infrastructure investment will result in increased capacity. In addition, there is likely to be a gradual rebalancing in China toward domestic consumption from the currently high levels of investment underpinning growth.

3 Emerging Asia and global inflation

The integration of emerging Asia into the global economy described in the previous section has two opposing effects on global inflation. Higher commodity prices have exerted upward pressure on inflation, while the decline in the price of imported manufactured goods has imparted downward pressure. International trade is the key channel that links emerging Asia and domestic inflation in the advanced economies. Increased competition from emerging markets can also have important effects on labour markets in advanced economies. A third channel that has been identified is the enhanced sensitivity of domestic inflation to global output conditions.

Trade

The most obvious avenue for the influence of emerging economies on global inflation is via imports. This direct effect has two elements: firstly, the price of imports will affect both producer prices and final consumer prices; and secondly, the relative share of imports from emerging Asia will affect average import prices.

The influence of import prices on a country’s inflation rate depends on a number of factors, including the foreign currency prices of the goods and services in the import basket, the exchange rate, and local market conditions in the sectors selling those imports or transforming them into finished goods. Exchange rate fluctuations will tend to have a significant bearing on the local currency price of imports. However, the transmission of import prices to producer and consumer prices will be affected by the nature of the competitive environment and whether domestic goods and services are competing with imports. For example, oil has few close substitutes, so oil price fluctuations in New Zealand dollars (NZD) terms tend to be quickly reflected in the pump price New Zealanders pay.

This imported price effect will be present even if import shares remain constant – although downward and upward price pressures may potentially offset each other depending on the import basket. This import price effect will, of course, tend to be stronger if the level of imports increases relative to GDP. As noted in the previous section, import penetration rates have increased for most advanced economies, including New Zealand. So how open an economy is will partly determine how much deflation or inflation is imported from emerging Asia.

Looking at both export price indices from emerging Asia and the import prices indices of advanced economies can give an initial sense of the magnitude of the direct import price effect. Figure 5 shows the secular decline in China’s export prices as proxied by re-exports from Hong Kong (in Hong Kong dollars). The aggregate export index has fallen 11 percent since the mid-1990s. Chinese export prices have increased 5 percent since the middle of 2003.

In reference to the US experience, Kohn (2006) and Yellen (2006) both note that exchange-rate fluctuations are possibly more influential in lowering US import prices and hence US inflation than cheaper goods from China per se. Note, however, that the sensitivity of import prices (measured in domestic currency) to movements in the exchange rate appears to have declined in many countries over the past two decades.

In terms of CPI inflation, the effect of import price changes will be influenced by the weight of any item in the regime, and whether the central bank accommodates the price changes by not tightening or loosening policy.

Conversely, even if the relative price of imported goods from emerging Asia to domestically produced goods stopped declining, for example, a rising share of imports from the region could still exert a downward influence on inflation, as the price level of these imports is still likely to be lower than domestically produced goods.

While outside the scope of this article, current and future Asian demand for commodities has implications for both New Zealand’s overall terms of trade (ratio of export prices to import prices) and export volume growth, given the commodity character of our export basket. Industrialisation and higher per-capita incomes have historically been connected with changing dietary patterns, with a greater proportion of protein and fats in the diets as a country becomes wealthier. However, aside from productivity improvements, agricultural production is supply constrained to a degree, suggesting there are biological limits to New Zealand export volume growth to the region.

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however, reflecting in part the higher cost of oil and other raw material inputs into production, together with some localised capacity constraints.\textsuperscript{12}

**Figure 9**
US import price indices – other

<table>
<thead>
<tr>
<th>Index</th>
<th>US Import Price Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Industrialised Economies* - 46% of US imports</td>
</tr>
<tr>
<td>200</td>
<td>Asia Near East** - 3.5% of US imports</td>
</tr>
</tbody>
</table>


* Western Europe, Canada, Japan, Australia, NZ, and South Africa
** Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen.

The OECD (2006a) estimates that increasing levels of imports from low-cost producers has reduced ‘non-commodity’ import prices by 1-2 percent per annum in most OECD countries between 1995 and 2005.\textsuperscript{13} In relation to the impact on consumer prices, it calculates that higher penetration rates and the imported inflation effect from emerging Asia shaved 0.1 percentage points off US inflation between 2000 and 2005, up from 0.03 percentage points between 1990 and 1995. Estimates for the euro zone are higher, given higher import penetration, with CPI inflation estimated to be 0.3 percentage points per annum lower on average, between 2000 and 2005 (p. 8).

The results do not take into account the effect of lower import prices on domestic firm behaviour. Indeed, there are indirect effects associated with the trade channel. Enhanced integration with emerging market economies can increase competition in advanced economies as domestically produced goods and services now compete with low-cost imports.\textsuperscript{14} This can reduce mark-ups for domestic firms or lead to productivity increases, thereby mitigating the pass-through of cost pressures into final product prices. Therefore, the OECD’s mechanical calculations of the impact...
of lower non-commodity import prices may be somewhat understated.\textsuperscript{15}

The net impact of Asia’s integration into the global economy must also take into account higher commodity prices. The OECD provides further evidence in this regard. Higher commodity prices are estimated to have increased the CPI by 0.1 percentage points per annum on average for the OECD as a whole (OECD (2006a), p 17). The net effect – combining both the upward pressure from commodity prices and the downward pressure from non-commodity import prices – is that average OECD inflation would have been 0-0.2 percentage points per annum higher without the integration of China and other emerging economies into the global economy. The impact on individual OECD economies varies with the degree of import penetration and differences in the speed of pass-through from import prices to consumer prices.\textsuperscript{16}

Labour markets

Another means by which emerging Asia affects domestic inflation in the advanced economies may be via the competitive pressures imparted on labour markets. This can occur if domestic firms close down and/or relocate overseas (‘offshoring’) where factor inputs are relatively less expensive.\textsuperscript{17} Any resulting unemployment will moderate wage cost demands and ultimately domestic inflation pressures. Wage moderation can also potentially occur from the threat of relocating overseas, therein reducing the bargaining power of workers. Offshoring may occur whether or not domestic firms are in direct competition with low-cost imported goods in the home market. It does not automatically follow that real wages in advanced economies are lower — indeed, the loss of wages from these competitive effects may be offset by the real wage gain from cheaper imports. Moreover, with unskilled tasks potentially relocated abroad, the premium for skilled workers in the areas in which the economy specialises could potentially increase and, along with it, the wages of skilled workers. It is perhaps too early to tell the ultimate impact of ‘globalisation’ on the labour markets of advanced economies. Nevertheless, it is likely that in the short run there could be significant adjustment costs.

The IMF (2006a), p. 118) has produced some evidence to suggest that wages in developed economies have been restrained due to the integration of China and other emerging markets. It notes that sectors with greater exposure to globalisation (and a higher import-to-production ratio) have tended to see smaller producer price increases. For some manufacturing industries, it finds that a 1 percentage point increase in the import ratio decreases relative producer prices by 0.1 percent.\textsuperscript{18} For the manufacturing sector as a whole, trade openness has reduced producer prices by 0.3 percentage points per annum, on average, over the last 15 years (p. 121).\textsuperscript{19}

The moderation in producer prices identified by the IMF can be largely explained by declining ‘unit labour costs’ relative to overall producer price inflation, implying the labour share of producer costs has declined (p. 121).\textsuperscript{20} It notes an increase in a sector’s import ratio directly reduces wages and salaries. While increased openness also increases productivity for a sector, the negative relationship between openness and wages/salaries remains even if allowing for the positive effects of openness on productivity.

Sensitivity to global output conditions

A number of commentators have remarked on the increasingly global character of domestic inflation (BIS 2006, p. 17). While this is implicit in the discussion above, in practice it suggests that domestic inflation is becoming less sensitive to traditional measures of domestic capacity constraints such

\textsuperscript{15} The OECD calculations also do not take into account any change in the stance of monetary policy. Deflationary impulses on the general price level can, in principle, be offset by looser policy, thereby increasing the prices of ‘non-traded’ goods.

\textsuperscript{16} Unfortunately, New Zealand is not included in the OECD’s estimates.

\textsuperscript{17} Less expensive factor inputs, such as labour are an important reason for offshoring or outsourcing, but not the only one. Firms may relocate to be closer to potential markets for example.

\textsuperscript{18} The IMF argues there is a similar elasticity for services. But given there is a far lower import-to-production ratio for this sector, there remains substantial scope for further trade integration to have a substantial impact on producer prices.

\textsuperscript{19} The IMF results are based on a selected number of advanced economies.

\textsuperscript{20} Unit labour costs are defined as total compensation of employees (wage and salaries) minus productivity growth.
as unemployment, capacity utilisation, or the output gap.\(^{21}\) Econometric evidence from the IMF (2006a) shows that inflation has become less sensitive to the domestic output gap for a cross-section of eight advanced economies.\(^{22}\)

The IMF results suggest that if output were 2 percentage points above trend for one year, inflation would be 0.4 percentage points higher. Twenty years ago, inflation would have been 0.6 percentage points higher (p. 106).\(^{23}\) The IMF attributes half this decline in the sensitivity of prices to domestic output to greater openness, and the remainder to greater monetary policy credibility which has anchored inflation expectations at a low level.

The flip side to this declining sensitivity of inflation to domestic conditions is that domestic inflation has become relatively more sensitive to global measures of excess capacity. There is little agreement, however, whether this implies that a global output gap measure, for example, is now more important than domestic capacity measures in forecasting cyclical inflation pressures (Rogoff 2006). At the very least, it suggests that central banks need to increasingly take broad global demand and supply developments into account when setting policy.

4 The inflation process in New Zealand

The IMF conclusion that the domestic inflation process has become less sensitive to domestic excess demand pressures may also be evident in the New Zealand context. Hodgetts (2006) notes that the sensitivity of inflation to the output gap in New Zealand (the so-called Phillips curve relationship) has fallen along with the fall in inflation since the early 1990s (p. 19). Hodgetts discusses the way in which the anchoring of inflation expectations following the adoption of the Reserve Bank’s inflation targeting regime in 1989 may have contributed to the lower and flatter Phillips curve, together with a number of other candidate explanations such as lower exchange rate pass-through, the breakdown of the wage/cost dynamic in the inflation process, competitive pressures in the retail sector, and globalisation associated with lower imported inflation.

To understand the relationship between import prices and domestic consumer inflation in New Zealand, it is useful to distinguish ‘tradable’ inflation from ‘non-tradable’ inflation.\(^{24}\) In the CPI regimen, the former includes those goods and services that New Zealand imports, together with a smaller proportion of goods and services that are produced locally but face significant international competition. Tradables inflation is therefore largely imported and heavily influenced by the inflation rates of our major trading partners and exchange rate fluctuations. Domestic demand and supply conditions also play a role via distribution networks linking wholesale prices to final retail prices.

By contrast, non-tradable inflation covers those goods and services that face little international competition, including construction and housing-related costs and some utilities such as electricity. Non-tradable inflation can still be influenced by foreign inflation, as non-traded goods and services still use many imported intermediate inputs.\(^{25}\)

Table 2 summarises non-tradable and tradable inflation developments since the beginning of the inflation-targeting era. Non-tradable inflation has clearly outpaced tradable

21 In technical parlance, the ‘Phillips curve’ has become flatter. The Phillips curve links current inflation with a measure of excess demand such as unemployment or the output gap, together with lags in inflation (previous period inflation rates). The lags of inflation indicate how persistent inflation is from period to period.

22 The output gap is the difference between actual output and an economy’s trend/potential rate of output, and is used to indicate the degree of slack (or lack thereof) in an economy. This degree of slack is traditionally used to indicate inflation pressures. See also Yellen (2006) and Kohn (2006) for evidence on a flatter Phillips curve for the US.

23 The lag or persistence in the inflation process has also declined. In the example above, inflation in the second year would be expected to be 0.2 percentage points higher following the output increase, compared to 0.45 percentage points 20 years ago. Declining persistence may be credited to the improved conduct of monetary policy.

24 Despite the fact that New Zealand is importing more of its consumption basket over time, the weight of tradable goods and services in the CPI regimen has actually fallen from 55 percent in December 1988 to 46.3 percent currently (June 2006 re-weighting). This lower weight arises because the weights are derived from consumer expenditure on the respective goods and services. Since consumers have to pay less for a given imported good (or its domestically produced substitute), their total expenditure on traded goods and services has fallen overall despite consuming more traded goods in volume terms.

25 That said, there is still a relatively tight relationship between non-tradable inflation and the output gap in New Zealand, indicating that fluctuations in non-tradable inflation are still predominately determined by domestic factors. See Hargreaves, Kite, and Hodgetts (2006).
Table 2:
New Zealand inflation

<table>
<thead>
<tr>
<th></th>
<th>Headline CPI inflation</th>
<th>Non-tradable CPI inflation</th>
<th>Tradable CPI inflation</th>
<th>Import price inflation (NZD)</th>
<th>Import price inflation (‘world’)</th>
<th>Ex-oil import price inflation (NZD)</th>
<th>Ex-oil import price inflation (‘world’)</th>
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<tbody>
<tr>
<td>Average annual growth 1990-2006</td>
<td>2.3</td>
<td>3.6</td>
<td>1.2</td>
<td>0.6</td>
<td>1.1</td>
<td>-0.2</td>
<td>0.3</td>
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</table>

Source: Statistics New Zealand and RBNZ.

Inflation over this 16-year period. The relatively subdued tradable component of headline inflation reflects low rates of imported inflation both in NZD and ‘world’ terms. The difference between the NZD import price growth and ‘world’ import inflation reflects the impact of the exchange rate.26 The fact that imported inflation in NZD terms is lower than the world price implies that our exchange rate has appreciated against the trade weighted index basket of currencies over the period.

Imported inflation has essentially been zero, on average, since 1990, once oil prices are taken into account. Figure 10 shows that this is, in large part, a function of falling prices for consumer durable goods – implicitly from China and emerging Asia. The world price of imported consumer durables has fallen just over 15 percent since 1990. As highlighted in the previous section, this decline in consumer durable import prices is a global phenomenon and has been passed through into final consumer prices.27

Figure 10
Major components of NZ import price index

Source: Statistics New Zealand.

We cannot directly attribute the absolute declines in consumer durable prices to China and emerging Asia, as Statistics New Zealand does not construct a separate import price index for the goods we buy from China. However, China’s own export index from section 3 suggests that low-cost exports from China are likely to be a primary driver. The declines in import prices seen at New Zealand docks will have been amplified by the growing share of Chinese imports in New Zealand’s import basket (figure 11).28

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26 There are no official price indices for New Zealand imports in foreign currency terms. The world price has been proxied by multiplying the NZD price with the trade weighted index (TWI).

27 In contrast, world prices for New Zealand’s imports of non-durable consumer goods appear to have increased moderately over the same period.

28 Note: this data on import shares is based on import values rather than volumes – we do not have import volume data for China.
China and other emerging Asia’s demand for industrial inputs, and the associated surge in commodity prices, has also been reflected in the higher world prices we face for intermediate imports. Aggregate intermediate import prices have increased 40 percent since 1990, with most of this increase since 2000 (figure 12). Obviously, the increase in import prices is being driven by the dramatic growth in fuel prices, but industrial prices excluding fuel have also increased significantly. Since 2000, the fuel subcomponent of intermediate goods has increased 160 percent, while primary and processed industrial supplies have increased 24 and 36 percent respectively. The upward pressure from world intermediate prices to New Zealand producer prices has been mitigated somewhat by the strong NZD over the past few years. In addition, competitive pressures in individual sectors will have influenced the extent of pass-through to both producer and consumer prices.

5 Conclusion

There is broad agreement that the integration of emerging markets into the global economy is having an effect on the inflation process in the advanced economies. Globalisation is one factor that has been identified in contributing to the disinflation characterising both advanced and developing economies since the early 1990s.

Monetary policy makers have benefited from the protracted deflationary impulse from lower import prices, which may have made domestic inflation objectives easier to achieve than might otherwise have been the case. However, this positive supply shock has more recently been matched by the headwinds of higher commodity prices. In an environment of growing global interdependence, monetary policy needs to increasingly take account of the structural changes to the domestic economy induced by globalisation.

References


Tradables and non-tradables inflation in Australia and New Zealand

Andrew Coleman

This article presents a detailed comparison of price changes for non-tradable and tradable items in the CPI across Australia and New Zealand. The main result is that relative price movements in Australia and New Zealand are highly correlated in the medium term, although not in the very short term. Sectors that have had large price increases in New Zealand have tended to have large price increases in Australia, and sectors that have had small price increases in New Zealand have tended to have small price increases in Australia. In both countries, price increases for non-tradable items have generally outpaced price increases for tradable items. However, the article finds that non-tradable price increases have not been noticeably higher in New Zealand than in Australia. Moreover, price changes have been high relative to Australia's in several of New Zealand’s ‘tradable’ sectors since June 1998, particularly for non-food retail items.

1 Introduction

Economists have noted that the prices of goods and services that must be produced locally, such as restaurant meals or dental examinations or electricity, tend to increase at a faster rate than the prices of goods and services that can be traded between countries, such as cars or books or cheese. This has been the case in New Zealand – according to Statistics New Zealand, average non-tradable prices increased by 63 percent in the 15 years to June 2006, or 3.3 percent per year, while average tradable prices increased by only 16 percent, or 1.0 percent per year. The size of this difference has caused some economists to wonder whether non-tradable prices have increased more rapidly than tradable prices because there is less competition in non-tradable sectors.

At first glance, this idea is plausible, simply because non-traded goods or services cannot be directly imported. Yet the idea is far from compelling, because the amount of competition in any sector depends on the ease of entry into that sector, not whether or not the goods can be easily transported. Since international firms can set up in New Zealand to provide non-traded goods, and since producers of internationally traded goods must have a local distributor, there is no inherent reason why non-traded goods sectors should be less competitive than traded goods sectors.

An alternative explanation for the different rates of price increase concerns the relative size of cost pressures in the two sectors. So long as it is not too difficult for new firms to enter a market, prices in a sector should ultimately reflect production costs, including an ordinary profit margin. Since costs fall if productivity increases exceed wage growth, or if the price of imported inputs falls, one would expect relatively low rates of price increase in sectors that have had relatively high rates of technical progress, or in sectors that import a large fraction of inputs from countries where prices are falling. According to this explanation, non-tradable goods and services have had greater price increases in the last 15 years because there has been slower technical progress in these sectors than in tradable sectors, and less opportunity to import inputs from low-cost international suppliers.

A corollary of this idea is the famous Balassa-Samuelson hypothesis, that the ratio of non-tradable to tradable prices should be higher in developed countries than in less-developed countries because technological advances are much faster in tradable than non-tradable sectors (Balassa 1964; Samuelson 1964).

There is a second implication of the ‘cost-pressure’ theory of relative prices. Because most technical advances are readily copied, and because cheap imports are readily obtained everywhere, the relative size of cost pressures should be similar in most developed countries. Consequently, the relative rates of tradable and non-tradable price increases in New Zealand should be similar to those in other countries.

1 Currently Statistics New Zealand categorises 46 percent of items in the Consumers Price Index (CPI) as tradable.
In principle, this hypothesis can be tested directly, using price data from different countries. In practice, most price data are not readily comparable, because statistics agencies in different countries publish different prices. Fortunately, however, it is reasonably straightforward to compare Australian and New Zealand retail prices.

This article presents the results of this comparison. The main result is that relative price movements in Australia and New Zealand are highly correlated in the medium term, although not in the very short term. Quite simply, sectors that have had large price increases in New Zealand have tended to have had large price increases in Australia, and sectors that have had small price increases in New Zealand have tended to have had small price increases in Australia. This tendency is particularly pronounced for tradable sectors, but it is also observed for non-tradable sectors. That said, some New Zealand prices have increased much faster than the same prices in Australia. However, in the last few years these prices have tended to be the retail prices of imported goods, rather than the prices of traditional non-tradable goods and services such as housing or hairdressing.

The high correlation of Australian and New Zealand prices suggests that most of the medium-term relative price movements in New Zealand reflect global — or at least Australasian — factors (see also the article by Chris Hunt in this issue of the Bulletin). If so, it is likely that relative price movements in New Zealand largely reflect cost pressures rather than local macroeconomic conditions or the local competitive environment. In turn, this means that the Reserve Bank has much more influence on the overall level of inflation than it has on the pattern of tradable and non-tradable prices.

There is, of course, a rather extensive literature examining the cross-border behaviour of consumer prices. However, most of this literature has focused on the behaviour of relative price movements in the short term, and found little relationship between the prices of the same good in different countries. Engel (1993), for example, studied the volatility of consumer prices in the G7 countries over horizons from one month to one year and concluded that: "the volatility of the consumer price of a good relative to the same good in another country tends to be much lower than the volatility of the price of that good relative to the same good in another country. For example, the price of a wool shirt relative to a bottle of wine in the United States is less volatile than the price of a wool shirt in the United States relative to the price of a wool shirt in Canada" (Engel 1993, pp. 35-36). In keeping with this finding, there is little short term correlation of relative price movements between Australian and New Zealand in the short term. In contrast with most of this literature, however, the focus of this article is the behaviour of prices in the medium term, for at this horizon, price changes for the same good in each country are very similar.

2 The data

The key analytic task of this analysis is the matching of Australian and New Zealand sector-specific consumer price data. Changes in data availability meant the matching was done for two periods, December 1983 – December 1993, and December 1993 – June 2006. The post-1993 analysis is based on the Australian consumer price index regime used since 1998 and backdated to 1993, which has separate sub-indices for 90 industries. Examples of these industries include eggs, electricity, furniture, and house repairs and maintenance. The New Zealand Consumers’ Price Index (CPI) in use between 1998 and June 2006 is considerably more detailed, with nearly 300 categories. In many cases, therefore, it was necessary to combine several New Zealand industries together to provide a match with the Australian industry. In the above examples, for instance, Australian eggs were matched with New Zealand eggs; Australian electricity was matched with New Zealand electricity; but Australian furniture was matched with three New Zealand classifications, bedroom furniture, dining and lounge furniture, and garden and outdoor furniture. In the last case, the three New Zealand price series were combined together using their 2003 CPI regime weights to form a composite ‘furniture’ category. The matching was based upon

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2 Statistics New Zealand introduced a new CPI regime in September 2006, and now publishes data on 108 classes of goods and services.
3 Australian data was more detailed than the New Zealand for two categories and, in these cases, the Australian sub-sectors were averaged to form a composite matching the New Zealand data.
information provided by the Australian Bureau of Statistics that indicates the main goods and services in each category.³ Thirteen New Zealand items totalling 3 percent of the CPI could not be matched with the Australian classification and were ignored.

Data for most of the 90 Australian CPI categories are available back to 1993, and for some series, they are available much earlier. However, Australian price indices for three categories of education expenditure and three categories of finance charges are not available prior to September 1999, and data do not exist for a further nine categories of goods and services between 1993 and June 1998. In addition, New Zealand price data are unavailable for a few items before 2002. For this reason, the post-1993 data are analysed twice, once using the 82 categories of goods and services available for the period 1998–2006, and once using the 73 categories of goods and services available for the period 1993 – 2006.

Although detailed price data for the period prior to 1993 are no longer readily available, it proved possible to find these data from contemporaneous records.⁵ There were 107 different Australian classifications for the pre-1993 period. They were matched with contemporaneous New Zealand data in a fashion similar to that described above. Different weights for used the 1983–1988 and 1988–1993 periods because Statistics New Zealand changed the CPI classification in 1988. After deletions, 98 common categories remained.

### 3 The main findings

#### Price changes in the medium term

The cross-sector correlations were calculated for the eight year period June 1998–June 2006 (82 goods and services); the 12 year period December 1993–December 2005 (73 goods and services); and the 10 year period December 1983–December 1993 (98 goods and services). Average inflation rates in Australia and New Zealand were similar over the period. In New Zealand, the CPI increased by 32 percent between December 1993 and June 2006, or 2.2 percent per year. In Australia, the CPI increased by 40 percent, or 2.7 percent per year. The introduction of GST in Australia in 2000 accounted for nearly 4 percent of the total price change. Similarly, the exchange rates at the beginning, middle, and end of the period were similar, being equal to $NZ1 = $A0.826 in December 1993, $NZ1 = $A0.847 in June 1998, and $NZ1 = $A0.837 in June 2006.

Figure 1 shows a scatter-plot of the New Zealand price changes against the Australian price changes for each sector, 1998–2006, along with a 45-degree line passing through the average inflation rate in each country. Each point represents the average annual price increase in a single sector; the area of the point is proportional to the New Zealand CPI weight. The points above the 45-degree line indicate New Zealand price changes relative to average New Zealand inflation that were higher than Australian price changes relative to average Australian inflation.

![Figure 1](image)

The dominant feature of the graph is the high correlation of the two series. The simple correlation coefficient, calculated using equal weights for each of the 82 series, is 0.77.⁶ Given that the New Zealand disaggregated series are not calculated in exactly the same way as the Australian series, the correlation is the same if it is calculated by weighting each series by its CPI weight.

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⁵ The data came from a source that obtained them contemporaneously from the ABS to study how distance affected prices in Australia. Only prices from Sydney, Perth, Brisbane, and Hobart, not the whole of Australia, were obtained. An Australian average was calculated from these series using their 1993 populations as weights.

⁶ The correlation is the same if it is calculated by weighting each series by its CPI weight.
the estimated correlation coefficient is likely to be an underestimate of the true correlation of price changes, because some of the difference between the measured relative price changes in each country will reflect the different measurement practices.\footnote{The best example is the audio, visual and computing equipment classification, which has the highest rates of price decline in either country, -7.6 percent per year in New Zealand and -12.1 percent in Australia. It is doubtful that Australian prices have declined faster than New Zealand prices by 5 percent per year since 1998. Rather, Statistics New Zealand and the Australian Bureau of Statistics measure the price of home computing equipment quite differently. Statistics New Zealand surveys prices in New Zealand; since 1998, it has recorded a decline in computer prices of 7 percent per year. The ABS did not survey computer prices in Australia until September 2005, but used the United States Bureau of Labor Statistics hedonic price index, which declined at 13 percent per year. Given that computers have a 0.64 weight in the New Zealand CPI, this difference in methodology accounts for almost all of the difference in the audio, visual and computing equipment classification.}

Figures 2 and 3 show the relationships between tradable price changes and non-tradable price changes respectively. The correlation between tradable price changes in Australia and New Zealand was 0.79, somewhat higher than that for non-tradable prices, 0.53.\footnote{The low correlation in part reflects a single point, insurance services, which had price changes of 7.1 percent in Australia but only 1.7 percent in New Zealand. Without this sector, the correlation was 0.65.} Nonetheless, as the graphs show, for both tradable and non-tradable goods and services there is a clear positive relationship between relative price changes in Australia and those in New Zealand.

Relative prices were slightly more correlated over the longer period, December 1993–June 2006. The cross-sector correlation coefficient for the 73 series over this period was 0.84, compared to 0.76 for the period June 1998–June 2006. However, the cross-sector correlation in the ten years to December 1993 was appreciably smaller, 0.56. As is well known, the New Zealand economy experienced substantial reforms during this period, so it is to be expected that there might have been many idiosyncratic components to relative price movements as sectors were deregulated and taxes and tariffs were changed. The higher cross-sector correlation of prices since 1993 suggests that global influences have become more important determinants of medium-term relative prices than they were prior to this date.
Price changes in the short term

Even though sectoral price movements in Australia and New Zealand were similar in the medium term, there are considerable differences in the timing of price changes. These differences can be seen in the four graphs in figure 4, which show the change in each sector’s prices in Australia and New Zealand over quarterly, annual, four yearly, and 12-yearly time horizons. Each graph plots the price changes for 73 sectors for the 12-year period December 1993–December 2005. In the top graph, there are 73x48 = 3504 separate points, representing all pairs of quarterly changes over the 12-year period: in the bottom graph, there are 73 points, representing the 12-year price change for each sector. All price changes are calculated in terms of the average annual percentage change.

If relative price changes in each sector in Australia and New Zealand were identical, all points would lie along the 45-degree line. In the graph showing 12-yearly price changes, the points lie close to this line. In the graphs showing quarterly and annual price changes, however, the points are scattered all over the place, indicating that price changes in New Zealand and Australia are not particularly highly correlated. Indeed, the average cross-sector correlation coefficients for the quarterly and annual horizons are only 0.25 and 0.45 respectively, compared to 0.64 and 0.84 for the four-yearly and 12-yearly correlations.

Figure 4
Relative price changes over different horizons

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9 Because points with price changes greater than 20 percent are omitted from the graphs, some of the possible 3504 points are not shown in the top graph.
Table 1
Estimated correlation coefficients between New Zealand and Australia sector-specific price changes,
by time period, 1993–2005

<table>
<thead>
<tr>
<th>1-year horizon</th>
<th>2-year horizon</th>
<th>4-year horizon</th>
<th>12-year horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>0.60</td>
<td>1997:4</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>0.45</td>
<td>1997:4</td>
<td>1997:4-2001:4</td>
</tr>
<tr>
<td>1999</td>
<td>0.24</td>
<td>1999:4</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>0.35</td>
<td>2001:4</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>0.51</td>
<td>2001:4</td>
<td>2001:4-2005:4</td>
</tr>
<tr>
<td>2003</td>
<td>0.43</td>
<td>2003:4</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0.61</td>
<td>2003:4</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0.52</td>
<td>2005:4</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.45</td>
<td>0.53</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Table 1, above, shows how the cross-sector correlations for these 73 sectors have changed through time. The data suggest the one-year horizon cross-sector correlations have increased over the period, from an average of 0.39 in the six years 1993–1999 to an average of 0.52 subsequently. If this difference reflects an underlying increase in the extent to which the two series are becoming correlated, and not just random sampling error, it means that the New Zealand economy is becoming more integrated with the Australian economy in the sense that relative prices increasingly move by the same amount at the same time.10

The largest price differences between Australia and New Zealand

Table 2, opposite, indicates the 17 sectors in which New Zealand price changes differed from Australian price changes by at least 2 percent per year more than the difference in the average inflation rate over the period June 1998–June 2006.

The list of sectors has two features. First, price increases in most of the traditional non-tradable sectors have not been much higher in New Zealand than Australia. Government motor charges, electricity prices, and audio, visual, and computing services prices did increase at noticeably faster rates in New Zealand than Australia; but prices for insurance and child care increased at much lower rates, and price increases in other non-tradable sectors were similar in both countries. Secondly, there has been a significant divergence in price trends in the food and non-food retailing sectors in Australia and New Zealand. Relative price changes for many food items were much lower in New Zealand than Australia; but relative price changes for items such as sports

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10 Statistical tests of the difference in the mean correlation are not particularly meaningful given the small number of observations, particularly as the variances of the pre-2000 and post-2000 samples appear to be quite different, so that a standard ‘difference in means’ test is not valid. Non-parametric procedures such as the Wilcoxon-Mann-Whitney test have little power with such small samples.
equipment, tableware, tools, and linen were much higher in New Zealand than Australia. In each of these latter sectors, prices increased by less than the average inflation rate in New Zealand, but the relative price decline was greater in Australia.\footnote{A small amount of the difference can be attributed to the changes in wholesale tax rates in Australia. When GST was introduced in July 2000, various wholesale taxes were removed, and overall taxation on many non-food items such as tools declined. However, relative price movements were larger in New Zealand than Australia even when an adjustment has been made for this factor.}

This pattern is curious. It suggests that food and non-food retailing have followed different trajectories in Australia and New Zealand since 1998. Moreover, it appears a small but measurable part of the average inflation rate in New Zealand can be attributed to a failure of many non-food retail prices to fall as quickly in New Zealand as in Australia (notwithstanding some substantial price declines for some products). Whether this divergence reflects differences in the competitive environment of the retail industries in the two countries or some other factor is an open question.

\footnote{The figure of 0.42 is the average of the correlation coefficients calculated using annual June-year price changes in the eight years to June 2006.}

### Table 2

Sectors with the largest relative price change, 1998:2–2006:2

<table>
<thead>
<tr>
<th>Sector</th>
<th>New Zealand price change</th>
<th>Australian price change</th>
<th>Relative price movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio, visual and computing equipment</td>
<td>-7.6%</td>
<td>-12.1%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Other motoring charges</td>
<td>7.2%</td>
<td>4.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Sports and recreational equipment</td>
<td>1.1%</td>
<td>-1.9%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Towels and linen</td>
<td>1.1%</td>
<td>-1.7%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Audio, visual and computing media and services</td>
<td>0.4%</td>
<td>-1.1%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Electricity</td>
<td>4.5%</td>
<td>3.2%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Glassware, tableware and household utensils</td>
<td>0.5%</td>
<td>-0.8%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Tools</td>
<td>1.3%</td>
<td>0.1%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Ice cream and other dairy products</td>
<td>0.3%</td>
<td>3.1%</td>
<td>-2.0%</td>
</tr>
<tr>
<td>Pork</td>
<td>2.1%</td>
<td>5.2%</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>1.0%</td>
<td>3.8%</td>
<td>-2.0%</td>
</tr>
<tr>
<td>Cheese</td>
<td>1.1%</td>
<td>4.2%</td>
<td>-2.3%</td>
</tr>
<tr>
<td>Child care</td>
<td>3.6%</td>
<td>6.7%</td>
<td>-2.3%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1.5%</td>
<td>4.9%</td>
<td>-2.5%</td>
</tr>
<tr>
<td>Overseas holiday travel and accommodation</td>
<td>-1.8%</td>
<td>2.7%</td>
<td>-3.6%</td>
</tr>
<tr>
<td>Insurance services</td>
<td>1.7%</td>
<td>7.1%</td>
<td>-4.6%</td>
</tr>
<tr>
<td>Fruit</td>
<td>1.3%</td>
<td>9.9%</td>
<td>-7.8%</td>
</tr>
</tbody>
</table>

Australian inflation was 0.8 percent higher than New Zealand inflation over the period. The relative price movement is adjusted for this difference.

### Relative price movements within Australia

To provide a comparison, cross-sector correlation coefficients were calculated for Brisbane, Perth, and Hobart against the Australian average using data for the period June 1998–June 2006. The correlation coefficients for the eight year price changes were 0.97, 0.96, and 0.97, appreciably higher than the Australia-New Zealand figure of 0.77. The average correlation coefficients for the annual price changes were 0.89, 0.83, and 0.82, nearly twice as large as the Australia-New Zealand figure of 0.42. Two conclusions follow. First, it is apparent that relative price movements within Australia are extremely highly correlated in both the short term and medium term, despite the vast distances between the major cities. Secondly, short-term relative price movements display much greater idiosyncrasy in New Zealand than between the different Australian states, but most of this idiosyncrasy disappears in the medium term. It appears to be the case that...
that New Zealand firms face a different set of cost pressures in the short term than Australian firms, or that cost pressures are transmitted into prices at quite different speeds.

4 Implications

Three claims can be made in light of the above analysis:

(i) Australian and New Zealand relative price movements are highly correlated over medium-term but not short-term time horizons;

(ii) this correlation has increased through time, although is still significantly lower than the correlation of prices within Australia; and

(iii) non-tradable price increases have not been noticeably higher in New Zealand than in Australia; if anything, price increases have been high relative to Australia in several New Zealand ‘trading’ sectors since June 1998, particularly non-food retailing.

These results raise doubts about the claim that New Zealand’s inflation rate is caused by large price increases in uncompetitive non-tradable sectors. It is, of course, possible that uncompetitive non-tradable sectors are the cause of inflation in both countries: in response to similar economic shocks, firms in each country might have changed prices in much the same way. Nonetheless, it could also be the case that the majority of relative price changes in New Zealand reflect Australasia-wide – probably global – changes in the costs of producing goods and services rather than peculiarly New Zealand factors. If this is the case, the large increase in the ratio of non-tradable to tradable prices over the last 15 years could be interpreted as an appropriate relative price movement, not as a problematic cause of a ‘high’ average inflation rate.

These findings suggest the medium-term pattern of tradable and non-tradable prices is driven by non-monetary factors. Clearly, temporary changes in the exchange rate and interest rates can affect the ratio of tradable to non-tradable prices in the short term. In the longer term, however, it appears the Reserve Bank of New Zealand may have more influence on the overall level of inflation than on relative prices.

References


### Appendix
The 1998-2006 price study included the following categories of goods and services, along with their 2002 New Zealand CPI weights.

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>0.83</td>
</tr>
<tr>
<td>Cheese</td>
<td>0.34</td>
</tr>
<tr>
<td>Ice cream and other dairy products</td>
<td>0.19</td>
</tr>
<tr>
<td>Bread</td>
<td>0.72</td>
</tr>
<tr>
<td>Cakes and biscuits</td>
<td>0.51</td>
</tr>
<tr>
<td>Breakfast cereals</td>
<td>0.23</td>
</tr>
<tr>
<td>Other cereal products</td>
<td>0.39</td>
</tr>
<tr>
<td>Beef and veal</td>
<td>0.96</td>
</tr>
<tr>
<td>Lamb and mutton</td>
<td>0.18</td>
</tr>
<tr>
<td>Pork</td>
<td>0.28</td>
</tr>
<tr>
<td>Poultry</td>
<td>0.68</td>
</tr>
<tr>
<td>Bacon and ham</td>
<td>0.34</td>
</tr>
<tr>
<td>Other fresh and processed meat</td>
<td>0.49</td>
</tr>
<tr>
<td>Fish and other seafood</td>
<td>0.36</td>
</tr>
<tr>
<td>Fruit</td>
<td>0.90</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1.19</td>
</tr>
<tr>
<td>Soft drinks, waters and juices</td>
<td>1.18</td>
</tr>
<tr>
<td>Snacks and confectionery</td>
<td>1.88</td>
</tr>
<tr>
<td>Restaurant meals</td>
<td>1.64</td>
</tr>
<tr>
<td>Takeaway and fast foods</td>
<td>1.99</td>
</tr>
<tr>
<td>Eggs</td>
<td>0.18</td>
</tr>
<tr>
<td>Jams, honey and sandwich spreads</td>
<td>0.13</td>
</tr>
<tr>
<td>Tea, coffee and food drinks</td>
<td>0.28</td>
</tr>
<tr>
<td>Food additives and condiments</td>
<td>0.36</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>0.34</td>
</tr>
<tr>
<td>Food not elsewhere classified</td>
<td>0.65</td>
</tr>
<tr>
<td>Beer</td>
<td>2.81</td>
</tr>
<tr>
<td>Wine</td>
<td>1.54</td>
</tr>
<tr>
<td>Spirits</td>
<td>2.09</td>
</tr>
<tr>
<td>Tobacco</td>
<td>2.29</td>
</tr>
<tr>
<td>Men's clothing</td>
<td>1.19</td>
</tr>
<tr>
<td>Women's clothing</td>
<td>1.87</td>
</tr>
<tr>
<td>Children's and infants' clothing</td>
<td>0.64</td>
</tr>
<tr>
<td>Men's footwear</td>
<td>0.32</td>
</tr>
<tr>
<td>Women's footwear</td>
<td>0.41</td>
</tr>
<tr>
<td>Children's footwear</td>
<td>0.15</td>
</tr>
<tr>
<td>Accessories</td>
<td>0.19</td>
</tr>
<tr>
<td>Clothing services and shoe repair</td>
<td>0.08</td>
</tr>
<tr>
<td>Rents</td>
<td>5.48</td>
</tr>
<tr>
<td>Electricity</td>
<td>2.73</td>
</tr>
<tr>
<td>Gas and other household fuels</td>
<td>0.31</td>
</tr>
<tr>
<td>House purchase</td>
<td>8.48</td>
</tr>
<tr>
<td>Property rates and charges</td>
<td>2.04</td>
</tr>
<tr>
<td>House repairs and maintenance</td>
<td>2.12</td>
</tr>
<tr>
<td>Furniture</td>
<td>1.48</td>
</tr>
<tr>
<td>Floor and window coverings</td>
<td>0.42</td>
</tr>
<tr>
<td>Towels and linens</td>
<td>1.02</td>
</tr>
<tr>
<td>Major household appliances</td>
<td>1.04</td>
</tr>
<tr>
<td>Small electric household appliances</td>
<td>0.44</td>
</tr>
<tr>
<td>Glassware, tableware and household utensils</td>
<td>0.21</td>
</tr>
<tr>
<td>Tools</td>
<td>0.21</td>
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<tr>
<td>Household cleaning agents</td>
<td>0.39</td>
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<tr>
<td>Toiletries and personal-care products</td>
<td>1.46</td>
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<tr>
<td>Other household supplies</td>
<td>0.54</td>
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<tr>
<td>Child care</td>
<td>0.38</td>
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<tr>
<td>Hairdressing and personal-care services</td>
<td>0.52</td>
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<tr>
<td>Hospital and medical services</td>
<td>3.33</td>
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<tr>
<td>Optical services</td>
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<tr>
<td>Dental services</td>
<td>0.70</td>
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<td>Pharmaceuticals</td>
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<td>Urban transport fares</td>
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<td>Audio, visual and computing equipment</td>
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<td>Books</td>
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<td>Newspapers and magazines</td>
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<td>Sports and recreational equipment</td>
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<td>Toys, games and hobbies</td>
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<td>Sports participation</td>
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<tr>
<td>Pets, pet foods and supplies</td>
<td>0.52</td>
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<td>Pet services including veterinary</td>
<td>0.23</td>
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<tr>
<td>Other recreational activities</td>
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<td>Domestic holiday travel and accommodation</td>
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<tr>
<td>Overseas holiday travel and accommodation</td>
<td>3.11</td>
</tr>
<tr>
<td>Insurance services</td>
<td>3.55</td>
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Economic and financial chronology 2006
Gina Williamson

January
18 The Reserve Bank issues its finalised policy on the requirements that will apply to large New Zealand banks that have entered into outsourcing arrangements. The final policy follows consideration of comments on a draft policy issued in October 2005. The policy focuses on ensuring that the boards of large New Zealand banks maintain the legal and practical ability to control outsourced functions so that they can continue to provide critical services in a crisis situation. The policy also requires the boards to exercise meaningful control and oversight over the bank’s chief executive and staff. Statistics New Zealand figures show that the Consumer’s Price Index (CPI) rose 0.7 percent in the December 2005 quarter. This brings inflation for the year to December 2005 to 3.2 percent.

26 The Reserve Bank leaves the Official Cash Rate (OCR) unchanged at 7.25 percent at its interim review. The Bank notes that there is no firm evidence of a slowing in domestic demand as employment, wage growth, and house prices have remained strong. Though resource constraints are easing, inflation expectations remain high and the Bank states that an early decline in interest rates would reignite inflationary pressures.

31 The Reserve Bank temporarily raises the Settlement Cash Level from $20 million to $500 million for value date 2 February. This move reflects concern over increasing liquidity pressures, which are expected to be exacerbated by the upcoming New Zealand Government bond maturity on 15 February.

February
9 The New Zealand Companies Office signs a memorandum of understanding with the Australian Securities and Investment Commission reflecting an intention to work toward the alignment of processes and practices that will simplify the obligations of trans-Tasman companies.

10 The Reserve Bank temporarily raises the Settlement Cash Level from $500 million to $2,000 million, for value date 13 February.

20 The Reserve Bank announces that 31 July 2006 will be the date for the introduction of New Zealand’s new, smaller and lighter 50, 20 and 10 cent coins. There will be a three-month transition period from 31 July to 31 October during which all coins may be used. From 1 November the old coins will no longer be legal tender.

22 Commerce Minister, Leanne Dalziel, signs a revised memorandum of understanding with the Australian Treasurer affirming a commitment to the coordination of trans-Tasman business law and to reduce impediments to trans-Tasman commerce.

28 The Government introduces the Kiwisaver Bill to Parliament.

March
9 The Reserve Bank leaves the OCR unchanged at 7.25 percent when releasing its Monetary Policy Statement. The Bank notes that while economic growth is slowing and there is some cooling in household spending, productive capacity is stretched and the labour market remains tight. The Bank notes that it does not expect to be able to reduce the OCR during the current year.

17 The Reserve Bank issues a consultation document and calls for submissions on proposed changes to the Bank’s liquidity management system (Exchange Settlement Account System). The review addresses issues of insufficient liquidity and inefficient injection of liquidity into the banking system. Closing date for submissions on the options presented is 20 April 2006.

22 Parliament passes the Taxation (Depreciation, Payment Dates Alignment, FBT, and Miscellaneous Provisions) Bill, issuing in a set of comprehensive business tax cuts at a fiscal cost of $1.1 billion over four years.

24 Statistics New Zealand figures indicate a decline in GDP
of 0.1 percent for the December 2005 quarter. This brings annual growth to 2.2 percent for the year to December 2005.

April
6 The Reserve Bank and The Treasury release a joint report on possible additional instruments to supplement the role of interest rates in managing demand pressures and inflation. Prompted by the persistence of domestic demand and house price pressures, the report considers structural and cyclical policies and instruments in addition to the Official Cash Rate that could be used to manage specific demand or inflationary pressures. The report notes that there are no readily implemented options without significant complications or costs and further work is warranted in some areas.

19 Statistics New Zealand figures show the CPI rose 0.6 percent in the March 2006 quarter, bringing CPI inflation for the year to March 2006 to 3.3 percent.

27 The Reserve Bank leaves the OCR unchanged at 7.25 percent at its interim review. The Bank notes that while the economy has weakened faster than expected, short-term inflation pressures have intensified, due to a fall in the New Zealand dollar exchange rate and the ongoing effects of the world oil price shock. The Bank reiterates that it sees no scope for a cut in the OCR during the current year.

May
11 Statistics New Zealand Household Labour Force Survey figures reveal an unemployment level of 3.9 percent for the March 2006 quarter.

18 The Minister of Finance, Dr. Michael Cullen, releases the 2006 Budget. Key features include:

- Additional spending especially in health, education, research, science and technology, defence and transport infrastructure.
- Further tax relief for families through the expansion of the Working for Families package.
- The implementation of interest-free student loans from 1 April 2006.
- The OBERAC (Operating Balance Excluding Revaluations and Accounting Changes) is projected to be a surplus of $7.0 billion for 2006/07, following an actual surplus of $8.9 billion for the 2005/2006 year.

19 The Reserve Bank releases its first Financial Stability Report for 2006. The report notes that household indebtedness has reached an all-time high, creating some additional vulnerability in the face of a slowing economy. A sharp but orderly depreciation of the New Zealand dollar has significantly reduced risks to the financial system. Overall, banks are profitable and well capitalised and the financial system remains well placed to weather the slowdown of the economy.

26 The Reserve Bank hosts the EMEAP (Executives’ Meeting of East Asia and Pacific Central Banks) governors, furthering moves to strengthen financial market regulation and operation, and regional cooperation in central banking.

June
8 The Reserve Bank leaves the OCR unchanged at 7.25 percent when it releases its Monetary Policy Statement. The Bank notes that weaker economic activity has reduced medium-term inflationary pressures. However headline CPI inflation is expected to remain above 3 percent into 2007 due to the effects of further petrol price increases and higher import prices. The Bank continues to see no scope for an easing of the OCR.

23 Statistics New Zealand figures show an increase in GDP of 0.7 percent in the March 2006 quarter, bringing annual growth in GDP to 2.2 percent for the year to March 2006.

29 The New Zealand dollar exchange rate hits a 25-month low of US$9.51 cents, while the Trade Weighted Index (TWI) slips to a three year low of 60.5.

30 The Reserve Bank releases the details of the liquidity management regime adopted following proposals
publicised in March 2006. The new regime involves the removal of the Bank’s autorepo facility and the use of bank paper, government bonds and corporate securities as security in liquidity operations, in return for cash injections into the system as is consistent with revealed demand. The Settlement Cash Level will be gradually increased until a target can be established at a steady state level.

July
17 Statistics New Zealand figures indicate the CPI rose 1.5 percent in the June 2006 quarter. Annual CPI inflation for the year to June 2006 was 4 percent.


27 The Reserve Bank leaves the OCR unchanged at 7.25 percent at its interim review. The Bank notes short term inflationary pressures arising from stronger than anticipated business activity and consumer demand and the continued upward trend in oil prices. While a rebalancing of economic activity from domestic demand toward exports and import substitution is expected to continue, second round wage and price effects remain a risk. The Bank states that it will be some time before an easing in the OCR can be considered.

31 The Reserve Bank releases the new plated steel 50, 20 and 10 cent coins into circulation and begins the phasing out of the 5 cent piece. A three month transitional period will continue until 31 October 2006 during which the existing coins can be used.

Petrol prices at the pump hit a record high of 176.9 cents per litre (91 unleaded). A high in real petrol prices (inflation adjusted) was reached in the June 2006 quarter.

August
2 Dubai oil prices reach a record high of US$72.49 per barrel.

10 Statistics New Zealand figures indicate an unemployment rate of 3.6 percent for the June 2006 quarter.

30 The Kiwisaver Bill passes into law. Key changes to the draft bill have included the extension of opt out terms, amendment of employer exemption criteria, and the allowance of employer contributions to count toward the minimum contribution of 4 percent. The implementation date for the scheme is 1 July 2007.

September
6 The Reserve Bank officially opens the Reserve Bank Museum. The museum focuses on the New Zealand economy, the role of central banking, and the production of currency.

14 The Reserve Bank leaves the OCR unchanged at 7.25 percent at the release of its Monetary Policy Statement. Resource pressures and economic activity have been easing more slowly than expected despite clear evidence of rebalancing in the economy. The Bank notes that significant inflationary pressures are being generated from higher oil prices and the depreciation of the exchange rate.

28 Statistics New Zealand figures indicate an increase in total foreign investment in New Zealand of $19.5 billion (9 percent) in the year ended March 2006, while New Zealand investment abroad increased by $10.7 billion (11.4 percent). Australia remains the most important investment partner, accounting for 23.9 percent of all New Zealand investment abroad and 29.3 percent of foreign investment in New Zealand.

29 Statistics New Zealand figures indicate an increase in GDP of 0.5 percent for the June 2006 quarter. Annual growth in GDP was 1.9 percent for the year to June 2006.
October
13 The Securities Legislation Bill is passed into law, amending the Securities Act 1978, the Securities Markets Act 1988, the Takeovers Act 1993, and the Takeovers Code. Changes include prohibitions against market manipulation, amendment of broker and advisor disclosure law, and a new insider trading regime.
25 Statistics New Zealand figures show the CPI rose 0.7 percent in the September 2006 quarter, bringing CPI inflation for the year to September 2006 to 3.5 percent. As from this release, the CPI has been reweighted using the 2003/04 Household Economic Survey and other information. The reweighted CPI results in a higher weight on petrol prices and rents and a lower weight on the purchase and construction cost of new dwellings than under the previous regimen. The CPI was last reweighted in 2002.
26 The Reserve Bank holds the OCR unchanged at 7.25 percent. The Bank notes an improvement in the short-term inflation outlook due to a fall in the price of oil. However, medium-term pressures remain significant, with a resilient housing market and an expected increase in consumer demand resulting from declining petrol prices and a strong labour market.
30 The Reserve Bank of New Zealand Amendment Act 2006 is passed into law. The Act amends part of the existing act passed in 1989 and is being matched by equivalent legislation in Australia. The legislation provides greater assurance of cooperation between New Zealand and Australian prudential regulators by imposing obligations to consult each other on proposed policy action and to avoid actions that may have a detrimental effect on financial stability without unduly constraining the actions of the regulators.

November
1 The Reserve Bank registers Westpac New Zealand Limited as a New Zealand Subsidiary of Westpac Banking Corporation. This completes the local incorporation of all systemically important banks operating in New Zealand in line with the Reserve Bank’s local incorporation policy.

December
7 The Reserve Bank holds the OCR unchanged at 7.25 percent at the release of its Monetary Policy Statement. The Bank notes an improvement in the near-term inflation outlook. However, household spending has remained resilient, the labour market has remained firm, and there is new momentum in the housing market. The Bank states further tightening cannot be ruled out and this is particularly dependent upon trends in housing and domestic demand indicators.
15 The trans-Tasman provisions in the Reserve Bank of New Zealand Amendment Act come into force.
20 Statistics New Zealand figures indicate a current account deficit of 9.1 percent of Gross Domestic Product in the year to September 2006.
21 Statistics New Zealand figures show that GDP increased 0.3 percent in the September 2006 quarter. Annual growth in GDP for the year to September 2006 is 1.4 percent.
Reserve Bank workshop on ‘Housing, savings, and the household balance sheet’

On 14 November 2006, the Reserve Bank held a one-day workshop to discuss issues around housing, saving, and household balance sheet developments. Seven papers were presented at the workshop. These papers are available from the Reserve Bank website at http://www.rbnz.govt.nz/research/workshops.

The website also contains a summary of workshop findings and key points. This summary groups the findings under four categories:

- **Measurement issues**: The national-level estimate of household saving appears low; it is possibly not covering fully the income of trusts. In contrast, household-level data appears to be under-estimating household expenditure, which explains why saving measures based on this data are typically high.

- **Macro and micro views of household saving**: Macro-level data shows low household saving but large gains in household wealth due to house-price increases. Micro or household-level data shows that most households in the 45-54 age group will need to save relatively high proportions of their incomes if they wish to maintain their post-retirement consumption at pre-retirement levels. After adjustment for the effects of inflation and government transfers, it seems that the young are generally saving, while the old are dissaving.

- **The global house price phenomenon**: Growth in housing finance over the last decade or so has been driven by low inflation and low nominal interest rates, along with financial deregulation. This has resulted in higher demand for housing. With supply being unable to meet this demand, at least in the short term, house prices have risen.

- **Determinants of saving/consumption behaviour**: The withdrawal of equity from both housing and farms appears to be affecting household spending and saving.

The papers presented at the conference were:

- *Household savings and wealth*, by Bernard Hodgetts, Phil Briggs and Mark Smith, Reserve Bank of New Zealand.
- *Family trusts*, by Phil Briggs, Reserve Bank of New Zealand.
- *What do we know about equity withdrawal by households in New Zealand?* by Mark Smith, Reserve Bank of New Zealand.
- *Housing in the household portfolio and implications for retirement saving: some initial findings from a longitudinal panel survey*, by Grant Scobie and Trinh Le, Treasury, and John Gibson, University of Waikato.
- *Housing and housing finance: the view from Australia and beyond*, by Luci Ellis, Reserve Bank of Australia.
- *The life-cycle model, savings and growth*, by Andrew Coleman, Reserve Bank of New Zealand.
- *Statistical issues in the measurement of New Zealand’s saving(s)*, by Geoff Bascand and Diane Ramsay, Statistics New Zealand.
The Reserve Bank Museum celebrates and records New Zealand’s economic and banking heritage.

It is the first museum of its type in New Zealand, and was developed during 2006 by the Reserve Bank and consultants 3D Creative. A blend of artefacts, graphics, diagrams – even a simulated vault door – are designed to appeal to those interested in the history of our economy, and the role played by the central bank, and in learning more about our currency and the way in which it has evolved.

Open 9.30 a.m.–4.00 p.m. weekdays. Closed weekends, public holidays, and for special events. Please call to confirm opening hours.

Reserve Bank Museum
2 The Terrace
Wellington
New Zealand

ph 04-471-3862
museum@rbnz.govt.nz
http://www.rbnz.govt.nz/about/museum/2766074.html

Photography by Stephen A’Court
Uncovering the hit-list for small inflation targeters: a Bayesian structural analysis
by Timothy Kam, Kirdan Lees and Philip Liu, November 2006
We estimate underlying macroeconomic policy objectives of three of the earliest explicit inflation targeters – Australia, Canada and New Zealand – within the context of a small open economy DSGE model. We assume central banks set policy optimally, such that we can reverse engineer policy objectives from observed time series data. We find that none of the central banks show a concern for stabilising the real exchange rate. However, all three central banks share a concern for minimising the volatility in the change in the nominal interest rate. The Reserve Bank of Australia places the most weight on minimising the deviation of output from trend. Tests of the posterior distributions of these policy preference parameters suggest that the central banks have very similar objectives.

A new core inflation indicator for New Zealand
by Domenico Giannone and Troy Matheson, December 2006
This paper introduces a new indicator of core inflation for New Zealand, estimated using a dynamic factor model and disaggregate price data. Using disaggregate price data we can directly compare the predictive performance of our core indicator with a wide range of other ‘core inflation’ measures estimated from disaggregate prices, such as the weighted median and the trimmed mean. Predictive performance is assessed relative to a centred 2 year moving average of past and future annual inflation outcomes. The 2 year centred moving average is used as an analytical approximation of the inflation target from the PTA, which requires the Reserve Bank to keep annual inflation between 1 and 3 percent on average over the medium term. We find that our indicator produces relatively good estimates of this characterisation of core inflation when compared with estimates derived from a range of other models.

Assessing the fit of small open economy DSGEs
by Troy Matheson, December 2006
We describe a simple extension of the Monacelli (2005) small open economy model that incorporates a non-tradable good, habit persistence and price indexation. The empirical fit of eight different specifications of this model is then tested in a Bayesian framework using data for three small open economies: Australia, Canada, and New Zealand. The results show that the model with a non-tradable good fits the data better than the one-good model across all specifications considered. In contrast to Rabanal and Rubio-Ramirez (2005), we find that adding price indexation to either the one- or two-good model deteriorates overall empirical fit.

The present value model and New Zealand’s current account
by Anella Munro and Rishab Sethi, December 2006
This paper tests the present value model of the current account on New Zealand data. There is some evidence in favour of the PVM – the current account tests as stationary and Granger-causes changes in national net income. However, the cross-equation restrictions implied by the model are rejected both individually and jointly. This result holds for both the linear and non-linear versions of the tests. The orthogonality test results are consistent with rejection due to the presence of a transitory demand shock. We conclude that a richer model is needed to understand current-account dynamics.
2007

DP2007/01

Open economy DSGE-VAR forecasting and policy analysis - head to head with the RBNZ published forecasts

by Kirdan Lees, Troy Matheson and Christie Smith, January 2007

We evaluate the performance of an open economy DSGE-VAR model for New Zealand along both forecasting and policy dimensions. We show that forecasts from a DSGE-VAR and a ‘vanilla’ DSGE model are competitive with, and in some dimensions superior to, the Reserve Bank of New Zealand’s official forecasts. We also use the estimated DSGE-VAR structure to identify optimal policy rules that are consistent with the Reserve Bank’s Policy Targets Agreement. Optimal policy rules under parameter uncertainty prove to be relatively similar to the certainty case. The optimal policies react aggressively to inflation and contain a large degree of interest rate smoothing, but place a low weight on responding to output or the change in the nominal exchange rate.

DP2007/02

Nowcasting and predicting data revisions in real time using qualitative panel survey data

by Troy Matheson, James Mitchell and Brian Silverstone, January 2007

The qualitative responses that firms give to business survey questions regarding changes in their own output provide a real-time signal of official output changes. The most commonly-used method to produce an aggregate quantitative indicator from business survey responses - the net balance, or diffusion index - has changed little in 40 years. It focuses on the proportion of survey respondents replying “up”, “the same” or “down”. This paper investigates whether an improved real-time signal of official output-data changes can be derived from a recently advanced method on the aggregation of survey data from panel responses. It also considers the ability of survey data to anticipate revisions to official output data. We find, in a New Zealand application, that exploiting the panel dimension to qualitative survey data gives a better in-sample signal about official data than traditional methods. This is achieved by giving a higher weight to firms whose answers have a close link to official data than to those whose experiences correspond only weakly or not at all. Out-of-sample, it is less clear it matters how survey data are quantified with simpler and more parsimonious methods hard to improve. It is clear, nevertheless, that survey data, exploited in some form, help to explain revisions to official data.
NEWS RELEASES

Brian Lang retires from the Reserve Bank
11 December 2006

The Reserve Bank announced today that Mr Brian Lang will be retiring from the Bank on 15 December 2006.

A career central banker, Brian Lang joined the Bank in 1962 and has filled a wide range of senior positions, including Chief Manager Registry; Chief Manager Computer Services; and Chief Manager Personnel. He was appointed to his present position, Head of Currency and Building Services, in 1991.

Mr Lang has been closely involved with the modernisation of New Zealand’s bank notes and coins over the past 15 years. This includes introducing $1 and $2 coins in 1991; changing the designs and sizes of the bank notes in 1992/93; changing to polymer bank notes in 1999; and this year, improving our low value coins.

Reserve Bank Governor Alan Bollard said Mr Lang has made a huge contribution to the Reserve Bank over the last 44 years. “Through the dedication of Mr Lang, the Reserve Bank has made considerable progress in advancing New Zealand’s currency and making New Zealand a world leader in currency modernisation.”

Alan Boaden, who has worked at the Bank for over 15 years, will replace Mr Lang as Head of Currency and Building Services. Mr Boaden has had a number of roles at the Bank. He worked in the Economics Department for 12 years, but more recently he managed the change-over to New Zealand’s smaller lighter 50, 20 and 10 cent pieces.

Mr Boaden takes up his appointment on 18 December 2006.

Reserve Bank Bulletin released
13 December 2006

The Reserve Bank today released the December 2006 issue of the Reserve Bank of New Zealand Bulletin.

The first article of this issue considers the role of core inflation statistics and outlines a range of possible calculation methods. The article sets out some characteristics that a core inflation measure might ideally possess and then goes on to assess seven core inflation measures used at the Reserve Bank in light of these criteria. Whilst there are trade-offs involved, the article identifies three measures that appear to meet these criteria better than the others. The Bank intends to report regularly on these three measures in its future Monetary Policy Statements as well as publishing them on its website.

Under the Reserve Bank’s local incorporation policy, systemically important banks are now required to incorporate locally to provide a degree of assurance that the Reserve Bank would have the ability to manage a failure affecting one of these banks. The second article provides an outline of this policy and the rationale for it.

The third article briefly discusses the Reserve Bank of New Zealand Amendment Act 2006, passed in October, which makes further amendments to the existing Reserve Bank Act passed in 1989.

The fourth article describes changes to the liquidity management regime that were implemented between July and October of this year, and notes that the system appears to have been functioning more smoothly since the changes.

Finally, this issue includes the Editors’ summary of the policy forum held earlier this year to examine New Zealand’s macro economic policy frameworks and consider whether alternative, possibly non-conventional, policy tools could be used to provide a smoother ride for the exposed sectors of the economy over the business cycle. The full conference proceedings and papers can be downloaded from the Bank’s website.

Adrian Orr to take up new appointment
8 January 2007

Reserve Bank Deputy Governor and Head of Financial Stability Adrian Orr is leaving the Bank to take up the role of Chief Executive of the Guardians of the New Zealand Superannuation Fund.

Reserve Bank Governor Alan Bollard today congratulated Mr Orr on his appointment.

“This is a great opportunity for Mr Orr. During his time here, Adrian has made a huge contribution to the way the
Reserve Bank regulates the financial system and monitors for financial stability in New Zealand.

“This is a loss for us, but we wish him all the best in his new job,” Dr Bollard said.

Mr Orr’s final day at the Bank will be 5 February 2007.

Mr Orr said he was very proud of the Reserve Bank and its achievements over recent years.

“I now look forward to the challenge of assisting in the management of an important piece of New Zealand’s infrastructure, the NZ Superannuation Fund. I hope to build on the excellent platform that has been developed by the Guardians and their team over recent years.”

Appointment to IMF External Audit Committee

19 January 2007

The Reserve Bank announced today that the Head of Risk Assessment and Assurance, Steve Anderson, has been appointed to the International Monetary Fund’s (IMF) External Audit Committee.

The Committee has general oversight responsibilities for the external auditing of the IMF, the related financial reporting practices, and the system of internal controls.

Mr Anderson said it was an honour to be appointed to this important role.

Mr Anderson joined the Bank in 1989 and has filled a wide range of senior positions. He was appointed to his present position in 1999. His duties on the Committee are part-time and will be carried out in addition to his existing position at the Reserve Bank.

Grant Spencer to be Head of Financial Stability

23 January 2007

Reserve Bank Governor Alan Bollard today announced that the Bank’s Assistant Governor, Head of Economics, Grant Spencer, will move to become Head of Financial Stability.

The Financial Stability Department manages the Bank’s responsibilities for banking regulation, foreign reserves management, market operations and liquidity management.

This move follows the resignation of Adrian Orr, Deputy Governor, who will be taking up a position as Chief Executive of the Guardians of the New Zealand Superannuation Fund.

Mr Spencer has economics degrees from Victoria University and the London School of Economics. He began his career at the Reserve Bank, where he headed the Economics and Financial Markets departments, before moving to the ANZ Bank, where he spent several years in senior management roles in Wellington, Melbourne and Auckland. He has also worked at the International Monetary Fund. He returned to the Bank as Assistant Governor in 2004.

Simon Tyler, Manager Market Operations, will be acting Head of Financial Stability until Mr Spencer takes up his new role. Bernard Hodgetts, Manager Issues and International, will be acting Head of Economics until a permanent appointment is made.

OCR unchanged at 7.25 percent

25 January 2007

The Official Cash Rate (OCR) will remain unchanged at 7.25 percent.

Reserve Bank Governor Alan Bollard said: “While indicators show that economic growth was continuing to moderate in the third quarter of 2006, it is increasingly apparent that domestic demand has rebounded since then, with retail trade picking up, a resurgent housing market and consumer and business confidence recovering strongly. The main drivers appear to be the decline in petrol prices since last October, a pickup in net immigration and an expansionary fiscal policy.

“At the same time, headline inflation has reduced as a result of the lower oil prices and the strengthening of the exchange rate in the fourth quarter. Annual CPI inflation fell to 2.6 percent in December and is projected to decrease considerably further through 2007, thus helping to lower inflation expectations. But the medium-term outlook is less
rosy, with annual rates of inflation projected to return to the upper part of our target range through 2008 and into 2009.

“While the near-term inflation outlook is relatively benign, we remain concerned about the upside risks to medium-term inflation. In particular, our assumption that the housing market and consumer demand will resume their slowing trend over 2007 and 2008 is looking more uncertain, particularly if further fiscal expansion occurs.

“In the absence of clear indications of a moderation in housing and domestic demand, it is likely that further policy tightening will be required. The situation will be reassessed in the light of a full review of our economic forecasts at the March Monetary Policy Statement. A return to a moderating trend in housing and domestic demand will be essential if we are to see a reduction in medium-term inflation pressures.”

Ensuring financial services work better for New Zealand

26 January 2007

A lack of depth and breadth in New Zealand's capital markets is limiting economic growth and leaving the economy more vulnerable to crises, Reserve Bank Governor Alan Bollard said today.

In a speech to the Canterbury Employers’ Chamber of Commerce in Christchurch, Dr Bollard said that capital markets could develop more if lenders and borrowers changed their behaviour.

He said that limited product and service innovation is probably due to the fact that government and larger businesses have been net savers in recent years, while the household sector has been a heavy net borrower.

“Banks deliver basic banking services in New Zealand reasonably efficiently. However our capital markets do not all look so sophisticated - there are some financial services that our businesses and our investors cannot easily access on-shore.

“Our financial system currently looks sound. The industry has adapted to our rather unique circumstances. Because of this, and in particular our lack of household savings, we probably remain more vulnerable to financial shocks than most developed countries.”

New Zealand’s economic performance could potentially be raised if its capital markets were wider and deeper, the performance of the non-bank financial sector was enhanced, and the total pool of financial savings and financial literacy were raised.

“The New Zealand market is too dominated by bank debt and derivative markets, and its domestic capital market is too small,” he said.

Dr Bollard said the more means by which savings can be channeled into capital investment by firms, then the more back-up there is if any single channel fails.

“Countries with efficient financial systems tend to be less prone to financial crises, and tend to recover more quickly at less cost if such a crisis does occur.”

He said firms rely too heavily on debt financing. This could constrain their flexibility, their development and innovation.

In many other economies firms rely on some combination of external equity and debt for their financing.

“New Zealand’s capital markets are relatively small. Very few New Zealand dollar corporate bonds or securities are issued by local businesses, and New Zealand’s stock market is small relative to the size of its economy.

“Whether as a symptom or consequence of this, the direct and indirect holdings of equity by New Zealand households appear to be relatively low by global standards.”

Dr Bollard said there is room for New Zealand’s capital markets to develop.

“These improvements can come about through more effective regulatory arrangements currently being considered, through a better understanding of some of the outcomes of the current tax environment, through the promotion of deeper and more liquid bond markets, and through improved financial literacy,” Dr Bollard said.

Improvements would also come from financial innovation and the necessary recovery of private savings.
John McDermott appointed Head of Economics

9 February 2007

Dr John McDermott has been appointed Head of Economics at the Reserve Bank.

Governor Alan Bollard said today he was pleased to announce the appointment following the announcement last month that the current Head of Economics, Grant Spencer, will take over as Head of Financial Stability. The moves come after the recent departure of Adrian Orr to take up the role of Chief Executive of the Guardians of the New Zealand Superannuation Fund.

Dr McDermott will commence at the Bank on 11 June 2007. He is currently Associate Professor at Victoria University’s School of Economics and Finance. Dr McDermott has held positions at the ANZ National Bank of New Zealand and the International Monetary Fund. He has also previously worked at the Reserve Bank in various roles.

“Dr McDermott brings to the position a strong and broad background in economics,” Dr Bollard said.

Once Mr Spencer moves to the Financial Stability Department, Bernard Hodgetts will be acting Head of Economics until Dr McDermott takes up his appointment.

Arthur Grimes re-appointed to Reserve Bank Board

5 March 2007

Arthur Grimes has been re-appointed as a non-executive director on the Reserve Bank Board for a second five-year term, Finance Minister Michael Cullen announced today.

“I am grateful for Dr Grimes’ commitment to the development and maintenance of the board’s functions and activities over the past five years, particularly in his role as chair,” said Dr Cullen.

“Dr Grimes has a thorough understanding of the roles and responsibilities of our central bank and its influence on the economy and his knowledge and experience will continue to serve the bank well over the next five years.”

He is a Senior Fellow at Motu Economic and Public Policy Research Trust and is an adjunct Professor of Economics at the University of Waikato. He has previously held senior positions within the Reserve Bank and the National Bank, and as Director of the Institute of Policy Studies at Victoria University of Wellington.

Dr Grimes is currently chair of the Reserve Bank Board. The non-executive directors appoint the Board’s Chair. Other non-executive directors on the RBNZ Board are: Paul Baines; Hugh Fletcher; John Goulter; Alison Paterson; the Rt Hon Ted Thomas; and Dr Marilyn Waring. The Reserve Bank Governor, Dr Alan Bollard is an executive director.

Reserve Bank Deputy Governor appointed

16 February 2007

Grant Spencer has been appointed Deputy Governor of the Reserve Bank, Reserve Bank Governor Alan Bollard announced today.

Dr Bollard said Mr Spencer’s appointment was approved by the Reserve Bank Board on 15 February, and is effective immediately. The appointment follows the recent departure of Adrian Orr to take up the role of Chief Executive of the Guardians of the New Zealand Superannuation Fund.

Mr Spencer is currently Head of Economics, but will leave that role to become Head of the Financial Stability Department on 2 April 2007.

Reserve Bank raises OCR to 7.50 percent

8 March 2007

The Official Cash Rate (OCR) will increase by 25 basis points to 7.50 percent.

Reserve Bank Governor Alan Bollard said: “Recent indicators show clear evidence of a pick-up in economic activity in late 2006 and early 2007. Strengthening domestic demand is being supported by a resurgence in the housing market and an expansionary fiscal policy. The acceleration in housing reflects firming net immigration, a recovery in confidence, a continuing rapid expansion of mortgage credit at very low margins, and strong growth in household incomes. The recent lift in export commodity prices – particularly dairy –
may also be a factor. All this is adding to resource pressures and increasing the risk of a re-emerging inflation problem in the medium term.

“The short-term inflation outlook continues to ease. CPI inflation is projected to be around the middle of the target band through 2007, benefiting from lower oil prices and the high exchange rate. Domestic price inflation is also expected to moderate somewhat in 2007, assisted by the effect of lower headline inflation on inflation expectations. Despite this, domestic inflation is projected to remain at high levels over the medium term and is subject to considerable upside risk.

“Our concern is that the recent pick-up in housing and domestic demand may gain momentum, giving rise to a stronger cyclical upturn at a time when resources are already very stretched. This could reverse the rebalancing of the economy that has been underway since late 2005 and present substantial risks to the medium-term inflation outlook. It would also increase the prospect of a more costly correction in the country’s external deficit.

“We are continuing to assess alternative measures that might support the OCR, working with the relevant government agencies. These include a tightening of tax rules applying to housing investment and changes to bank capital requirements to help moderate the amplifying effect of credit on the housing cycle. However, we will continue to rely on the OCR as the primary instrument of monetary policy.

“The current policy tightening is aimed at reducing the risk of an unsustainable rebound in activity. Depending on the persistence of the current upturn, further tightening may be required. A return to a moderating trend in housing and domestic demand will be essential if we are to see a reduction in medium-term inflation pressures.”

Easy money: Global liquidity and its impact on New Zealand

Date 15 March 2007

Households and banks need to realise that the recent period of cheap international money has been unusual and at some point is likely to revert to more normal financial conditions, Reserve Bank Governor Alan Bollard said today.

In a speech to the Wellington Chamber of Commerce, Dr Bollard said there are significant distortions in global liquidity, with savings flowing from mainly Asian and oil-producing economies to developed countries with current account deficits.

Given New Zealand’s relatively high interest rates, New Zealand has attracted a disproportionate share of global liquidity in recent years, Dr Bollard said. “This has put upward pressure on the New Zealand dollar despite our relatively large current account deficit.

“Of course the inward capital flows would not have happened without a strong domestic demand for borrowing. It is New Zealand households’ desire to keep investing in housing, while at the same time consuming strongly, that fuels their demand for funds,” Dr Bollard said. “New Zealanders need to think about other eventualities ahead, and in some cases show less exuberance.”

Monetary policy continues to work despite these distortions, but its impact has been muted as borrowers have been able to access longer-term fixed-rate mortgages driven by lower international rates than by the short-term rates affected by the Bank’s Official Cash Rate (OCR).

Dr Bollard noted that the attractiveness of the New Zealand dollar for offshore investors is not just a reflection of the current level of interest rate differentials, but also investors’ views regarding their sustainability.

“Recent fears sparked by a share retracement in China’s share market saw investors rush to reduce positions in a range of markets. This turbulence has proved relatively contained to date, with risk appetites and markets recovering. But it does demonstrate the potential widespread impact of an increase in risk aversion and market volatility,” Dr Bollard commented.

He said the Bank will continue to rely on the OCR as the primary instrument of monetary policy. Monetary policy lags have been longer in this cycle but the OCR remains a potent policy instrument.

“We are continuing to assess alternative measures that might support the OCR, working with the relevant government agencies.”
PUBLICATIONS

Annual Report
Published in October each year.

Financial Stability Report
Published six-monthly. A statement from the Bank on the
stability of the financial system.

Monetary Policy Statement
Published quarterly. A statement from the Bank on the conduct
of monetary policy.

Reserve Bank of New Zealand Statement of Intent, 2004–2007
Snakes and Ladders – a guide to risk for savers and investors
Testing stabilisation policy limits in a small open economy: proceedings from a macroeconomic policy forum

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survey data
Troy Matheson, James Mitchell and Brian Silverstone

Full lists of Discussion Papers are available from Administration, Economics Department. Lists of the Working Papers
and the Research Notes can also be obtained from the Economics Department.

Pamphlets

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Changes in the inflation process in New Zealand
Analysis of revisions to quarterly GDP – a real-time database
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