Animal spirits and the hangover in private sector investment – June 2017

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Abstract

Growth in real private sector investment has slowed markedly in recent years, recording negative year-on-year growth rates since 2015Q3. The South African indicators of business confidence show a similarly dismal trend, recording historic lows in recent quarters. This note looks into the influence that business confidence has had on private sector investment, and considers what investment may have been if business confidence had not plummeted. Private sector investment would have been up to 8.5 per cent higher by 2016, in level terms, had business confidence remained at the levels recorded in 2011. Finally, the SACCI business confidence index shows promising results in improving private sector investment forecasts, especially in the near term.

Introduction

> "Most, probably, of our decisions to do something positive ... can only be taken as a result of animal spirits – of a spontaneous urge to action rather than inaction, and not as the outcomes of a weighted average of quantitative benefits multiplied by quantitative probabilities.
> ... if the animal spirits are dimmed and the spontaneous optimism falters ... enterprise will fade and die;— though fears of loss may have a basis no more reasonable than hopes of profit had before."
>
> *– John Maynard Keynes, The General Theory, Chapter 12*

Private sector investment is not only a significant determinant of economic activity but, more importantly, is a crucial driver of potential output and economic development.[1] That is, through expanding the productive capacity of an economy, investment ensures increases in future socio-economic welfare. This is why the National Development Plan (NDP) has set a target for total investment to reach 30 per cent of GDP by 2030. This target seems particularly ambitious given that total investment only represented 19.9 per cent of GDP by the end of 2016. Given this background, the marked decline in South African private sector investment growth since the recession of 2008/9 is especially worrying (see Figure 1). As a percentage of GDP, private sector investment peaked at 15.4 in 2008Q4, and has since declined to 12.2 per cent by the end 2016. This economic note investigates the role that a decline in business confidence has played in private sector investment during recent years. In addition, the note assesses the extent to which the use of business confidence as an explanatory variable could improve forecasts of investment.[2]

Private sector investment in South Africa since 2000

The early 2000s marked the beginning of an international boom in commodity prices, driven largely by strong demand from economies such as China and India. The commodity boom had two distinct effects: (1) it significantly raised the economic growth of commodity exporting economies; and (2) it fueled global risk appetite. South Africa was no exception, and experienced average annual real GDP growth rates of 5.1 per cent over the period 2004Q1 to 2008Q2. Over this period, annual growth in real private sector investment averaged 11.2 per cent.

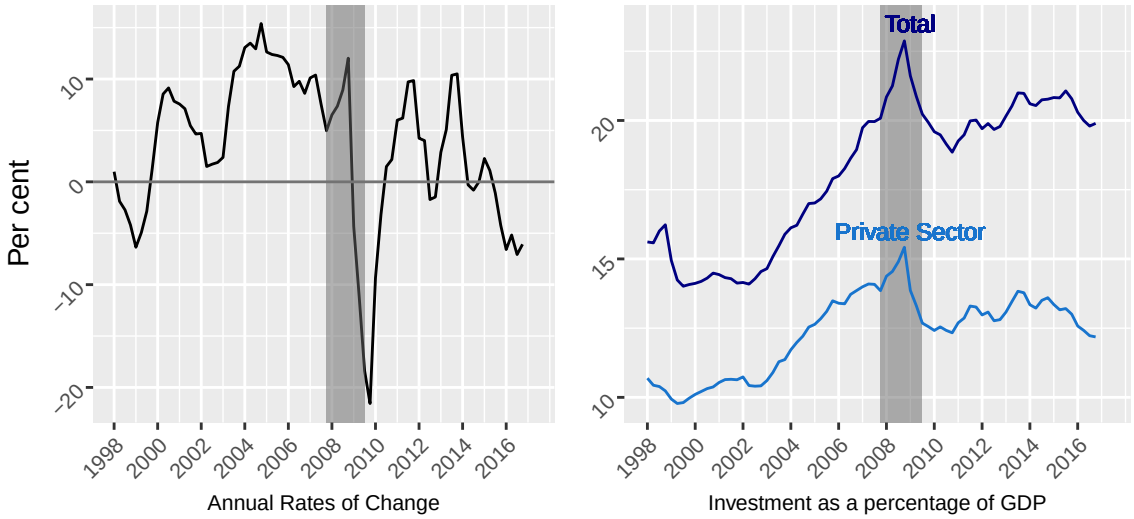
The commodity price boom also fueled global risk appetite, and together with relatively loose global monetary policy, provided further stimulus to the South African economy, as the *risk on* environment encouraged capital flows towards emerging markets.[3] While, domestically, the resultant growth in asset prices and the boom in

[1] Since 2000, private sector investment has been between 10 and 15 per cent of gross domestic product and constitutes between 60 and 75 per cent of total investment.

[2] Currently, there are two surveys of business confidence in SA: (1) the South African Chamber of Commerce and Industry's business confidence index (SACCI BCI), and (2) the RMB/BER business confidence index. Figure 4 in Section shows a comparison between the two surveys. We use the SACCI BCI since preliminary analysis suggests that it is more strongly correlated with movements in private sector investment. In addition, while the SACCI BCI does not survey businesses directly, it is constructed to capture the overall business mood by reflecting the environment in which businesses operate as well as their actual behaviour.

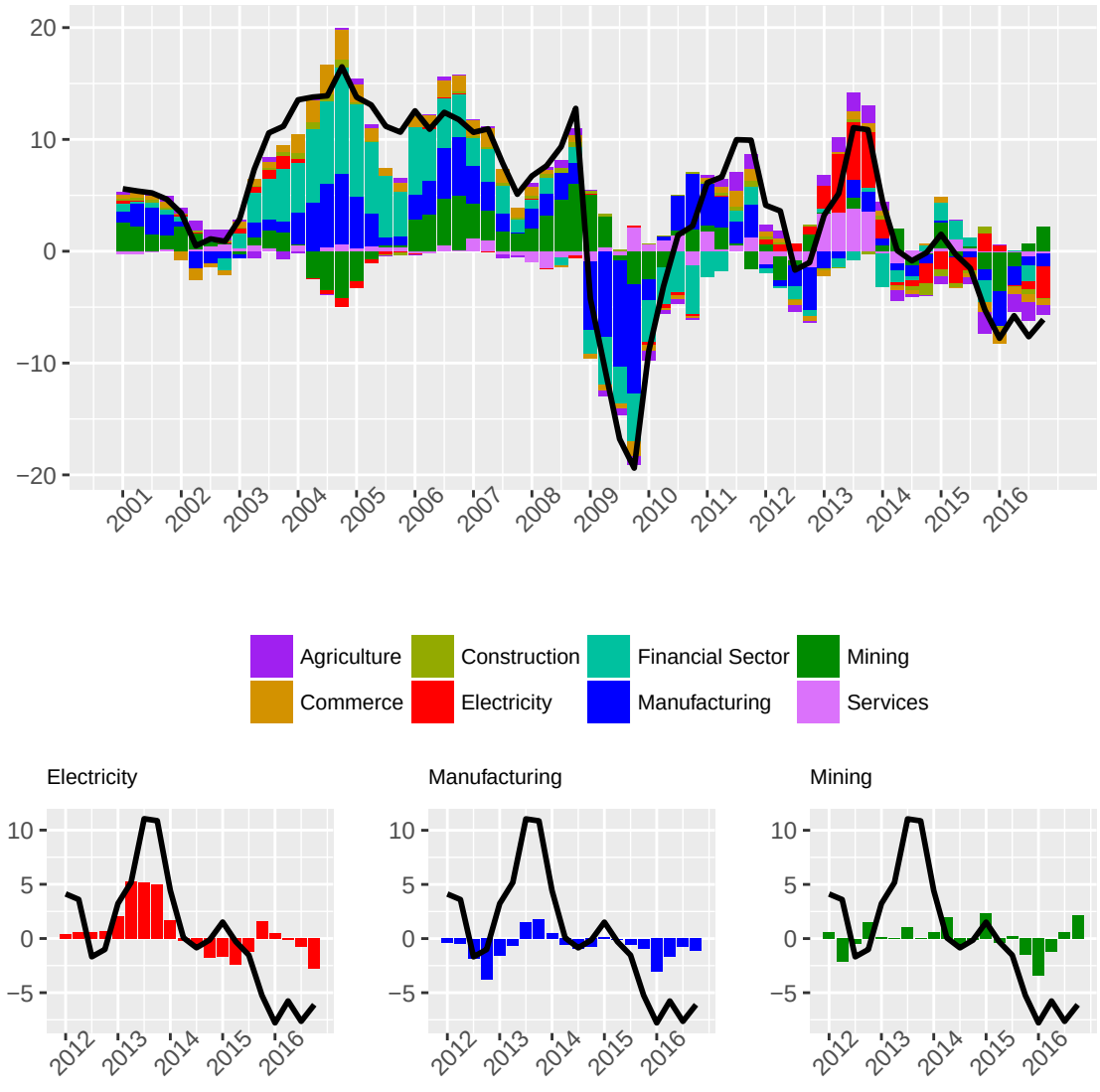
[3] The Chicago Board Options Exchange (CBOE) VIX reached an all time low of 11.19 index points in 2006Q4.

Figure 1. Real Private Sector Investment



Source: StatsSA, Own calculations

Figure 2. Sectoral Contributions to Annual Private Sector Investment Growth



credit extension, saw real consumption of households and investment by the private sector surging. As can be seen in Figure 2, the impact on private sector investment over this period was fairly broad-based. Additionally, growth in private sector investment from around 2008 was further accelerated by preparations for the 2010 Soccer World Cup.

Eventually, the boom culminated with the onset of the global financial crisis (GFC) in 2008/9, and commodity prices subsequently collapsed. While there was a temporary post-crisis recover in commodity prices, they began trending downwards after 2011. This is clearly reflected in private sector investment growth, which only recovers briefly in 2013/14 as a result of the Government's Renewable Energy Independent Power Producer Procurement Programme (REIPPP) in the Electricity sector. Annual growth in private sector investment has been mostly negative since 2014Q2, with the main contributors to this outcome being investment in the manufacturing and mining sectors, as well as the impact of the drought on agricultural sector investment.

Animal spirits and business confidence

> "Thus if the animal spirits are dimmed and the spontaneous optimism falters ... enterprise will fade and die;— though fears of loss may have a basis no more reasonable than hopes of profit had before"
>
> *– John Maynard Keynes*

Business confidence in South Africa similarly reached an all time high of 139.4 index points in 2006Q4, averaging 134 points between the end of 2003 and the start of the GFC in 2008. By 2009Q1, confidence had dropped back to 111.8 points, roughly in line with levels seen before the commodity price boom. Along with commodity prices, business confidence recovered temporarily after the crisis. However, since 2011Q1 it has been in constant decline, recording a current low of 90.1 index points in 2016Q3.

While the initial impetus of the commodity price boom was real demand (mainly from China), it is argued by the authors of this note that a portion of what followed in South Africa can be attributed to Keynes's *animal spirits*. Keynes used the term animal spirits to capture the role that human emotions play in economic decision-making. These emotions – be it feelings of optimism or pessimism – are not linked to the fundamentals of an economy, but often are rather irrational. Therefore, there is an aspect of the business confidence index and its impact on private sector investment that cannot be explained by any observed economic variables. This begs the question, that if "animal spirits" result in self-fulfilling prophecies, what would private sector investment in South Africa have been, had confidence not declined by such a great extent over the last decade?

Modelling investment

In the economic literature there are a number of theories on the drivers of investment[4]. Nevertheless, some overarching determinants of investment can be identified.

Theoretical determinants in the investment equation

Based on the theory underlying the investment equation in the Core model of the SARB, the following five drivers determine private sector investment behaviour:[5,6]

1. GDP after company tax (Net Income, LR):
   This variable proxies the amount of income that is available to firms for investment. Homogeneity is imposed, simply ensuring that in the long-run, investment cannot increase by more than available income. This is in line with standard neoclassical growth theory. However, since it is assumed that there is a lag between when a firm decides to invest and when physical investment occurs, this relationship is only expected to hold in the long-run.

[4] The most well-known of these being: (i) the (Flexible) Accelerator theory (Keynes, see Chenery(1952)), (ii) the Neoclassical theory (user cost of capital) (see Jorgenson and Hall (1967)), and (iv) Tobin's Q theory (see Kaldor (1966)), Tobin and Brainard (1968))

[5] Two dummy variables are also included for 2008Q4-2009Q1, to capture a GFC related outlier, and in 2014Q1, to capture the impact of the protracted platinum mining strike.

[6] LR and SR indicate whether the variable enters the long-run or short-run component of the error-correction mechanism (ECM) for private sector investment.

2. Required real rate of return bonds (Real Bonds + Depreciation, LR):
   This variable (also in line with neoclassical theory) proxies a key component of the user cost of capital. This component implies that investment in the private sector is a function of how much interest the money spent on investment could earn if it was instead used to purchase a safe asset (which does not depreciate over time).

3. The relative price of capital goods (LR):
   This captures an additional key component of the user cost of capital. It is constructed as the ratio of the private sector capital goods deflator to the GDP deflator, and therefore the relationship between this variable and private sector investment is expected to be negative.

4. Openness of the economy (Openness, LR and SR):
   This variable proxies financial and trade liberalisation and has been found to be an empirically important policy determinant of foreign direct investment in South Africa (see Fedderke and Romm (2006)) and Africa more broadly (see Kariuki (2015)).

4. Real broad credit extension (Credit, SR):
   There is a vast literature[7] suggesting that firms, especially small and medium enterprises (SMMEs), face credit constraints when it comes to investment decisions. Thus, the availability of credit introduces procyclicality into investment outcomes. This variable enters the equation with a lag in order to allow for the time it takes for approved credit to be used for investment.

Adding business confidence to the equation

The investment literature has also identified uncertainty as a key determinant of investment.[8] The equation can therefore be respecified to either include the BCI in the short-run only (as the case for broad credit extension), or in both the long-run and short-run. While initial intuition suggests that it be included as only explaining the cyclical nature of investment (the short-run), a recent study has suggested that uncertainty contains both a long and short-run component, and that "investment is significantly more sensitive to long-run uncertainty" (Bloom et al. 2016). Figure 3 below shows the implied residuals of the alternative specifications (i.e., the remaining portion of quarterly private sector investment growth that is not explained by the equation). The observed improvement in the residual by including BCI in both the long and short-run ultimately informed our decision to use this specification of private sector investment.[9,10]

Empirical results

The specification and results of the final estimated equation are presented in Table 1 below.

$$
\begin{aligned}
\Delta log(\text{Investment}) = \alpha_0 [& log(\text{Investment}_{t-1}) - \alpha_1 log(\text{Net Income}_{t-1}) \\
& - \alpha_2 (\text{Real Bond yields + Depreciation})_{t-1} \\
& - \alpha_3 log(\text{Relative Price of Capital goods}_{t-1})) \\
& - \alpha_4 \text{Openness}_{t-1} \\
& - \alpha_5 log(\text{BCI}_{t-1})] \\
& + \beta_0 + \beta_1 \Delta(\text{Openness}) + \beta_2 \Delta log(\text{Credit})_{t-2} + \beta_3 \Delta log(\text{BCI})_{t-2} \\
& + \beta_4 \text{Dummy 2009Q1} + \beta_5 \text{Dummy 2014Q1} \qquad (1)
\end{aligned}
$$

[7] For example, see Aghion et al. (2010), and Fielding (2000) for a South African case study.

[8] In the South African case, for example, Ajam and Aron 2007) state that "[e]mpirical evidence suggests that investment in South Africa is substantially driven by uncertainty"

[9] To obtain these graphs, a standard ECM was estimated based on the theory outlined above. The SACCI BCI was then included in two different equations: one with the BCI (second lag) in only the short-run, and one with the BCI in the long (first lag) and short-run (second lag). The original equation and "short-run only"" specification can thus be seen as versions of the restricted "complete" equation.

[10] A standard LM test suggests accepting the complete model at the 5 per cent level of significance.

Figure 3. Residuals from Alternative ECM specifications

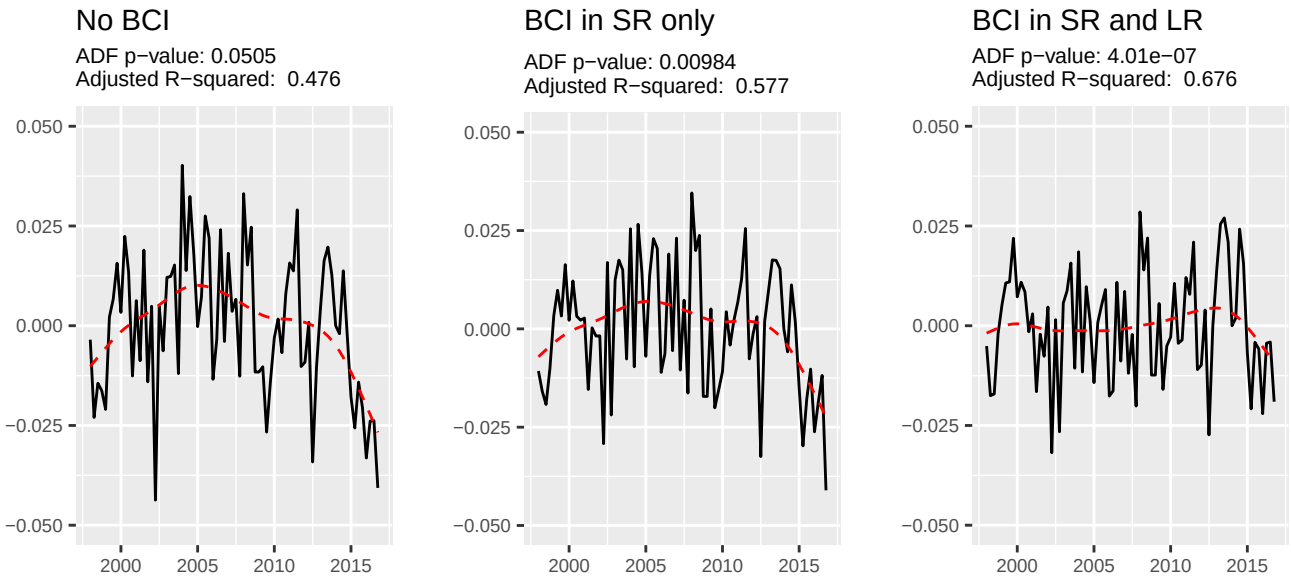


Table 1. Estimation Results (Sample 1998Q1 to 2016Q4)

Dependent variable: Private Sector Investment

long run	α_0	Speed of Adjustment	-0.175^{***}
	α_1	log(Net Income)$_{t-1}$	1.000
	α_2	Real Bond yields$_{t-1}$ + Depreciation $_{t-1}$	-0.017^{**}
	α_3	log(Relative price of Capital goods) $_{t-1}$	-0.926^{***}
	α_4	Openness$_{t-1}$	1.350^{***}
	α_5	log(BCI)$_{t-1}$	0.538^{***}
short run	β_0	Constant	-0.916^{***}
	β_1	Δ(Openness)	0.404^{***}
	β_2	Δlog(Credit)$_{t-2}$	0.133^{*}
	β_3	Δlog(BCI)$_{t-2}$	0.181^{**}
	β_4	Dummy2008Q42009Q1	0.052^{***}
	β_5	Dummy2014Q1	-0.037^{**}
Adjusted R^2		0.676	
F Statistic		16.637^{***}(df=10;65)	
Note:		*p<0.1; **p<0.05; ***p<0.01	

The impact of the business confidence index on private sector investment is positive and significant, meeting our *a priori* expectations. The results suggest that a 1 per cent increase in the BCI leads to a 0.5 per cent increase in investment in the long-run, and a 0.2 per cent increase in the short-run (with a lag of 2 quarters).

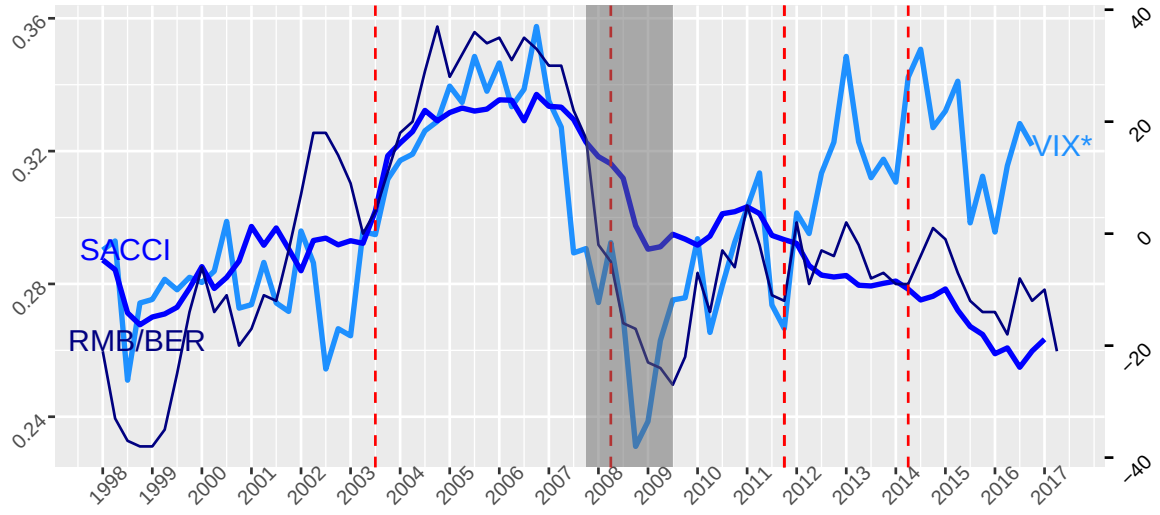
How high would investment have been had business confidence not declined?

In order to determine a point of reference, the SACCI BCI is analysed statistically to identify any clear structural breaks in the series (see Figure 4). In total, five structural breaks are identified.

To aid this search for a reference point, we also compare the BCI to the CBOE's emerging market VIX – a market-based proxy of uncertainty. Up to the end of 2011, the BCI and inverted VIX correlate quite strongly. However, at the start of 2012 – exactly when the last structural break in the BCI occurs – the relationship breaks

down completely. As a result, we choose to hold the BCI constant at its 2011Q4 value.

Figure 4. The SACCI BCI with statistically identified break points

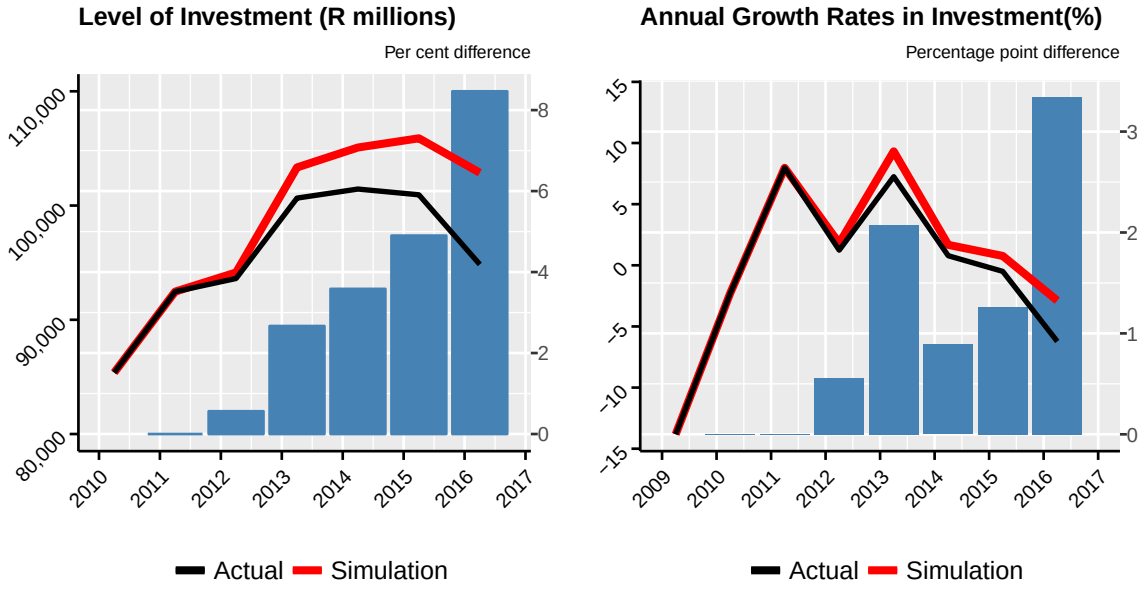


Source: SACCI, BER, CBOE EM VIX (*inverse)
Own Calculations: For comparability, the SACCI BCI is expressed as a deviation from its mean, while the RMB/BER BCI is a deviation from the survey's neutral level of 50 index points.

We are now able to ascertain what investment would have been had the BCI remained at its 2011Q4 value, and not declined by a further 20 index points as it subsequently did.[11]

Figure 5 shows the results of this simulation. They imply that if business confidence had remained elevated (while still far below peak levels), the level of private sector investment would have been roughly 8.5 per cent higher in 2016, relative to the actual outcome, while annual growth rates would have been up to 3.3 percentage points higher by 2016. Given the contribution of private sector investment to overall GDP, these magnitudes imply that the level of real GDP would have been approximately 1.0 per cent higher by the end of 2016, while the GDP growth rate of 2016 would have been 0.4 percentage points higher.

Figure 5. Private sector investment if business confidence had not declined



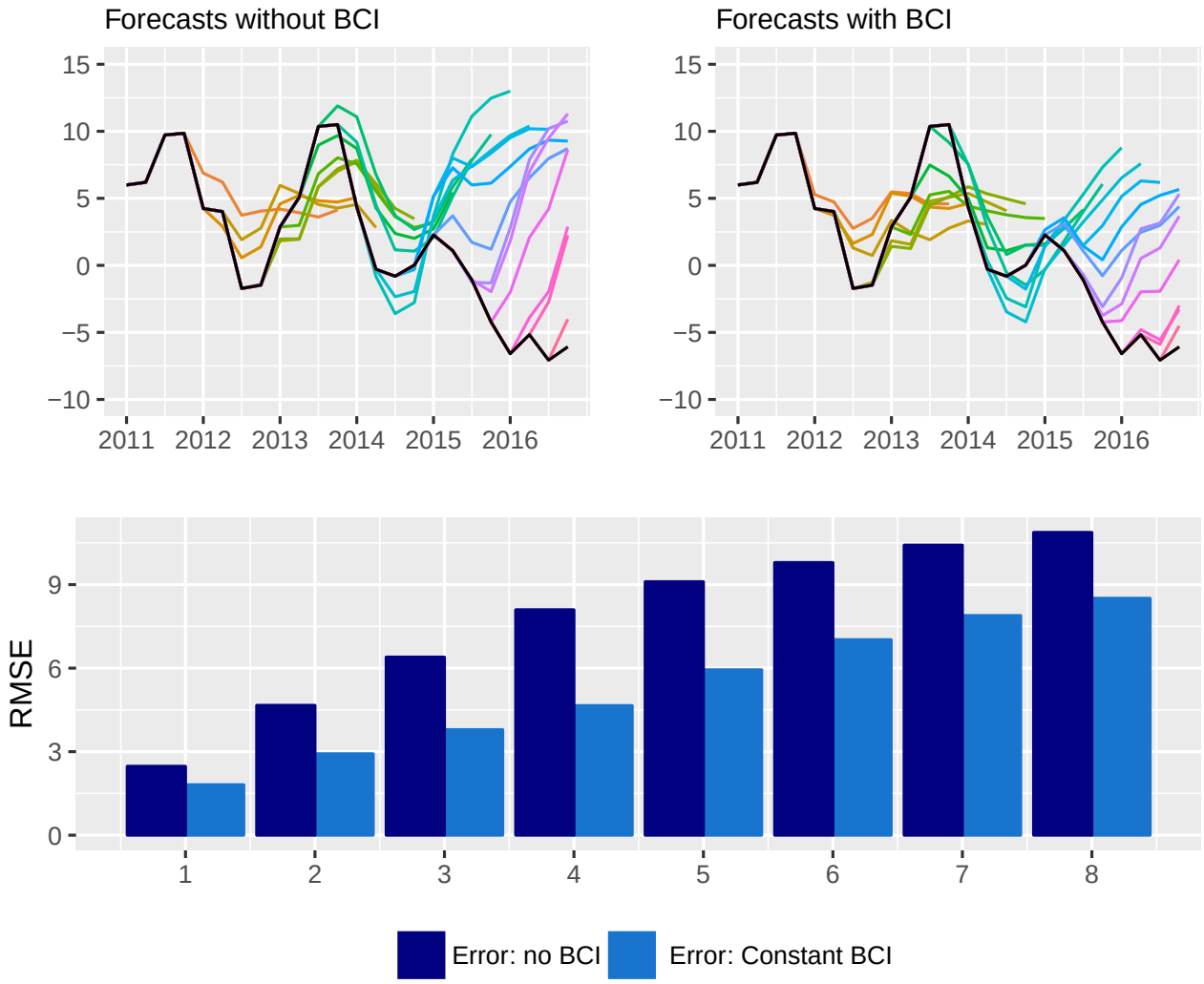
[11] It should be noted that this estimate can be interpreted as the minimum impact from a higher business confidence, as this scenario does not include any positive feedback loops between confidence, and therefore private sector investment, and the rest of the economy. That is, in this scenario all explanatory variables are held constant except for business confidence.

Does business confidence improve the accuracy of investment forecasts?

As a final scenario, and a first-pass assessment of the predictive power of the BCI, we assume that a forecaster has at his disposal two competing models with which to forecast: the current version of the SARB Core Model, and the same model with the private sector investment equation modified to include the SACCI BCI.[12]. Starting in 2012Q1, the forecaster uses these two competing models to forecast growth in private sector investment up to eight quarters ahead. In the model that includes business confidence, the BCI is assumed to remain at its last known value over the entire eight-quarter forecast horizon. The process is then repeated every quarter up to the end of 2016. Using the Core Model for this exercise allows for important feedback loops to and from the rest of the economy. However, it should be noted that this does not result in the reproduction of actual SARB forecasts at the time, as the paths of the variables for which assumptions are normally made are not comparable.

The results are depicted in Figure 6, suggesting that including the BCI, on average, leads to an improved forecast performance over all 8 horizons. The root mean square error (RMSE) of the forecasts is reduced by an average of 20 percent over all quarters, suggesting promising results for improving forecasts of private sector investment.

Figure 6. Private sector investment forecasts (yy) and errors



[12] This equation is represented by equation (1), but the dummy for 2014Q1 is removed as it coincides with the forecast horizon.

Conclusion

While addressing the current form of macroeconomic uncertainty that South Africa faces is generally beyond the remit of the SARB, this note emphasizes the importance of maintaining the SARB's reputation and credibility as a strong macroeconomic institution. Furthermore, given the significance of uncertainty/confidence as both a short- and long-run determinant of private sector investment, this note highlights the relevance of trying to account for "animal spirits" in the analysis and forecasting of the South African economy. That is, while standard macroeconomic variables may capture the rational portion of decision-making, capturing the optimism or pessimism of agents - that may be a result, for example, of political uncertainty - would enable an improved understanding and prediction of economic outcomes.

Future research should therefore include a more thorough analysis of the predictive power of business confidence indices when modelling private sector investment at the Bank. Similarly, an investigation into the role that consumer confidence plays in the final consumption expenditure of households is justified.

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