

GDP-12 – the Bank’s measure of trading partner demand

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This article provides readers with the technical details of the Bank’s measure of external demand. GDP-12, as it is known, is a summary measure that is used to help gauge trading partner demand for New Zealand’s exports. Although GDP-12 is a useful summary measure, there are other external influences affecting the demand for our exports and economic activity more generally. Bearing this in mind, the Bank considers a wide range of developments in its monitoring and forecasting of the world economy.

Introduction

Being small and open, the New Zealand economy is heavily influenced by its trading partners. The level and growth of activity in trading partner economies has a direct bearing on the volumes and prices of the exports New Zealand sells abroad and on the prices it pays for its imports. Reaching a view about the world economy is therefore an important part of the Reserve Bank’s assessment of the prospects for the local economy and for monetary policy.

The Bank’s analysis of the world economy takes a number of forms. Economic data from individual trading partner economies are watched closely and the views and commentaries of a range of international analysts are scrutinised. Trends and developments in international financial markets are also continuously analysed. This, among other things, provides useful information on inflation developments and future monetary policy settings abroad.

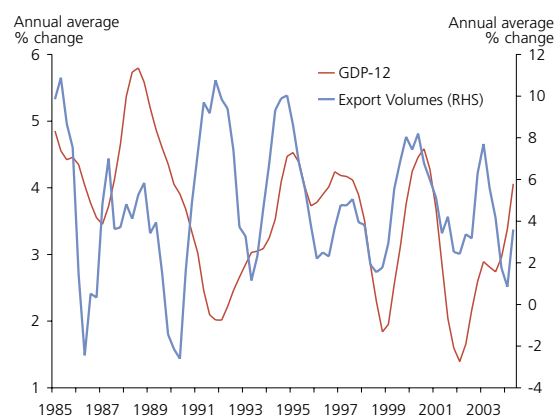
As part of its assessment of the global economy, the Bank constructs an aggregate of trading partner GDP, known as GDP-12. GDP-12 is a summary statistic of trading partner activity and is a variable used in the Bank’s Forecasting and Policy System (FPS) model of the economy. The GDP-12 measure will be familiar to readers of the Bank’s monetary policy statements, where it is used to help illustrate prospects for the world economy.

This short article provides details about the construction of GDP-12, its trend over time, and the methods currently used to forecast it.

What is GDP-12?

As the name implies, GDP-12 is a summary measure of the economic activity of 12 of New Zealand’s major export destinations.¹ The Bank is primarily concerned with finding a measure that proxies the demand for the quantity of New Zealand’s exports, hence an export-weighted aggregate is more suitable than weighting together the individual GDP’s in terms of economic size. Countries taking a larger share of exports (such as Australia) therefore have a proportionately greater weight in GDP-12. Table 1 lists these country areas and summarises their share of merchandise exports.²

Figure 1
GDP-12 and aggregate New Zealand export volumes



¹ The Bank started reporting an export weighted GDP measure for world demand in the November 1998 *Monetary Policy Statement*. Prior to that OECD industrial production was used. In September 2003, GDP-14 was changed to GDP-12 as GDP from the Eurozone replaced output in Germany, France, and Italy.

² Merchandise exports do not include services exports (which make up about one-quarter of New Zealand’s total export receipts). Although data quantifying the value of each of New Zealand’s major services export markets is not available, these countries are likely to be the same as for merchandise

Table 1

Growth in NZ exports and GDP-12 country areas since 1985

| | Weight in GDP-12 (%) | Average annual growth in NZ exports (%) | Average annual GDP growth (%) |
|------------------|----------------------|---|-------------------------------|
| Australia | 26.7 | 6.7 | 3.4 |
| US | 18.4 | 5.3 | 3.1 |
| Japan | 14.2 | 3.9 | 2.4 |
| EU-12* | 12.0 | 5.0 | 2.3 |
| China | 6.7 | 10.7 | 9.2 |
| UK | 6.0 | 1.6 | 2.6 |
| South Korea | 4.8 | 10.8 | 6.6 |
| Taiwan | 2.8 | 8.5 | 6.3 |
| Hong Kong | 2.4 | 6.1 | 4.9 |
| Malaysia | 2.3 | 7.0 | 6.4 |
| Canada | 2.2 | 4.5 | 2.8 |
| Singapore | 1.4 | 4.3 | 6.7 |
| Total GDP-12 | 100.0 | 5.2 | 3.5 |
| Non-Japan Asia** | 20.5 | 8.6 | 6.6 |

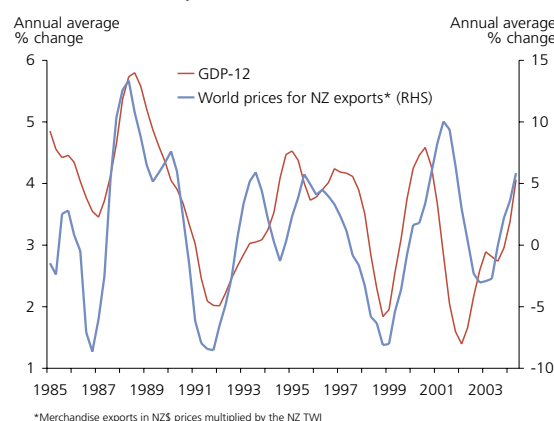
* Consists of Germany, France, Italy, Spain, The Netherlands, Belgium, Austria, Finland, Ireland, Portugal, Luxembourg, and Greece

** Includes China, South Korea, Taiwan, Hong Kong, Malaysia, and Singapore.

The countries included in GDP-12 purchase around 80 percent of New Zealand merchandise exports by value.³ GDP-12 includes many of the major economies including all of the G7 members, and the rapidly growing Chinese and east Asian economies. Australia, the US, Japan, and the Eurozone area are major export markets and account for about 60 percent of total merchandise exports, and nearly 75 percent of total merchandise exports for the countries in GDP12. China, United Kingdom and South Korea each account for about 5 to 7 percent of merchandise exports of the GDP12 total, with Taiwan, Hong Kong, Malaysia, Canada, and Singapore making up the remainder.

Growth rates for GDP-12 have roughly tended to track changes in the world prices for New Zealand's merchandise exports (figure 2). This correlation suggests that the prices for many exports are at least partly determined by general world demand conditions, rather than necessarily market-specific factors.⁴ There are episodes, however, where New Zealand's export prices have been more influenced by supply-and-demand conditions specific to the type of export

Figure 2
GDP-12 and the world prices for New Zealand's merchandise exports



(for example, the influence of weather patterns, biological factors, and institutional arrangements on prices for agricultural products). The Bank's analysis of future export-price trends attempts to take these factors into account as well as prospects for world supply-and-demand conditions more generally.

It is sometimes asked why GDP-12 has not been extended to cover more countries with whom New Zealand trades, such as the European economies outside the Eurozone and UK or those of South America. The issue is largely one of practicality. More countries could be added, but their small share in trade means that doing so is likely to be of marginal benefit. The timeliness and reliability of data and the availability of external forecasts have also been considerations in choosing

³ Merchandise imports from GDP-12 countries constitute a roughly similar portion of total merchandise imports. The value of New Zealand's merchandise imports is typically larger than exports. Merchandise trade deficits are frequently incurred against most trading partners, with the notable exceptions of the US and UK.

⁴ However, prices for other exports (including service exports such as tourism and some niche products) will tend to reflect domestic conditions. See Smith (2004) for further details.

Box 1

How the Bank constructs GDP-12

GDP components

Data for real GDP volumes are obtained from Datastream. Seasonally adjusted estimates in quarterly frequency are available for most countries, but for some Asian countries seasonally adjusted estimates have to be calculated. Estimates of quarterly Chinese GDP are obtained by interpolating annual official GDP estimates. In constructing the GDP-12 index, the GDP volumes for each country area are converted to index form, with the base periods set to 1995Q1=100.

Export weights

Export weights are based on merchandise export values obtained from Statistics New Zealand. For each country area, they are expressed as a portion of total GDP-12

export receipts. Export values are volatile, so the weights used to construct GDP-12 are based on a 2-year moving average.

Constructing the GDP-12 index

To ensure the aggregate index better reflects changes in export patterns, GDP-12 is calculated as a Fisher Ideal Index. A Fisher Ideal Index (Q^F) is the geometric mean of a Laspeyres (Q^L) and a Paasche Index (Q^P). The Laspeyres index uses the export shares of the base period as weights, whereas the Paasche index uses the export shares of the current period.

$$Q^F = (Q^L \times Q^P)^{1/2}$$

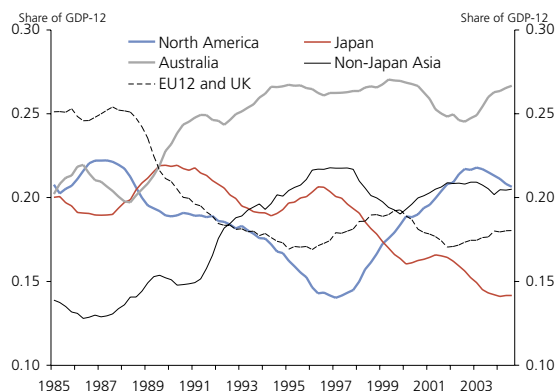
$$Q^L = Q^1 W^0 / Q^0 W^0$$

$$Q^P = Q^1 W^1 / Q^0 W^1$$

Where: Q = GDP index at time t=0 and 1.

W = export weight in time t=0 and 1.

Figure 3
Share of GDP-12 merchandise exports by country area
(2 year moving averages)



the threshold for inclusion. The composition and coverage of GDP-12 is regularly reviewed in line with changing trade patterns.

How is GDP-12 constructed?

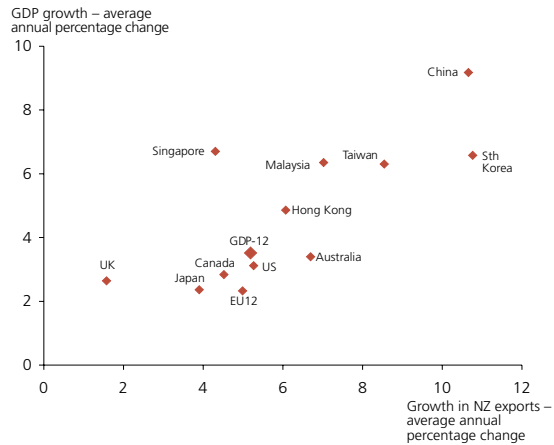
To calculate GDP-12, individual trading partner GDP is weighted according to its share of New Zealand's merchandise exports. The weight applied to each country in GDP-12 is based on a 2-year moving average. The moving average is used to ensure that the export weights applied to each country reflect their evolving influence as an export destination, whilst smoothing through quarter to quarter volatility. Box 1 contains further details.

Figure 3 shows how the relative shares of each of the major export destinations in GDP-12 have evolved. Since the late 1980s, Australia has become New Zealand's largest market for merchandise exports, with its export share on a gentle upward trend. Conversely, the share of New Zealand's merchandise exports destined for Japan, the UK, and the Eurozone has been on a gradual decline. Although quite cyclical, the share of merchandise exports destined for North America is now roughly where it was in the mid 1980s.⁵

Increases in the value of New Zealand's exports tend to be positively correlated with the rate of economic growth

⁵ This possibly reflects the impact of greater cyclical swings of the NZD/USD exchange rate which affect NZD denominated export receipts.

Figure 4
Average NZ export value growth and GDP growth of export markets (1985-2004)

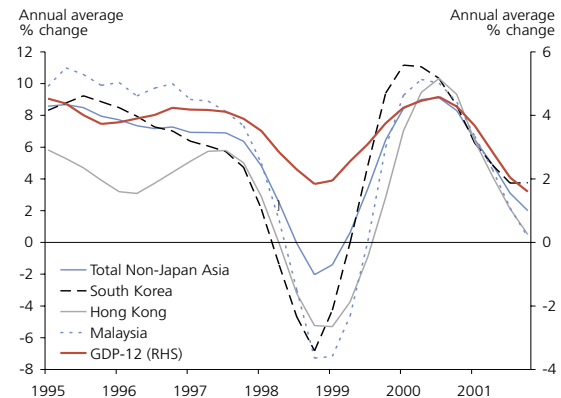


in the particular market (figure 4). This is particularly true for emerging countries such as China, which has recorded consistently high rates of growth over the recent past and has been one of our fastest growing export markets. As such, the export weight applied to Chinese GDP in the GDP-12 calculation has steadily increased and is now above that of the UK. As a result of these shifts, the impact of changes to Chinese GDP growth has a proportionally greater impact on GDP-12 now (and probably in the future) than it did just a few years ago.

Volatility in trading partner economies

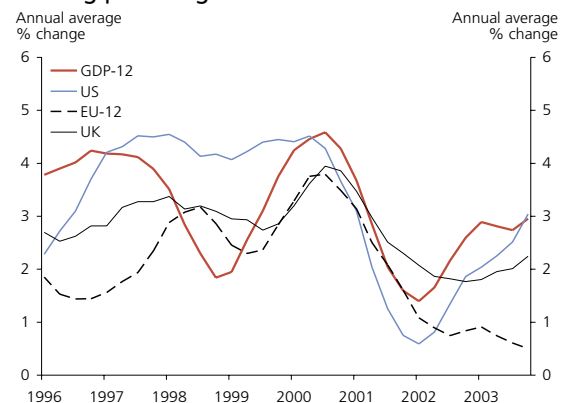
Although the growth rates of GDP-12 tend to be relatively smooth, movements in GDP for some of our individual trading partners have been considerably more volatile. The Asian financial and currency crisis of the late 1990s is one case in point. Output declined outright in Singapore, Malaysia, South Korea, Japan, and the pace of growth declined sharply in China and Taiwan (figure 5). Consequently, New Zealand's export growth to these countries slowed sharply, and the share of exports to the region dipped as proportionately more exports were sold to other markets. This regional shock dampened aggregate GDP-12 growth, although it was partly offset by continued strong growth in the US, Eurozone, and Australian economies.

Figure 5
Asian trading partner growth



Following the recovery from the Asian crisis, growth in GDP-12 slowed sharply again at the end of 2000. The surge in IT investment and associated build-up in equity wealth had led to a strong expansion in domestic demand in the US, UK, Eurozone and other countries. When the bubble burst, the fall in equity values contributed to an outright recession in the US and a significant slowdown in growth in many countries around the world (figure 6).

Figure 6
Trading partner growth around Y2k



How does the Bank forecast GDP-12?

As foreign demand conditions are likely to have a significant influence on New Zealand's output and inflation, it is important for the Bank to anticipate future prospects for the world economy. Because of the significant resources that would be required, the Bank does not attempt to produce its own forecasts for the individual countries in GDP-12. Instead, GDP forecasts for the countries comprising GDP-12 are obtained using a survey of forecasts contained in the

Consensus Forecasts publication.⁶ These forecasts are added to official GDP statistics to produce an index for GDP-12, which is then used as input into the Bank's projections of the New Zealand economy.

The Bank uses *Consensus Forecasts* as a guide only. Previous work at the Bank has highlighted the positive serial correlation in *Consensus Forecasts* – the forecasts tend to consistently under- or over-predict actual GDP for periods of time, though these forecast errors are not usually substantial. In instances where we believe there are solid grounds for deviating from the *Consensus Forecasts*, we do so.⁷ During typical forecasting rounds, the Bank also generates a range of alternative scenarios for the world economy that differ from the *Consensus Forecasts*. For example, the Bank has recently assessed the potential impact of alternative oil price profiles on world activity and inflation prospects.

Are there other alternatives to GDP-12?

Although GDP-12 appears to provide a reasonable historical measure of world demand from the New Zealand perspective, it has its limitations. Other aggregates could potentially do a better job explaining the demand for our exports. GDP may not be the ideal proxy for export demand when exports to a country are destined to a particular sector of its economy. For example, fluctuations in New Zealand's manufactured export volumes to Australia tend to be more closely correlated with the Australian residential building cycle than with cycles in Australian GDP per se. This is likely to reflect the importance of goods such as building materials, carpets and household appliances in the basket of exports sold to Australia. Similarly, work at the Bank has suggested that changes in household

consumption in some trading partner economies may be more closely correlated with movements in exports.⁸ The factors influencing demand for some categories of exports – such as commodities – can be very complex. Supply conditions affecting other world producers and institutional changes (eg changing subsidies) can also have an important bearing on demand for particular exports.

Given the diversified nature of New Zealand's exports, there is unlikely to be a summary measure that captures all of the factors influencing demand in each particular export market. Needless to say, these considerations underscore the importance of looking beyond simple statistical measures when analysing growth prospects.

Conclusion

The Bank has developed GDP-12 as a summary indicator of the demand for New Zealand's exports. As New Zealand exports a wide range of goods and services to a variety of different markets, it is unlikely that one statistic will provide an accurate representation of the demand conditions in each market. Where there are other influences affecting the demand for New Zealand's exports, these are taken into account judgementally.

The Bank's analysis of the international economy encompasses a wide range of economic and financial market developments. Rather than exclusively focusing on the GDP-12 aggregate, other developments in the world economy are also considered.

References

Reserve Bank of New Zealand (2003), "An introduction to the Forecasting and Policy System at the Reserve Bank of New Zealand".

Smith, M (2004), "Impact of the exchange rate on export volumes", *Reserve Bank of New Zealand Bulletin*, March 2004.

⁶ This is produced by Consensus Economics Inc. in the UK. Every month the Consensus survey compiles forecasts for a number of macroeconomic aggregates (such as real GDP growth and CPI inflation) from a number of forecasting institutions. Forecasts for the current calendar year and year ahead are published monthly, with forecasts for longer horizons published in the April and October surveys.

⁷ The most visible example was at the time of the Asian financial crisis in the late 1990s. In the December 1997 *Statement* and March 1998 *Economic Projections*, the Bank used a subset of 'pessimistic' forecasts from *Consensus Forecasts* for its forecasts of world output. This was taken at a time when prospects for many Asian economies were taking a turn for the worse and allowed the Consensus panel time to adjust their forecasts.

⁸ Further work investigating the merits of using alternative measures of world output is underway.