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China's 'New Normal': How will China's growth slowdown affect Australia's growth?

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Abstract

China's 'New Normal' has been widely discussed in both the press and in academic circles. While many aspects of the Chinese economy are expected to change in this situation, an important component of the change is a significant and persistent growth slowdown. Not surprisingly, Australian commentary on China's growth slowdown has focussed on the implications for Australia's growth rate. Evaluations of this effect vary widely but are generally not firmly based on empirical research. This paper helps to fill this gap by analysing the likely effect on Australia's growth rate of a reduction in China's rate of economic growth. The analysis begins with a simple back-of-the-envelope calculation and then moves to regression analysis and the simulation of a vector-autoregressive model. Estimates are remarkably consistent across a range of models and suggest that the effect on Australia of a permanent fall in China's growth rate from 10% per annum to 7% per annum will be to reduce Australia's growth rate by about 0.2 percentage points in the short run and approximately 0.5 percentage points in the long run. While not trivial, given Australia's current growth rate, these estimates are hardly enough to justify prophesies of doom. (about 200 words)

Keywords: China; New Normal, Australia, growth, international spillover
JEL Codes: F41, F43, O47,

1. Introduction

Since it was used by China's President, Xi Jinping, in 2014, the expression 'New Normal' has featured widely in discussions of actual and anticipated long-term changes to the Chinese economy.¹ While it has covered a range of actual and predicted changes, an important aspect is a permanent slowdown in Chinese economic growth from an average of around 10% per annum for the three decades preceding the GFC to a new level of at most 7% per annum.

This slowdown has received much attention in the Australian press, particularly insofar as its possible impact on Australia's growth rate is concerned. Thus in January 2015 the *Sydney Morning Herald's* headline read "Australia to feel the effects as China's growth slows" and in the ensuing article it argued that "Slower growth and tighter credit in China will place pressure on the Australian economy, which heavily relies on resources exports". Similarly, *The Guardian* in August of the same year declared that "China's slumping economy a bigger threat to Australia than its plunging stock market". And as recently as May of 2017, ABC News in an article headed "The trouble with the Chinese economy and what it means for Australia" told Australian viewers that "As the nation that benefitted the most from the China stimulus, and with our economy now dominated by trade with China, any hiccups from Beijing will rattle our economy".² There is considerable fear, then, that this new state of China's economic affairs will be permanent and that it will have a seriously adverse effect on Australia's economic prosperity.

While there has been much similar news and opinion coverage, there seems to have been little empirical analysis to provide a basis for conjectures of the likely severity of the

¹ Xi was not the first to use this, however, in relation to the changes following the Global Financial Crisis (GFC); see El-Erian, (2010).

² SMH: <http://www.smh.com.au/business/china/australia-to-feel-the-effects-as-chinas-growth-slows-20150119-12tgd.html>, The Guardian: <https://www.theguardian.com/business/grogonomics/2015/aug/27/chinas-slumping-economy-a-bigger-threat-to-australia-than-its-plunging-stock-market>, and ABC News: <http://www.abc.net.au/news/2017-05-22/the-trouble-with-china-and-what-it-means-for-australia/8545886>. All accessed on 7 September, 2017.

effect on the Australian economy (particularly its growth rate) of the projected fall in China's growth. This paper makes a start in this direction. It begins with a simple back-of-the-envelope calculation, using information on the importance of Australia's trade with China and the importance of exports in overall demand. Further analysis uses econometric estimation, starting from a simple single-equation model and progressing to several time-series models of the vector autoregressive (VAR) type. The results suggest that the immediate effect of a unit fall in China's growth rate will be a decline in Australia's growth rate of about 0.05 percentage points in the short run but a larger long-run effect of the order of 0.15 percentage points. Thus, if China's growth rate falls from 10% to 7%, Australia's growth rate is likely to be about 0.5 percentage points lower than it would have been in the long run – not trivial but no cause for panic.

The remainder of this section is structured as follows. In the next section some background information on China's New Normal is provided, followed in section 3 by preliminary calculations. Section 4 discusses the data used in the econometric modelling and section 5 reports the estimation results. Conclusions are drawn in section 6.

2. China's 'New Normal'

It was in 2014 that Chinese President Xi Jinping applied the term 'New Normal' to China's slowing growth, the implication being that the fall in the growth rate following the GFC was not a temporary situation which would be righted in time but was of a permanent nature. It is true that it has since been used to describe not just slowing growth but, more generally, a range of observed and planned changes in the Chinese economy, from industrial restructuring (increases in the shares of services and high-tech industries in total output and a reduction in energy consumption per capita) to a change in the balance between the components of GDP (greater reliance on domestic demand and less on exports and

investment), to change in the sources of growth (from factor inputs to greater innovation). However, it is fair to say that the growth slowdown is the major feature of the New Normal and this will be the focus in this paper.

Figure 1 shows the annual growth rate of real GDP in the post-reform period (1978 to 2016).

Figure 1 about here

While economic growth has fluctuated considerably over the period, it is clear that growth has slowed markedly since the pre-GFC highs in the early 2000s to a level of around 6-7% by 2016. There have been earlier substantial slowdowns in growth, the most recent being that beginning from a remarkable level of 14% in 1992 and falling to below 8% less than a decade later. The recovery by 2007 was equally remarkable and it is reasonable to ask whether the economy will recover in like manner from the current slowdown or whether this is a new phase in the history of Chinese economic growth.

There has been much discussion of the question of causes and permanence of the current slowdown and the balance of the informed opinion seems to favour a permanent shift in growth, driven largely by supply-side factors. A prominent argument concerns the drying up of excess labour from agriculture which is forcing the urban wage up and so reducing the marginal product of capital compared to what it would have been with continued flows of cheap labour from agriculture (see, for example, Li *et al.*, 2012, but also Golley and Meng, 2011, Meng, 2012, and Lou, 2016, for more qualified views).

A second supply-side argument concerns the depletion of the “demographic dividend” which argues that, until recently, the demographic structure was such that the working-age population was increasing more quickly than the overall population, providing more labour at a given population growth rate. But this effect is beginning to reverse so that in future the labour force growth rate will be slower than the (already low) population growth rate. Cai

and various co-authors have been a strong proponent of this view – see Huang *et al.* (2013), Garnaut *et al.* (2013), Cai and Lu (2013), Cai and Roberts (2015) and Cai (2016).

A third aspect affecting supply is that it is increasingly urgent to address the negative consequences of China's long period of high growth such as pollution, inequality and urban sprawl which will require resources which will no longer be available for production of output (see Tyers, 2014, for some discussion of these issues).

Finally, it is argued that China is catching up to the rest of the world as far as technology is concerned and as it reaches the technological frontier it will need to be pushed out, rather than simply catching up to an existing frontier based on developments in the rest of the world (Lee and Hong, 2010).

A notable exception to the supply-side focus of much of the literature is the paper by Lin *et al.* (2016) who attribute “the recent slowdown mainly to cyclical and external factors” (p.843). A further demand-side argument is that export growth cannot be sustained. This is partly because of the weak global economy after the GFC but may also reflect China's gradual loss of its competitive position in the market for low-tech, labour-intensive manufacturing, with other low-cost countries such as India, Bangladesh and Vietnam undercutting China as its real wages rise.

In all, many alternative explanations of this slowdown have been offered, both ones which operate through demand channels and ones which affect output via aggregate supply factors. But given the strength of the evidence for a long-term supply-driven effect, Australian policy-makers are right to be concerned about the possible ramifications for Australia's growth rate of a long-term fall in China's growth rate. How concerned they should be will depend importantly on the likely flow-on effects to the Australian economy, the estimation of which is the main purpose of this paper.

3. Preliminary calculations

In this section a simple back-of-the-envelope method is used to assess the importance of China's macroeconomic developments for Australia's economic growth. The method is similar to that in Day (2011) when she estimated the effects on the Australian growth rate of the Chinese fiscal expansion in the immediate aftermath of the GFC.³ The basis of the calculation is the GDP identity:

$$Y = C + I + G + X - M \quad (1)$$

where the symbols have their common meaning:

Y = real output,

C = real consumption,

I = real investment,

G = real government expenditure,

X = real exports, and

M = real imports.

In proportional-change terms, it is approximately true that:

$$dY = s_C.dC + s_I.dI + s_G.dG + s_X.dX - s_M.dM \quad (2)$$

where dZ = the proportional change in Z and s_Z is the share of Z in Y ($Z = C, I, G, X, M$).

Making the assumption that a change in X has no direct or indirect effect on the other variables on the right-hand side of (2), allows the effect on Y of a change in X to be written as simply $s_X.dX$. Further, disaggregating exports into those from China and those from the rest of the world, XC and XW , respectively, allows the effect on output to be written as

$$dY = s_X.(s_{XC}.dXC + s_{XW}.dXW)$$

where s_{XC} and s_{XW} are the Chinese and non-Chinese shares of Australia's exports. Extending the *ceteris paribus* assumption to that of XW being unaffected by a change in XC , it follows

³ See also Makin (2010) who effectively uses the same "contributions to growth" approach.

that $dY = s_X \cdot s_{XC} \cdot dXC$ so that the effect of a unit proportional change in XC leads to a proportional change in Y of $s_X \cdot s_{XC}$. Finally, assuming that the ratio of China's imports from Australia to its GDP is constant, it follows that $dY = s_X \cdot s_{XC} \cdot dXC = s_X \cdot s_{XC} \cdot dYC$, where YC is China's GDP. Hence a change in China's growth rate of one percentage point will lead to a change in Australia's growth rate of $s_X \cdot s_{XC}$ percentage points.

Using data from Australia's National Accounts for Y and X to evaluate s_X and using the share of Australia's merchandise exports going to China for s_{XC} (all for 2015-16), the numerical value for $s_X \cdot s_{XC}$ is $0.205 \times 0.28 = 0.0574$. Hence, under the assumptions made above, a one percentage-point fall in the Chinese growth rate will reduce Australia's growth rate by about .06 percentage points; or, if the predicted fall in the long-term growth rate in China is three percentage points (from 10% to 7%), the Australian rate might fall from, say, 2.6% to 2.4%, a reduction which is not negligible but also not a cause for panic.

However, this calculation is very much back-of-the-envelope; in particular, it assumes all the other variables in the equations are unaffected by a change in the Chinese growth rate while in any plausible economic model all the variables are potentially endogenous and should be allowed to respond to the Chinese shock. This issue is considered at some length in the next section where the relationship between the two key variables is analysed econometrically. But first the data are described.

4. Data

In this section the definitions and sources of the data to be used in the econometric analysis of the relationship between China's and Australia's growth rates will be briefly described. Data for the following variables will be used. For China: real output; for Australia: real output, real consumption, real investment, real government expenditure, real exports, real imports, the real exchange rate and two interest rates, one short and the other

long. Data are quarterly from 1992(1) (the earliest date from which quarterly real GDP for China are available) to 2017(1). All variables except the interest rates are in quarter-to-quarter proportional changes measured as log first-differences. All national-accounting data were seasonally adjusted – the Chinese real GDP data by using the X12 procedure in EViews and the Australia data were taken as seasonally-adjusted from web-site of the Australian Bureau of Statistics. The two interest rates had a clear and strong negative trend from 1992 onwards and were de-trended. The data used and their sources are as follows.

1. China real GDP. The data were obtained from the website of the National Bureau of Statistics (NBS) and from the CEInet Statistics Database. While real GDP (RGDP) data are available after 2010, before this date only an index of RGDP growth is available and this has been linked to later data to compute the level of RGDP for earlier years.

2. Australia National Accounts data were all chain volume measures, seasonally adjusted and taken from the website of the Australian Bureau of Statistics (ABS):

- (a) GDP: GDP (expenditure method),
- (b) Consumption: household final consumption expenditure,
- (c) Investment: private gross fixed capital formation,
- (d) Government expenditure: the sum of general government final consumption expenditure and general government gross fixed capital formation,
- (e) Exports: exports of goods and services, and
- (f) Imports: real imports of goods and services.

3. Financial variables were taken from the Reserve Bank of Australia's web-site:

- (a) Short-term interest rate: the 30-day bank-accepted bill rate,
- (b) Long-term interest rate: the 10-year government bond rate, and
- (c) Real exchange rate: the trade-weighted real exchange rate.

5. Estimation results

(a) Single-equation estimates

The econometric analysis begins with a simple bivariate regression of the Australian one-quarter growth rate (G1YA) on the Chinese one-quarter growth rate (G1YC):

$$G1YA = 1.7965 + 0.1527G1YC, \quad R^2 = 0.0458, \quad DWS = 2.09 \quad (1)$$

(2.56) (2.19)

The numbers in parentheses are absolute t-ratios and DWS is the Durbin-Watson statistic for first-order autocorrelation. The coefficient of the Chinese growth rate is positive as expected and significant. If it is assumed that G1YC is exogenous (as seems reasonable) so that the relationship may be interpreted causally, the magnitude of the slope coefficient implies that a one-percentage-point fall in China's growth rate will lead to a fall in its Australian counterpart of 0.15 percentage points. This is about three times the magnitude derived from the back-of-the-envelope calculations in section 3. The difference may be accounted for by arguing that the smaller number based just on the GDP identity assumes all other expenditure components are constant but this is not so in the equation above, the slope the coefficient of which may incorporate extensive multiplier effects.

Although the DWS for the estimated equation suggests the absence of first-order autocorrelation, it is possible that the equation has omitted dynamics. A simple way to model this is to include the lagged dependent variable to capture partial adjustment. The result is:

$$G1YA = 1.9768 + 0.1575G1YC - 0.0686G1YA(-1), \quad R^2 = 0.0503 \quad (2)$$

(2.63) (2.20) (0.67)

It seems that the simple bivariate equation (1) does not omit important dynamics – the coefficient of the Chinese growth rate is little altered by the addition of the lagged dependent variable, the coefficient of which is of the “wrong” sign and insignificant.

An alternative way of introducing dynamics into the process driving both growth rates is to use a vector-autoregressive (VAR) model. This will also provide a framework for

adding further variables to the analysis. The bivariate case is reported in the following subsection.

(b) A bivariate VAR model

The lag length for the model needs to be selected first. A preliminary assessment of the optimal lag length showed conflicting results: the AIC suggested a lag length of four while the SIC indicated zero lags. A model with one lag exhibited significant autocorrelation in the residuals at lag four whereas the model with four lags showed no autocorrelation. A model with four lags was, therefore, chosen. The dynamics of the model are analysed using the impulse response functions (IRFs) which were accumulated to capture the effects of a sustained change in the Chinese growth rate. All four IRFs together with two-standard-error bounds are reported in Figure 2. It is well-known that the order of the variables may affect the IRFs; the order underlying Figure 2 is (G1YC, G1YA), reflecting the obvious judgement that the Chinese growth rate is more likely to be exogenous relative to the Australian growth rate than *vice versa*.

[Figure 2 about here]

In Figure 2 both own effects are positive, as expected, and significant. The effect of a shock to Chinese growth on Australian growth is also positive and significant but there is no significant effect on China of an Australian growth shock, not surprisingly. The block exogeneity of China can be tested and results in an F-statistic with a p-value of 0.4934; thus the hypothesis that Australian growth shocks have no effect on Chinese growth cannot be rejected. A near-VAR with the Chinese growth rate being modelled by a univariate AR(4) model was also estimated and simulated; the crucial IRF (for the effect on Australia of a Chinese shock) was very similar to that reported in Figure 2 so that further analysis was

carried out in a standard VAR model, notwithstanding the joint insignificance of the Australian terms in the Chinese equation.

The implications of the IRFs in Figure 2 for the magnitude of the effect of a unit shock to China's growth rate on the Australian growth rate were calculated on the basis of a shock to the error for the first equation producing a unit effect on China's growth rate in the long run. The long-run value of the China-to-China IRFs (after 100 periods) was 7.61; dividing the effects on Australia's growth at horizons of 1, 4 and 100 results in the multipliers of 0.0715, 0.0979 and 0.1443. Comparing these to earlier results, suggests that the back-of-the-envelope calculations (0.0574) did, indeed, produce a short-run effect and that the simple bivariate regression produced a results similar in magnitude to the long-run effect in the VAR model. Thus, the analysis suggests an effect of about 0.06 to 0.07 in the short run and about 0.14 to 0.16 in the long run of a sustained unit shock to the Chinese economy. Experimentation with fewer lags and a four-quarter overlapping growth rate was also carried out. Similar magnitudes were obtained for the short- and long-run multipliers. Results changed considerably, however, if the order of the variables in the VAR model was reversed, with the multipliers being about one-half of the magnitude of the corresponding ones in the original model which is not surprising since the reverse order loads all the correlation between the residuals of the VAR onto the Australian error. Since it is unlikely that the correlation between the equation residuals reflect substantially the contemporaneous response of Chinese GDP to an Australian shock, rather than *vice versa*, the original order is strongly preferred and used as the base model in further analysis.

Before drawing conclusions from the results above about the likely implications for Australia of a long-term slowdown in the Chinese economy, some further experimentation was carried out by adding extra variables to the model. The results are discussed in the next sub-section.

(c) Multivariate VAR analysis

The main purpose of the introduction of further variables into the VAR model is to assess the sensitivity of the relevant multiplier to model extensions. The addition of variables is accomplished in two stages. First, some components of aggregate demand are added, followed by some financial variables. The aggregate-demand variables are consumption, investment, government expenditure and the trade balance; all are measured as one-quarter growth rates using the log first-difference, as were the output growth rates in the basic model, and are denoted G1CO, G1IN, G1GT, G1BT respectively. To avoid logs of negative numbers, the growth of the trade balance was measured as the difference between the growth rates of exports and imports (i.e., the log first-difference of the ratio of exports to imports). Initial model estimates used government consumption and government investment expenditure separately but tests indicated the constraint that they appear as a sum could not be rejected so that only results using their combined value are reported.

[Figure 3 about here]

The IRFs in Figure 3 show that the effects of the China shock on its own growth rate is very similar to that in the previous model and that the effect of the shock on Australia's growth rate is of similar shape and magnitude but with weaker significance, presumably reflecting the greater demands on the data as more variables are added. The implications for the multiplier of a sustained unit shock to Chinese GDP are similar to those in the bivariate model: the short-run effect is 0.0623 and the long-run effect is 0.1356. Both of these are smaller than their counterparts in the bivariate VAR but only marginally so.

Finally consider the effects on the IRFs and multipliers of adding two financial variables to the model: an interest rate and the (proportional change in) the real exchange rate. Whether long or short interest rates were used made little difference to the results and only the model with the long-term interest rates is reported. IRFs for the effects of a China

shock on Australian and Chinese growth are reported in Figure 4 which shows that the effects are much the same as for the two previous forms of the model.

[Figure 4 about here]

The implied multipliers for the Australian growth rate with respect to a unit shock to the long-run Chinese growth rate are 0.0797 and 0.1553 in the short and long runs respectively. Again, these are quite consistent with the results derived from earlier models. It may be concluded therefore that, as far as the crucial multipliers are concerned, the results are not very sensitive to a variety of alternative model specifications.

Considering the results for all the models, it is fair to conclude that the effect of a slowdown in China will affect Australia differently in the short run than it will in the long run and that the short-run effect of a unit shock is of the order of 0.06 to 0.08 while the long-run effect is in the range 0.14 to 0.16. Thus a slowdown which permanently reduces China's growth rate from around 10% per annum to 7% per annum will reduce Australia's growth rate by between 0.18 and 0.24 percentage points in the short run and between 0.42 and 0.48 percentage points in the long run. These are not trivial effects but hardly the basis for some of the more alarmist headlines.

6. Conclusions

This paper began with the observation that China's 'New Normal' involves a significant reduction in its growth rate and that this new state of affairs is likely to be a permanent one. Given perceived increasing dependence of the Australian economy on China's economic health, it is not surprising that fears of significant adverse effects on Australia have been widely discussed in the financial and other press. However, there is little empirical work to support this proposition and to estimate the likely magnitude of the effect. This paper has made a start to rectifying this lack by estimating the likely effect in a variety

of settings, beginning with a simple back-of-the-envelope calculation based on the national accounting identity for real GDP. A number of shortcomings of this approach were identified and addressed in subsequent analysis. The results were quite consistent across the different models used – from the informal to single-equation estimation, to simple and then more complicated VAR models. All in all, the analysis points to significant but modest effects of a Chinese slowdown on the Australian economy: a permanent fall in the Chinese growth rate from 10% per annum to 7% per annum is likely to result in a fall in Australia's growth rate from, say, 2.6% per annum to about 2.4% in the short run and to about 2.0% in the long run.

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Figure 1. The annual growth rate of China's real GDP (1978 to 2016)

Figure 2: Accumulated IRFs (2-s.e. bounds), bivariate VAR model

(a) Effect of China shock on Australian growth

(b) Effect of China shock on China growth

Figure 3: Accumulated IRFs (1-s.e. bounds), six-variable VAR model

(a) Effect of China shock on Australian growth

(b) Effect of China shock on China growth

Figure 4: Accumulated IRFs (1-s.e. bounds), eight-variable VAR model

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