



UNIVERSITY *of the*
WESTERN CAPE

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES
DEPARTMENT OF ECONOMICS

**Inflation Targeting, South Africa and the Great Recession: An Alternative
Perspective**

By

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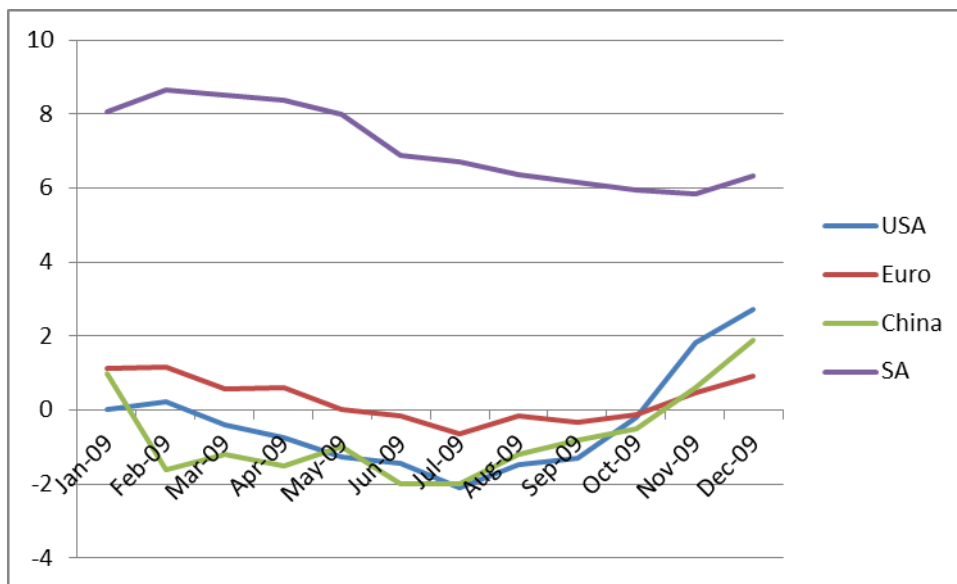
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As shown by the graph below, the South African inflation rate generally followed the inflation trend of the USA, Euro area and China. However, the trend for the USA, Euro area and China started moving upwards in July whereas South Africa continued to trend downwards. South Africa only started trending upwards in December. These differences in trends may be indicative of the impact that the exchange rate has had on inflation rates. It is also noted that the inflation rate for South African is significantly higher.

Figure 41: 2009 Inflation Rates



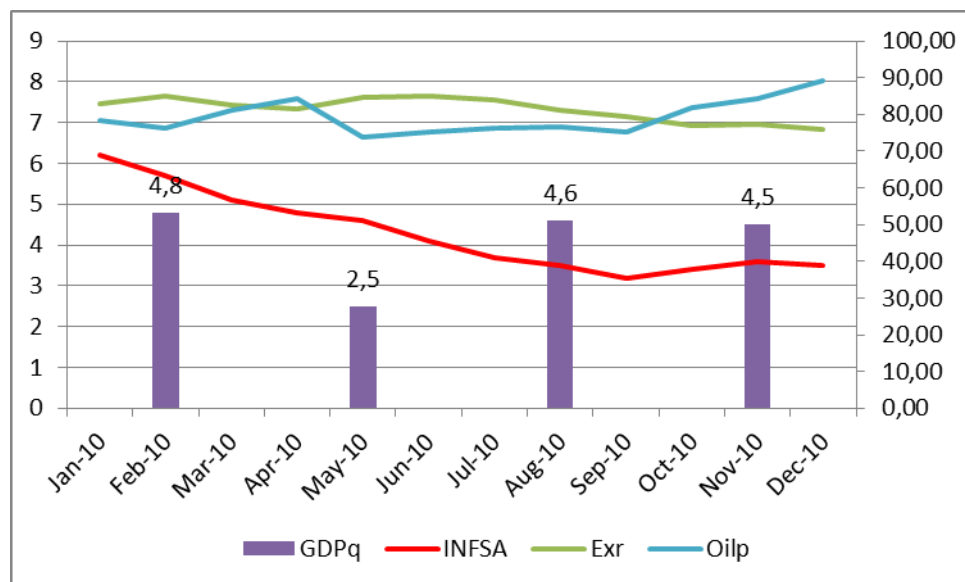
Source 12: IMF. 2016

The SARB (2010a:44) states that the rand strengthened on the back of increasing international commodity prices, net capital inflows into the country, an improvement current account deficit during the first half of 2009 and a “positive sentiment towards the country in anticipation of the hosting of the 2010 FIFA World Cup tournament”. Rand strength was further supported by positive GDP growth in the second half and “an improved inflation outlook”.

6.11 2010

6.11.1 The 2010 Narrative According to SARB, The Graphic Analysis and Interest Rates

Figure 42: 2010 Relationship Between SA Inflation, SA GDP growth rate, R/\$ Exchange Rate, Oil Price



Source: SARB. 2015a, IMF. 2016, Fred. 2017a, Fred. 2015

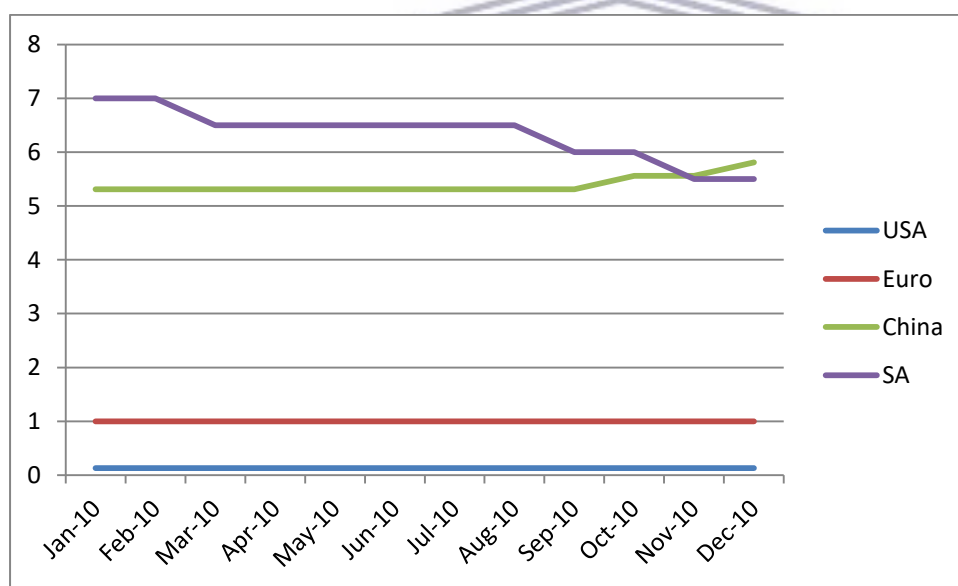
As shown by the graph above, during the course of the year, the inflation rate peaked at 6.2% in January, nearly halved to a trough of 3.2% in September, and the ended the year with 3.5% in December. The interest rate was reduced from 7% in January to 5.5% in December and the exchange appreciated from R7.45 to the dollar in January to R6.82 in December. The GDP growth rate was comparatively strong with only the second quarter recording a relatively weaker growth rate of 2.5%. GDP grew by 3% in 2010, up from -1.5% in 2009. Although the price of oil did increase by more than \$10 a barrel throughout the year, the price increase was not significant compared to previous years (Fred. 2015). It started with \$78 a barrel in January, troughed at R74\$ in May, and ended the year with a peak of \$89 in December. In 2009, the price of oil rose by approximately \$35 a barrel from January to December.

According to the SARB (2011a), inflation was contained by the continued impact of the global economic downturn, the relatively weak domestic demand conditions, excess production capacity and the appreciation in the exchange value of the rand. The SARB

considered food and oil prices to be “the biggest risk to the inflation outlook in the near future”.

The SARB (2011:1) states that the “major driving force behind the recovery has been final consumption expenditure by households” After having contracted in 2009, real expenditure by households increased by an annualised rate of approximately 5% whilst debt to disposable income has been declining on the back of reduced interest rates. This suggests that reduced interest rates reduced the debt burden, which allowed households to spend, directly impacting on the GDP growth rate. However, despite its rapid descent, the interest rate did not seem to have a particularly significant effect on inflation within an IT framework perspective. The inflation rate remained relatively well within the target range up until the first quarter of 2014 despite a continuation of lower interest rate

Figure 43: 2010 Interest Rates



Source: IMF. 2017b

As shown by the graph above, the interest rates of the US and the Euro remained at historically low levels while South Africa continued to lower its interest to a historical 30 year low (SARB. 2010:54). China increased its interest rates in October and December, overtaking the South African interest rates in December.

6.11.2 The Reference Areas

As shown by the graph below, 2010 was a volatile year for inflation rates in the US, Euro area and China. China saw its inflation rate escalate significantly from a trough of 1.5% in January to a peak of 5.1% in November, ending the year with 4.6% in December. Similarly, there was a significant rise in the EU area's inflation rate, starting the year with 1% and ending in December at a peak of 2.21%. In the US, the inflation rate generally trended downwards and experienced a significant drop from 2% in May to 1.1% in June. The inflation rates of emerging economies such as Russia, India and Brazil also rose by 8.7%, 7%, and 5.9%, which prompted a rise in interest rates (PBC. 2011:23).

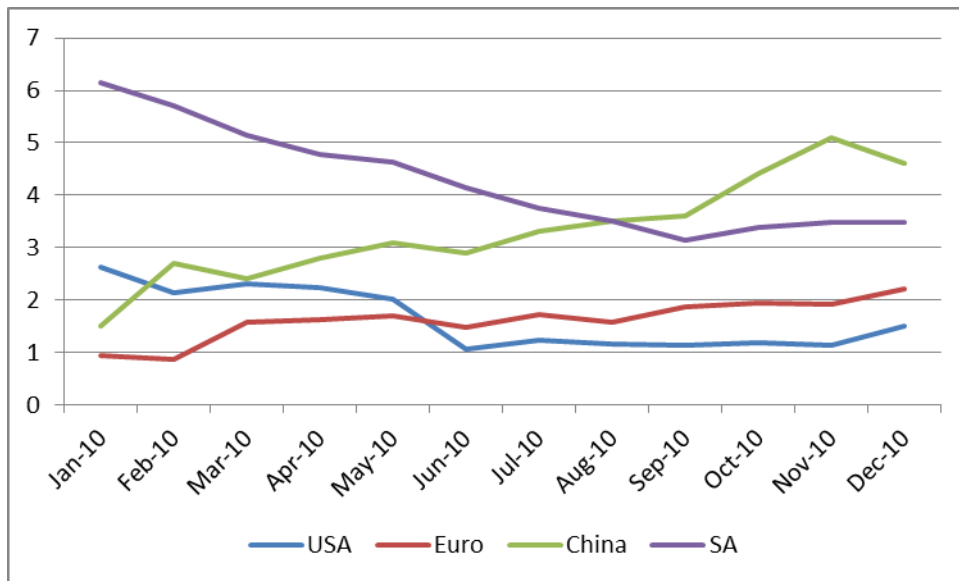
The SARB (2011:23) implies that higher food and oil prices accounted for a significant proportion of the acceleration in inflation in advanced and emerging economies. In response to the acceleration in inflation, "several central banks in emerging-market economies" increased their interest rates while the central banks in "major advanced economies maintained their policy rates at historically low levels" (SARB. 2011).

The ECB (2010.) states that "significant increases in energy prices in the first four months" of 2010, "triggered by a notable rise in oil prices over that period, contributed" to its higher inflation rates. It also states that food prices contributed "slightly" and "base effects stemming from the energy and food components" contributed "partly". Base effects are defined as "some atypical influence" that occurs at time, $t-12$, that affects the growth rate of a variable at time, t , where t equals a month and $t-12$ equals 12 months prior to time t (ECB. 2010a). What base effects suggest is that instead of, for example, inflation variation being caused by events in the previous month, they are caused by events that occurred 12 months ago.

China's PBC (2011) states that its rapid rise in inflation is attributed to the strong economic recovery, imported inflation, and rising cost of labour and land.

What is of particular interest is the behaviour of the US inflation rate, which will be elaborated on below.

Figure 44: 2010 Inflation Rates

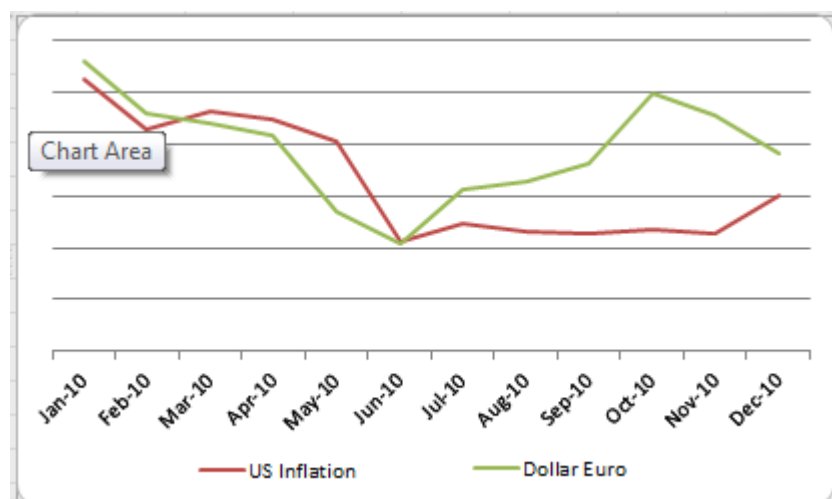


Source: IMF, 2016

6.11.3 The US Inflation Rate

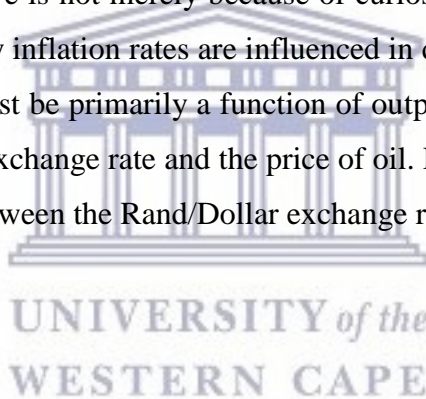
The Fed was not particularly clear on the reasons for the behaviour of the US inflation rates. However, in an academically curious attempt to understand these set events as stated above, various sources was explored, and it was found that there was a close correlation between the Dollar/Euro exchange rate, and the US inflation rate. The graph above illustrates this relationship. For the first half of the year, this relationship seems positive and strong. This positive relationship becomes less evident during the second half and turns negative in November and December. However, the Dollar/Euro exchange rate troughed in June, and accelerated upwards at a faster pace than the US inflation rate from July. It was in June that the Euro area inflation overtook the US inflation rate and by July, the US inflation rate's downward trend had halted and moderated.

Figure 45: Comparing US Inflation and Dollar/Euro Exchange ratetrends



Source 13: Fred. 2017

The point of the exercise above is not merely because of curiosity, but to determine whether there is a difference in the way inflation rates are influenced in different countries. For China, their inflation rate might be just be primarily a function of output and for the US, it might be a function of its Dollar/Euro exchange rate and the price of oil. For South Africa, it might just be because of the interplay between the Rand/Dollar exchange rate and the price of oil.

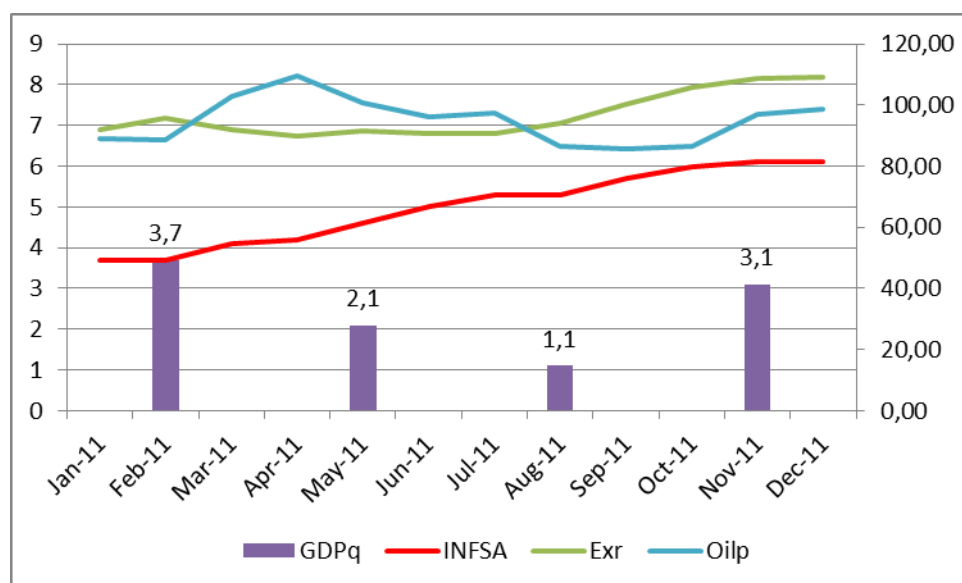


6.12 2011

6.12.1 The 2011 Narrative According to SARB and the Graphical Analysis

The SARB (2012b:18) states that “despite an environment of lacklustre growth and subdued levels of demand”, the inflation rate “accelerated markedly” “due to exogenous supply-side factors”. The immediate conclusion being drawn is the inflation rate’s growth was stronger than would have been the predicted by the IT framework and was a function of factors beyond the control of the SARB.

Figure 46: 2011 Relationship Between SA Inflation, SA GDP growth rate, R/\$ Exchange Rate, Oil Price



Source: SARB. 2015a, IMF. 2016, Fred. 2017a, Fred. 2015

As shown by the graph above, after its general decline in 2010, the inflation rate reversed its trend in 2011, troughing at 3.7% in January, and peaking at 6.1% in December. The SARB (2012a:27) states that the rise in domestic inflation can mainly be attributed to the increase in the prices of non-durable goods, which in turn was “primarily driven by notable increases in the prices of food and petrol”.

In addition, international inflationary pressures “spilled over” into South Africa’s economy, which placed upward pressure on the domestic inflation rate (SARB. 2012a:25). These pressures started to intensify “towards the end of 2010”, despite the “fairly hesitant global economic recovery and persistently large output gaps”. The components that were identified as contributing to these pressures were the increasing “international food and crude oil prices”. However, “the moderation in global economic activity, particularly in Europe” during the second half of 2011, reduced these inflationary pressures. It is noted again that despite weaker growth (large output gaps), the international inflation rates also grew at rates that is inconsistent with the outcomes as would be predicted by an IT framework.

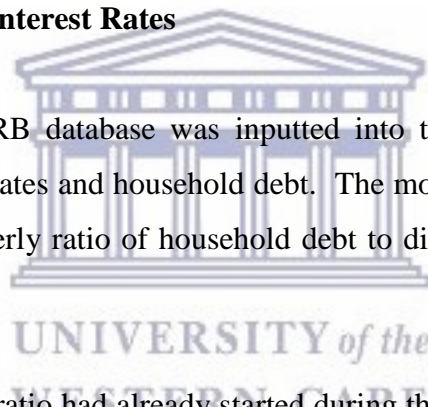
Despite the weak growth rate, the domestic GDP growth rate did in fact increase from 3% in 2010 to 3.2%. The SARB (2012a) however described this increase in the growth rate as “pedestrian”, “significantly below potential” and “well below the average rate of 4.4 per cent recorded during the previous upward phase which lasted from September 1999 to November 2007”. Furthermore, it attributes this weak recovery to the weakness of the recovery of the

global economy, the reduction in debt-to-GDP ratio, and the “destruction of some domestic productive resources”.

The increase in the growth rate was assisted by an increase in the real final consumption expenditure by households from 3.7% in 2010 to 5% in 2011. Furthermore, this increase was also supported by increased employment, salary and wages increases at “rates in excess of the upper limit of the inflation target range”, and the “stable 30-year low interest rate environment”. In addition, the increase in household spending was largely financed by an increase in income rather than an increase in debt. Household debt increasing on average by 7.2%, significantly lower than the 20% average increase between 2003 and 2008. The reduction in the growth of debt suggests that consumers began to manage their finances more prudently, or it may simply be the case that they had too much debt. This will be explored briefly below.

6.12.2 Household Debt and Interest Rates

Data extracted from the SARB database was inputted into the graph below to show the relationship between interest rates and household debt. The monthly interest rates are shown on the left axis and the quarterly ratio of household debt to disposable income is shown on the right.



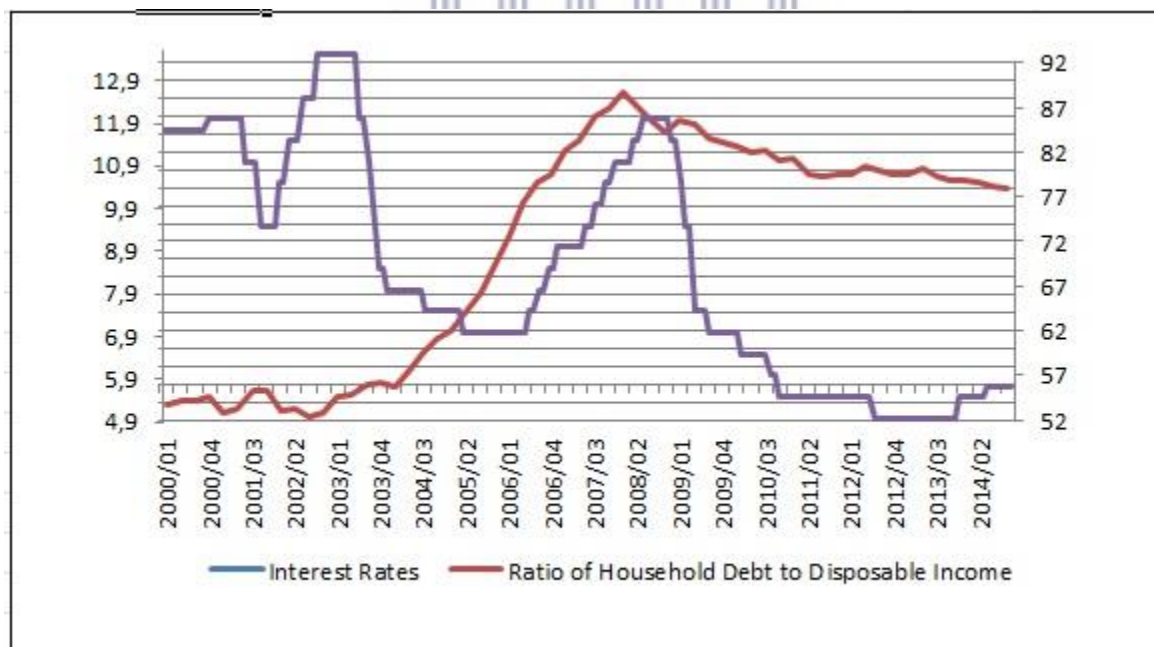
The upward trend in the debt ratio had already started during the lower interest rate period of 2003 and had escalated, even as interest rates began its sharp upward trend during the second quarter of 2006. The escalation in the debt ratio came to a halt in the first quarter of 2008, where it had peaked at 89%. By the first quarter of 2012, the debt ratio had declined to 79% and for the rest of 2012, there was very little change in the ratio. The ratio had already declined to 79% from the second quarter of 2011 and remained generally unchanged until the third quarter of 2013. By the final quarter of 2014, it had declined marginally to 78%.

As noted above, the SARB indicated that the drop in the debt ratio had contributed to the weak growth. This assertion may be debatable given the fact that the ratio remained relatively unchanged since 2013. The SARB also notes that the growth in household debt was significantly lower than in previous years and increased consumption was ‘largely financed by an increase in income rather than an increase in debt’.

Throughout the thesis, it was also suggested that increasing the interest rates adds to the debt burden and this assertion was validated by the SARB in their quarterly reports. It could be argued that lower interest rates had encouraged consumers to take out more debt, but the increase in the interest rate had added to debt burden and significantly eroded consumers ability to purchase goods and services. By the time the financial crisis had arrived, the debt burden had reached levels where growth in consumption had been impeded which suppressed the GDP growth rate over the longer term. As will be shown below, the GDP growth rate had continued to trend downwards up until 2014 and beyond.

The hypothesis above presents another interesting question. From June 2004 to August 2007, the US Federal Reserve had increased its interest rates by a comparatively significant 425 basis points. The 2008 crisis was the result of US home buyers no longer being able to afford the payments on their homes. Could it have been that the interest increases added to the debt burden of the US consumer and had interest rates not been increased, would there have been less mortgage defaults? If there had been less defaults, could the crisis have been avoided?

Figure 47: Relationship Between the Interest Rates and Ratio of Household Debt to Disposable Income

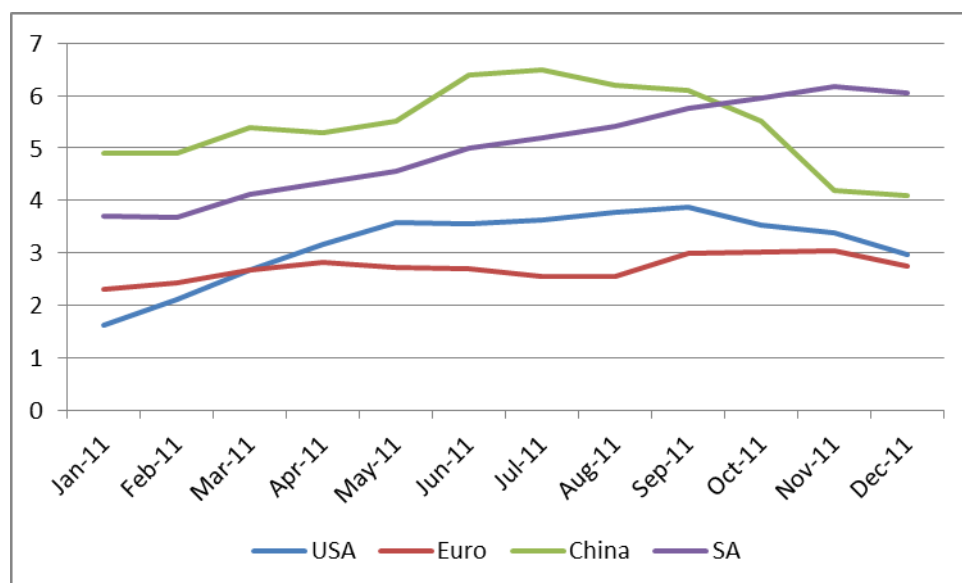


Source 14: SARB. 2017

6.12.3 The References Areas

As noted above, international inflation pressures spilled over into the domestic economy during the first half of 2011 and moderated in the second. This is illustrated in the graph below, which shows that the US and China experienced significant shifts in their trends. This is especially true for China which experienced significant volatility in their inflation rates.

Figure 48: The 2011 Inflation Rates



Source 15: IMF. 2016

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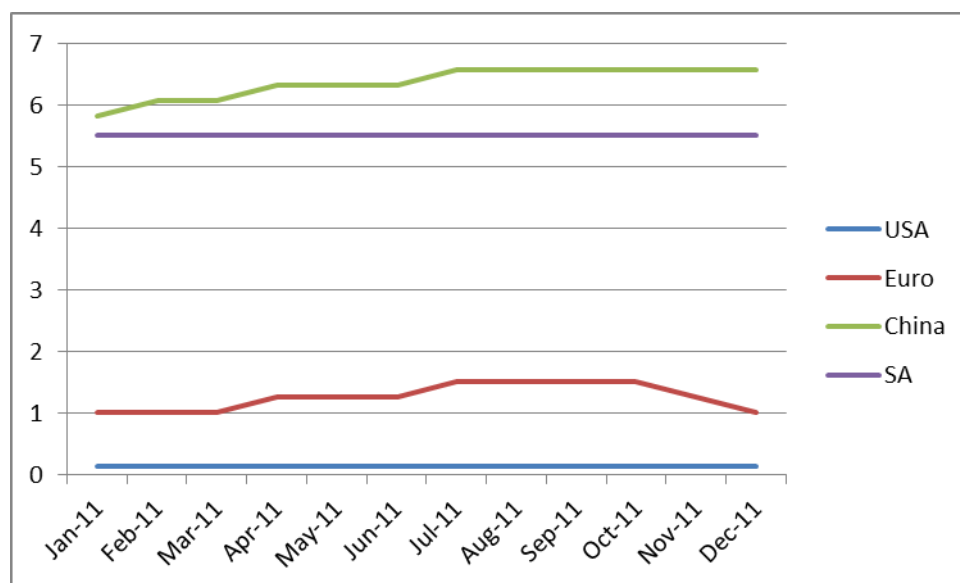
The PBC (2012) states that the generally rapid reversal in the inflation rate was as a result of a slowdown in GDP. They state that the slowdown was as a result of “prudent monetary policy”. The Chinese economy grew by 9.7%, 9.5%, 9.1% and 8.9% in the first, second, third and fourth quarter respectively. However, it should also be noted that there was a remarkable decline in the growth rate of exports that started in September and continued unabated up to the end of observation period.

The ECB (2012a) stated that energy prices contributed 80% to the increase in inflation, with a larger impact in the US. It also confirms that “inflation in the euro area and in the United States has followed similar patterns since 2008”.

It is also worth noting that Chinese inflation rates continued to overtake the South African inflation rates up until December, and this could be attributed to the interest rates as shown in

the graph below. However, despite the Chinese interest rates being higher than South African's, this did not deter the Chinese inflation rate from decelerating to below the South African inflation rates. This could suggest that the IT framework might be applicable to the Chinese economy. It might also just confirm the strong relationship between Chinese output and its inflation rates.

Figure 49: The 2011 Interest Rates



Source: IMF, 2017b

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In September, the inflation rate of the Euro area experienced a significant jump which coincides with a jump in the Euro/Dollar exchange rate (Fred, 2017a).

Starting at €1.3371 to the dollar at the beginning of January, the Euro continued to appreciate up until April. Starting in May, it generally fluctuated between €1.45 and €1.40 and on the 6th of September, it dropped to below €1.40 and continued to depreciate significantly during the September, ending the month at €1.35. The exchange rate continued to generally fluctuate between €1.40 and €1.35 before experience another significant drop in December.

It could be argued that the Euro appreciation, the rapidly rising price of oil had a more pronounced shock effect on the inflation rate increase from January to April. The same argument could be made for the rest of the year, except for September. During September, the oil price continued to decline, but the significant weakening in the Euro once again had a

pronounced shock effect, which positioned inflation at a higher rate in the following months. Although the depreciating Euro only pushed up the inflation rate during this month, the effect it had over the longer term was to have inflation increase at a more elevated base than before September.

It is significant to note that during this period, the strengthening Euro aligned more closely with the behaviour of the US inflation rate. The US inflation rate increased up until May, moderated up until September, started a decreasing trend in October and had a more pronounced decrease in December. However, this trend also closely aligned with the price of oil, which makes it difficult to determine which variable had the largest impact on inflation. What can quite reasonably assumed is that, when, for example, the oil price increases and the exchange rate appreciates, these variables acts as opposing forces, with the oil price increasing inflation and the exchange rate decreasing inflation. Similarly, if the oil price rises and the exchange rate depreciates, they reinforce each other's influence on the inflation rate in that they accelerate the inflation rate an exponential rate.

6.12.4 The 2011 Preliminary analysis

By suggesting that the inflation rate was beyond its control, the SARB also asserted that it could not use interest rates as a monetary policy tool. The most important implication is that the IT framework was 'unusable' during the 2011 period. Furthermore, the relationship between output and inflation was weak at best, both domestically and internationally. The general consensus among the various monetary bodies that included the ECB and the PBC is that the price of oil was a significant factor as well as the price of food. It had been established earlier on in the thesis that domestic price of food was generally a function of international factors. The only country that seemed to respond to output seems to be China, hence the IT framework might be more applicable to a country that is structurally similar to China. Lastly, it is noted that despite the interest rates in China being higher than in South Africa, by the end of 2011, the Chinese inflation rate had been lower than the South African inflation rate. This might help to negate the hypothesis that a higher interest rate leads to a higher inflation rate.

2.12.5 One Last Look at the Inflation Rate of 2011

During the 2011 period, it was relatively difficult to identify which variables had a more profound impact on the inflation rate. Given that the interest rate remained unchanged, it might be a good idea to use this lack of clarity to interpret the behaviour of the inflation within a possible framework, as had been observed in previous years.

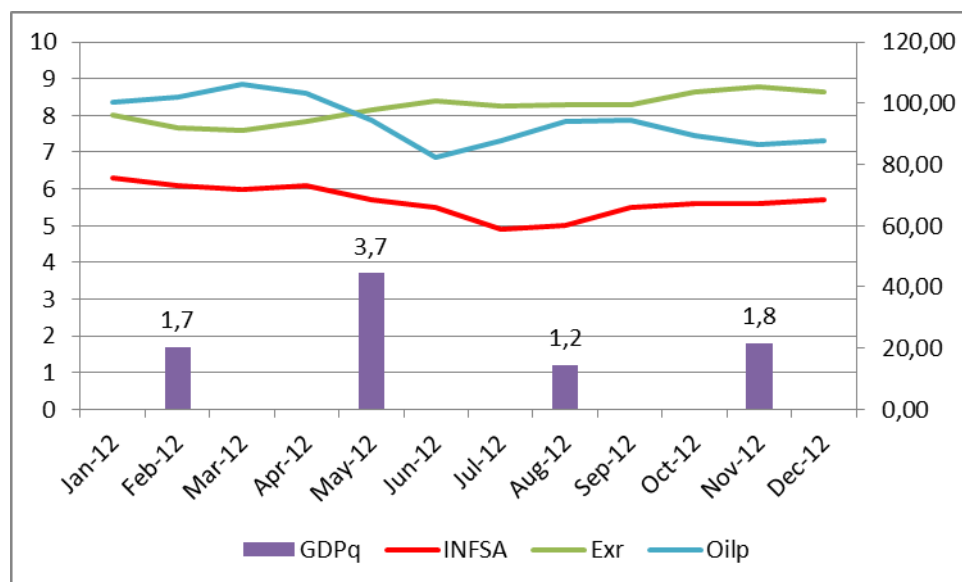
The inflation rate for South Africa had started to increase in October 2010, the same month that the price of oil started to increase. A significant jump in inflation from 3.7% to 4.1% was experienced in March 2011, the same month in which the price of oil jumped from \$89 a barrel to \$103 a barrel. For both the inflation rate and the price of oil, these were the largest unit increases since October. This may be indicative of the profound contemporaneous effect that the price of oil has on the inflation rate. However, the inflation rate continued to increase significantly from May to July, despite the significant drop in the price of oil, lower GDP growth rates, lower interest rates, and a relatively constant exchange rate. The inflation rate for the US also moderated and the EU's inflation rate declined. The continued escalation in the inflation rate could have been a lagged response to the significant increases in the price of oil or it could have been a response to the jump in the China's inflation rate. During the first half of 2011, China's inflation rate trended upwards and significantly jumped from 5.5% in May to 6.5% in July.

While South Africa's inflation rate seemingly started to moderate in August, the exchange rate accelerated significantly from R6.79/\$ in July to R7.06/\$ in August and R7.52/\$ in September. It peaked at R8.17/\$ in December. In what is assumed to be a lagged response to the exchange rate, the inflation once again escalated rapidly from 5.3% in August to 5.7% in September, peaking at 6.1% November and December. The inflation rate generally moderated in the fourth quarter. This quarter was characterised by a higher GDP growth rate, an increasing price of oil, and a depreciating rand. All of these fourth quarter characteristics should have translated into an increase in the inflation rate. The moderation in the inflation rate could quite possibly be explained as a lagged response to the decrease in the price of oil (\$110 a barrel in April to \$86 in September), a lagged response to the decrease in the inflation rates of the US and China, and/or a more contemporaneous response to the moderation and eventual decrease in the inflation rate of the EU area.

6.13 2012

6.13.1 The 2012 Narrative According to SARB and the Graphic Narrative

Figure 50: 2012 Relationship Between SA Inflation, SA GDP growth rate, R/\$ Exchange Rate, Oil Price



Source: SARB. 2015a, IMF. 2016, Fred. 2017a, Fred. 2015

The SARB (2013a:30) states that the general downward trend in the inflation rate during the first half of 2012 was largely because “of a moderation in food and non-alcoholic beverages price inflation, and in petrol price inflation”.

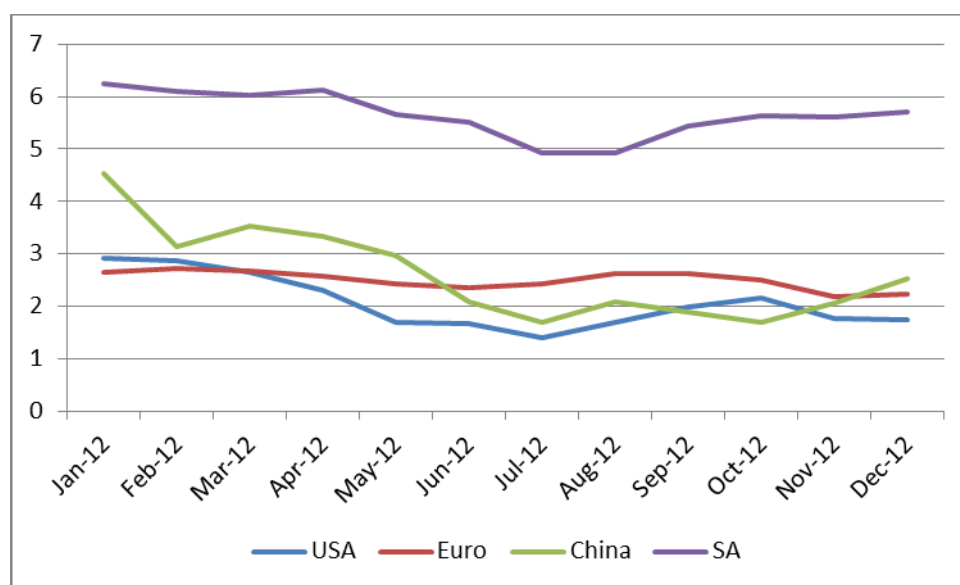
Starting in August, there was a gradual increase in the domestic inflation rate, despite the “benign international inflation environment”. The SARB states that the possible reasons for this acceleration in inflation could have been the depreciation of the rand, “high administered price inflation and wage increases in excess of inflation”. The fluctuations in administered prices were largely as a result of “fluctuations in petrol price inflation” (SARB. 2013a:30). The rand’s exchange rate generally “tracked that of the euro, especially after the global financial crisis”, but this relationships weakened in the second half of 2012 due to domestic factors (SARB. 2013:51).

The international inflationary pressures “remained modest” as a result of the “subdued global economic growth” that occurred in the second half of 2012 (SARB. 2013a:27). This slowdown also reduced “international commodity prices in especially the second half of 2012”.

6.13.2 The Reference Areas

By looking at the graph above, it becomes apparent that SA's inflation rate followed a generally similar trajectory as that of the 3 reference areas. However, it seems to have been more aligned to the trajectory of the US, up until October, where it became more aligned to China.

Figure 51: 2012 Inflation Rates



Source: IMF, 2016

The PBC (2013:13) states that GDP growth was 8.1%, 7.6%, 7.4% and 7.9% for the 1st, 2nd, 3rd and 4th quarter respectively. It attributed China's inflation behaviour to "prudent monetary policy" and implied that the fourth quarter rise in inflation was as a result of the increase in GDP growth (PBC. 2013:16). As shown in the graph above, China's inflation rate generally trended downwards up until the fourth quarter when it trended upwards.

Inflation in "most emerging Asian economies remained well contained" due to "moderate output growth", with India being the exception (Fed. 2013a:35). India's inflation rate stood at 10% for the year, and it is interesting to note that India's interest rates had been the highest it has been at 8.5%, for the entire period under review

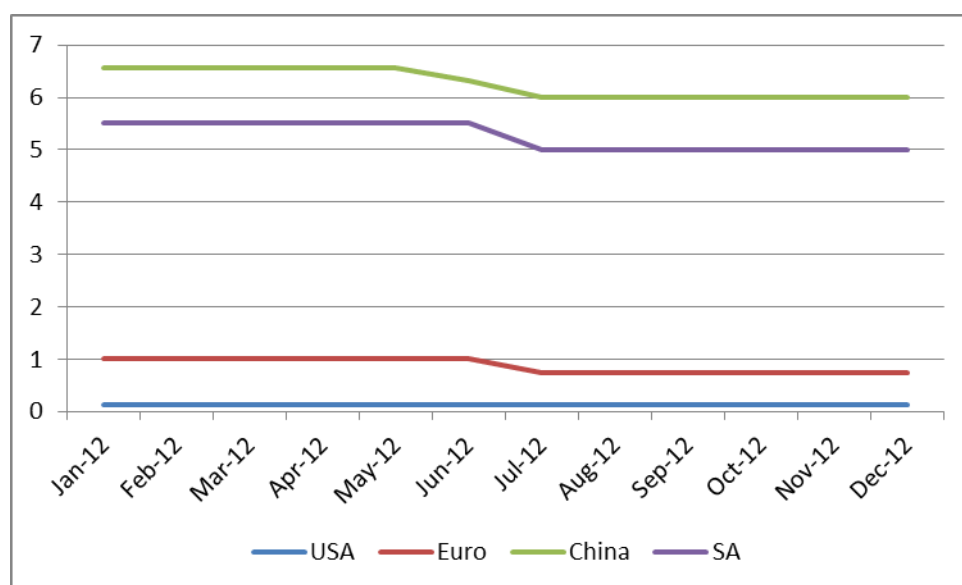
The Fed (2013a:10) states that the likely contributors to the low inflation rates of the US was the "considerable slack in labor markets and limited increases in labor costs, relatively stable

prices for commodities and imports, and well-anchored longer-term inflation expectations". Growth in output was also generally lower than in the previous year.

The SARB (2013a:34) asserts that weakness in the economies of the Euro area led to lower inflation with Greece in particular experiencing deflation. GDP growth in the EU area continued to plummet, falling further into recession (Fed. 2013a:34).

6.13.3 The 2012 Interest Rates

Figure 52: The 2012 Interest Rates



Source: IMF. 2017b

It is once again noted that despite China's interest rates being higher, its inflation rate continued to be significantly lower than that of South Africa. Once again, there may be some credence to the PBC's assertion that it has applied its monetary policy prudently. For example, China lowered its interest rate from 6.31% in June to 6% in July, which may have assisted in boosting output and inflation during the second half of 2012. However, if it is assumed that the IT framework starts to deliver results by the 24 month, then the result contradicts the IT framework.

China began to increase its interest rates in October 2010, with another increase in December 2010, February 2011, April 2011 and July 2011. Given the IT framework, within a 24 month period, the increase would have reduced output, reduced inflation, and placed the economy on a more stable, stronger trajectory. The inflation rate had indeed been reduced from 4.4% in

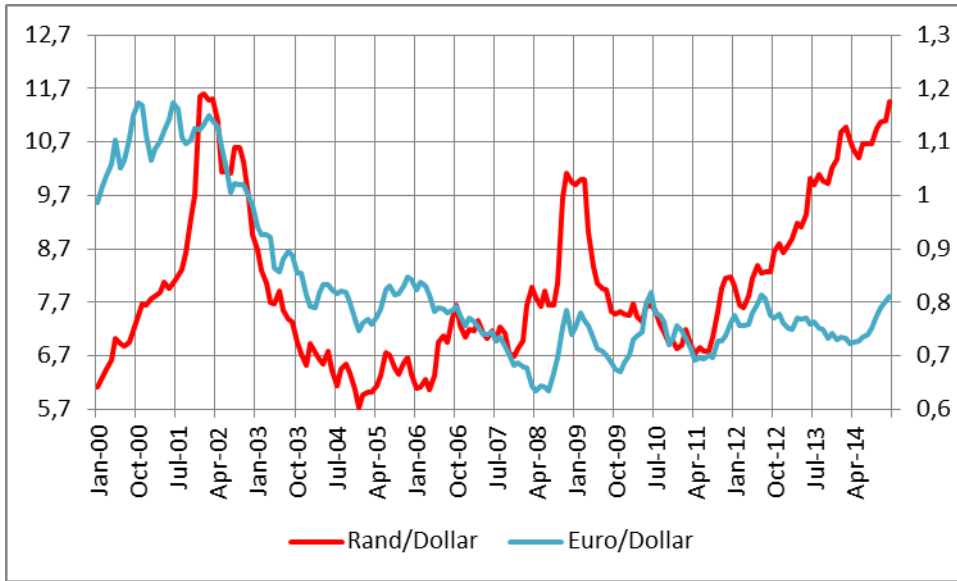
October 2010 to 2.6% in September 2012 and 1.6% in June 2013. Output had also been reduced, but the size of the declines does not suggest that increasing the interest rate had placed China on a more stable trajectory. The GDP growth rate for China had plummeted from 10.6% in 2010, to 7.8% in 2012 and 7.7% in 2013. By 2014, the GDP growth rate had fallen again to 7.3%. It might have been assumed that in the very least, output would have trended upwards by 2014.

Similarly for South Africa, it could be argued that the interest rate decreases that occurred in November 2010, gradually increased inflation more or less within a 24 month period. In November 2010, the interest rate was decreased by 50 basis points to 5.5%. At the time, the inflation rate stood at 3.5% and by October 2012, the inflation rate stood at 5.6%. However, for this claim to be valid, there would have to be an increase in output, which was not the case. Output had in fact plummeted from 4.3% in 2010 to 2.5% in 2012 and 2.4% in 2013. It had only slightly increased to 2.6% in 2014, which was still considerably weak. Even taking into account the interest increase of March 2010 and September 2010, this relationship between inflation and output does not hold. The GDP growth rate had been in general decline since 2010 and continued this trend into 2013 with a slight increase in 2014. Inconclusive outcomes are also evident in the US and EU area, hence, once again, a more plausible monetary policy tool might be needed to control the behaviour of the inflation rate.

6.13.4 The Relationship Between the Rand and the Euro

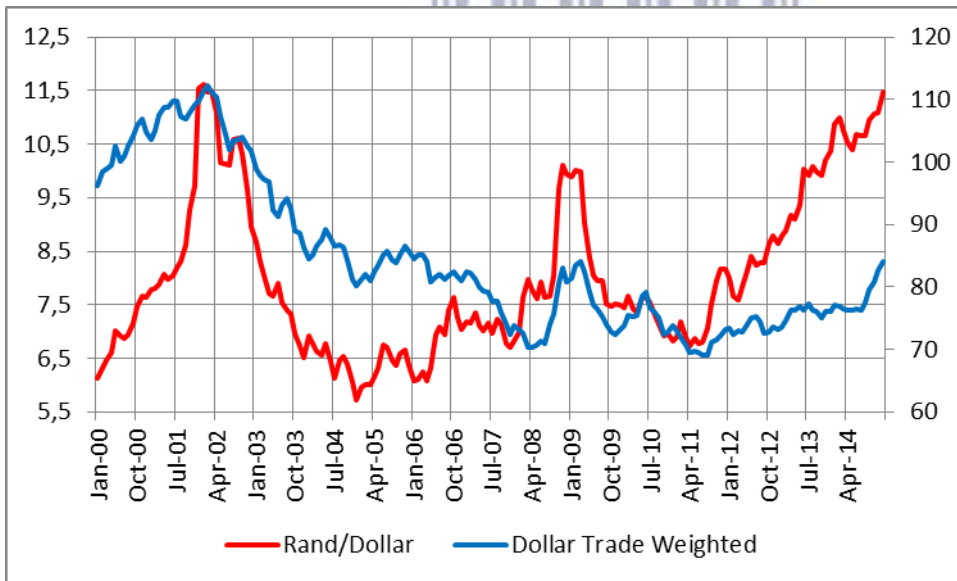
In section 6.4.1, it was asserted that there was a clear correlation between the rand and the dollar. It was also suggested that any breakdown in this relationship might be as a result of currency manipulation. However, in section 6.13.1, it was asserted that the SARB had confirmed that the Rand generally correlated with the Euro. However, the two graphs below illustrate these relationships and shows that the rand correlates strongly with both the Euro and the Dollar. Furthermore, it is observed that in both cases, there is a 'deviation' in these relationships at approximately the same time.

Figure 53: The Relationship between the Rand and Euro



Source 16: Fred 2017

Figure 54: The Relationship between the Rand and Dollar

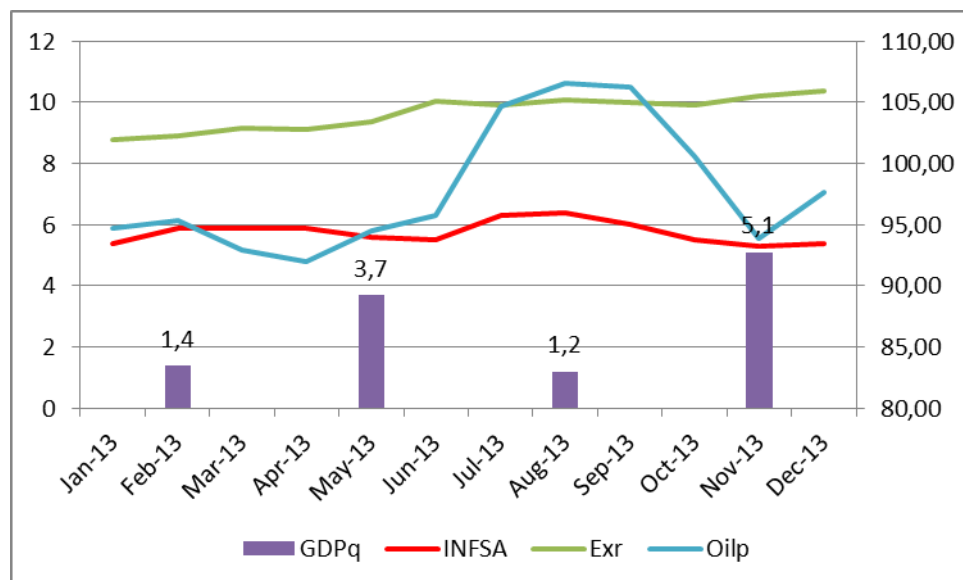


Source 17: Fred 2017

6.14 2013

6.14.1 The 2013 Narrative According to SARB and the Graphic Narrative

Figure 55: 2013 Relationship Between SA Inflation, SA GDP growth rate, R/\$ Exchange Rate, Oil Price



Source: SARB. 2015a, IMF. 2016, Fred. 2017a, Fred. 2015

The SARB (2014a:23) states that the inflation rate remained within the target range for most of the year, accelerating only marginally compared with the previous year and only breaching the upper limits in July and August. Furthermore, it ascribes fluctuations in the inflation rate to “food and petrol prices, with underlying inflationary pressures remaining fairly stable”. More specifically, inflationary changes “resulted largely” from the changes in the prices of non-durable goods, with petrol prices being a significant contributing factor. The acceleration in inflation during July and August “could mainly be attributed to higher petrol prices and, to a lesser extent, higher food prices” (SARB. 2013b:24).

It is observed that, once again, output and inflation did not correlate. The inflation rate increased during quarters where output was increased significantly and decreased where output decreased significantly. It is also once again noted that the ‘3% threshold’ hypothesis does not hold.

It could be argued that during each quarter, the inflation had a lagged response to the output of the previous quarter. It could also be argued that other factors such as the gradually

depreciating exchange rate distorted the impact of output. This possibility will be explored below.

As noted above, the exchange rate depreciated gradually, but the the SARB (2014a:2) asserted that this depreciation saw “little pass-through to consumer goods price inflation”.

The possible reasons for the limited pass-through given by the SARB include:

- Greater competition among producers due to surplus capacity
- “tight consumer budgets and conservatism among lenders and borrowers alike about the use and extension of credit”
- “the length of the supply chain, inventory buffers and the use of instruments to hedge against exchange rate movements”;
- Cheaper imports from “lowest-cost countries”;
- “technological advances lowering the real prices of a range of products such as telecommunication equipment and computers”; and
- “benign inflation expectations shaped by the generally successful inflation outcomes under inflation targeting”

However, the SARB does not state whether these factors definitively played a role but merely states that these factors “probably” contributed to the limited pass-through. The exchange rate did however depreciate significantly from a trough of R8.79/\$ in January to a peak of R10.37/\$ in December. It was noted that the rand weakened due to weaker-than-expected growth in output, a “decline in the international prices of gold and platinum”, and labour disputes (SARB. 2013a:51).

The SARB (2014a:4) attributed the weaker growth in output to labour disputes, “subdued business and consumer confidence levels”, hampered production due to “structural impediments”, and lethargic conditions in the global economy. The growth rate for 2013 was the lowest in 15 years, with the exception of 2009. It also stated above that the rand weakened because of ‘weaker-than-expected growth’, implying that the growth rate forecasted by the SARB had been incorrect. This incorrect forecast will be briefly explored below.

6.14.2 Forecasting Output and inflation: Another Brief Look at the IT Framework

After having grown by 2.5% in 2012, the SARB (2013d:73) had forecasted that the 2013 aggregate real GDP would grow at a rate of 2.6%. This forecast was made in the first quarter of 2013. However, by the end of 2013, aggregate real GDP had declined to a “disappointing 1.9%”. Not only was the growth rate significantly different to the actual growth rate, but the direction of the growth rate was also incorrect. If taking a look at the how the IT framework is applied, then it would be logical to assume that the SARB weren’t able to forecast the inflation rate either.

As noted in section 6.14.1, the SARB implied that the “generally successful inflation outcomes” had been as a result of the application of the IT framework. Once again, the IT framework suggests that after forecasting future output, the SARB would be able to know the approximate magnitude and direction of the inflation rate. However, if the SARB aren’t able to forecast output, then by implication, it would not be able to forecast inflation. As noted above, the SARB admitted that it had been unable to give a correct approximation of the GDP growth rate hence it would be logical to assume that it been unable to forecast inflation. However, just because this particular forecast is wrong, it cannot be automatically assumed that SARB is wrong ‘all of the time’.

During the first quarter of 2012, the SARB (2012b:69) stated that after an estimated real growth rate of 3.1% in 2011, the growth rate was forecasted to decline to 2.8% for 2012. Despite this growth rate being incorrect, it can be argued that the estimation was approximately correct, depending on the margin of error. The growth rate for 2012 was 2.5%. If it is to be assumed that this was an acceptable approximation, then in the very least, the SARB’s ability to forecast growth can be argued to be correct ‘some of the time’. However, the forecast of 2.8% had to be changed from a previous forecast of 3.2%. In addition, prior to the forecast of 3.2%, in September of 2011, the SARB (2011b:63) had forecasted a 2012 growth rate of 3.6%. This forecast of 3.6% was changed from a previous forecast of 3.9% which was significantly different from the actual growth rate of 2.5%. These significant downward revisions suggests that the SARB struggles with developing accurate forecasts over the longer term hence it may also struggle to accurately forecast the inflation rate over the longer term. Also in September of 2011, the SARB had forecasted that the growth rate for

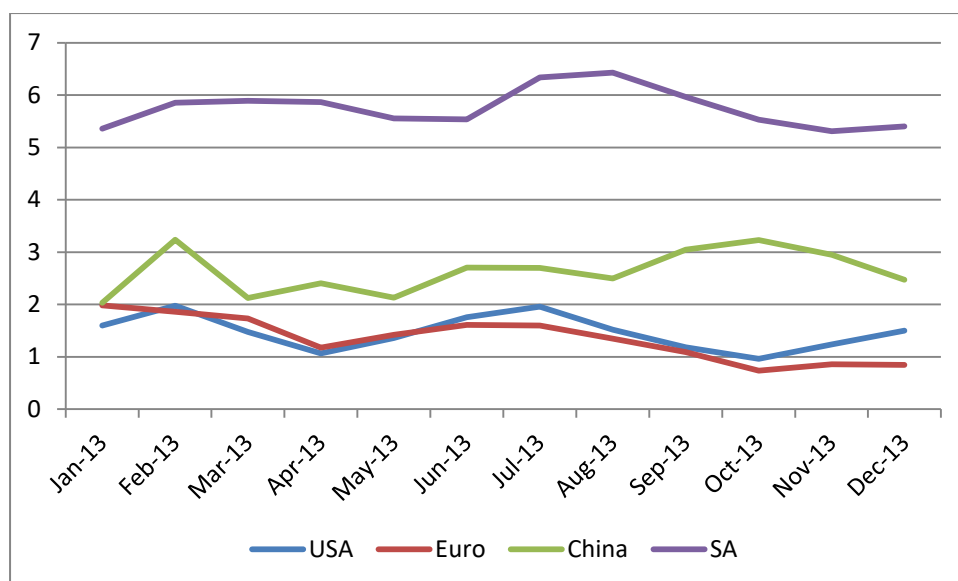
2013 would be 4.4% but as noted above, the actual growth rate of 1.9% was significantly different to the actual growth rate.

As noted above, the SARB may have difficulties in forecasting the GDP growth rate over the longer term but it does seem to have more accurate estimations over the shorter term. In the first quarter of 2010, real GDP was forecasted to grow at a rate of 2% (SARB. 2010b:66) and in the final quarter it was forecasted to grow at 2.8% (SARB. 2010c:67). The real GDP growth rate for 2010 was 2.9%, which is approximately equal to the forecast in the last quarter and once suggests that the SARB's forecasts are much more accurate over the shorter term. However, on the 12th of October 2006 (the last quarter), the MPC released a statement in which they wrote that the real GDP growth rate for 2006 is "expected to be lower" than the estimated 4.9% growth rate for 2005 (SARB. 2006b:60). In 2006 the actual growth rate had accelerated to 5.5% (SARB. 2007b:4). Despite this forecast for 2006 being made in the last quarter of 2006, the SARB had once again incorrectly forecasted both the magnitude and direction of the growth rate. This could mean that the SARB does not have the correct tools to forecast growth over both the long and short term. It could also mean that the SARB managed to improve its forecasting tools in the last few years to, in the very least, be able to forecast growth in the shorter term but still unable to give accurate longer term forecasts.

Regardless of which year is studied, it is observed that there are significant inconsistencies in what is forecasted by the SARB and the actual growth rates. Once again, output is fundamental part of the IT framework and being unable to predict output suggests an inability to predict the inflation rate.

6.14.3 The Reference Areas

Figure 56: 2013 Inflation Rates



Source: IMF, 2016

As shown in the graph above, the South African inflation rate generally correlated with the inflation rates of the US and Euro area. South Africa however had approximately the same inflation rate (5.4%) in December as it had in January. The US and EU's inflation rates experienced a significant downward trend from 1.6% in January to 1.5% in December and 2% in January to 0.8% in December respectively.

The ECB (2013a:68) states that the inflation rate in the first half of 2013 was largely influenced by “a strong decline in energy price inflation from the elevated levels seen in 2012”. It also stated that the sharp decline in the inflation rate that was experienced in August was largely as a result of “a decline in the annual rates of change of the energy, food and non-energy industrial goods components”, as well as “the appreciation of the euro over the past year”. More specifically, it states that the “fading away of the impact of past increases in oil prices” led to “negative base effects”. In other words, the annual oil inflation rates leading up to August had a significant impact on a negative energy price inflation rate of 0.4%.

It is noted that the inflation rates for South Africa were once again persistently and significantly higher than that of the reference countries. However, the Fed considered its significantly lower inflation rate to be problematic.

6.14.4 A Brief Look at the Fed's Monetary Policy Outcomes

The Fed's monetary policy report states that "the inflation rate over the longer run is primarily determined by monetary policy" (Fed. 2014a). The behaviour of the inflation rate since 2013 contradicts this statement and suggests that factors beyond the control of the Fed determine the inflation rate.

In its monetary policy report for 2013, the Fed's monetary policy committee stated that inflation was "persistently below its 2 percent objective", posing a risk to the economy (Fed. 2014a). It however assured the markets that the persistently lower inflation rate was "transitory"; and that "survey and market based measures of longer-term inflation expectations have remained in the ranges seen over the past several years". In other words, inflation forecast had shown that the inflation rate would eventually reach its 2% objective. This was not the case and IMF data shows that the inflation rate continued to be persistently and significantly below the stated inflation objective up until the November 2016 when it has reached 1.7%. During the month of December 2016, the objective was finally reached when the inflation rate was 2.1% However, since then, the inflation had fluctuated significantly and was either significantly above or below the 2% objective.

In a July 2017 article written for the New York Times, it was claimed that the Fed was "on track to fail for the sixth straight year" (Applebaum. 2017). At the time, the Fed's chairwoman, Janet Yellen is quoted as saying that "it's premature to reach the judgment that we're not on the path to 2 percent inflation over the next couple of years" (Applebaum. 2017). This quote verifies that the Fed had not reached its objective well into 2017. It also suggests that the Fed is not certain of how long it will take to get inflation under control.

6.15 2014

6.15.1 The 2014 Narrative According to SARB

The SARB (2014b:23) stated that "despite lacklustre output growth" during the first half of 2014, the inflation rate accelerated due to "an acceleration in petrol and food price inflation

and broader exchange rate pass-through”. By May 2014, the inflation rate had accelerated to 6.6%, “its highest level” since July 2009 when it was at 6.7%.

The considerable decline in the price of oil during the second half of 2014 “contributed largely to significantly lower domestic inflation” and helped contain global price inflation (SARB. 2015a:29). The declining oil price, which raised the “spectre of deflation in some economies”, was ‘reinforced’ by a stronger dollar, “weak demand and the decision by oil producers to refrain from cutting back on production” (SARB. 2015a:1). By the January 2015, the price of oil had “sank to a six-year low of US\$45 per barrel”.

It is perhaps important to point out that the declining oil price was influenced by factors external to the economy. If this was the case, then once again, the inflation rate was largely a function of factors external to the economy.

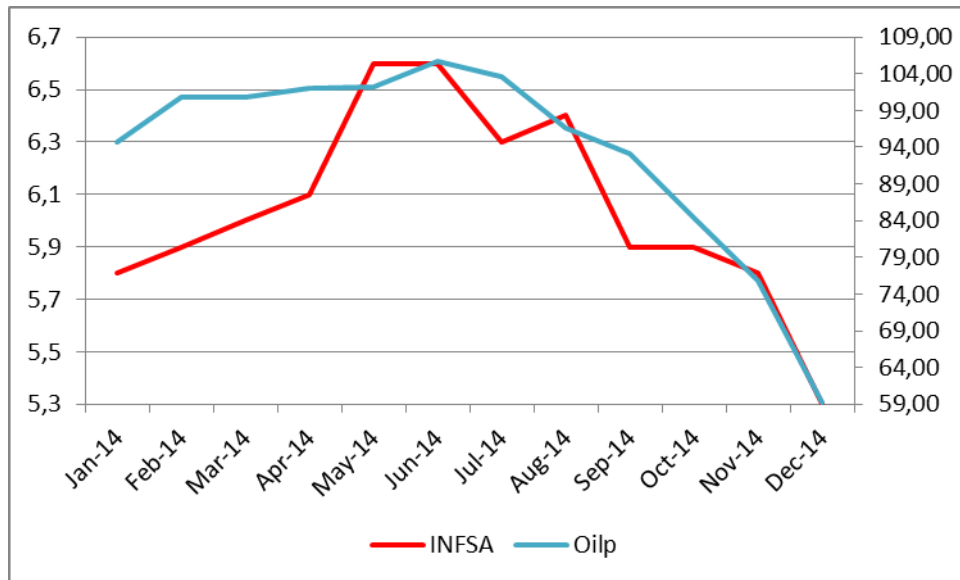
6.15.2 The Graphic Analysis and Reference Countries

As noted in section 1.2, the question for this thesis was formulated by causal observations made about the inflation behaviour in 2014. Thus far, the graphic analysis combined the selected variables into a single figure to establish a consistent narrative about the relationship between these variables. To understand the importance of 2014 in formulating the question, the independent variables will be separated and illustrated to show its exact relationship with the inflation rate in the same context as a bivariate regression. The reference countries will also be included to provide context to the narrative.

The first variable that will be graphically analysed is the price of oil which is shown in the graph below. If it is assumed that the price of oil is the only variable that influences the inflation rate, then it can be argued that within the first half of 2014, the elevated and rapidly accelerating price of oil had also accelerated the inflation rate. The price of oil had jumped from \$95 a barrel in January to \$101 in February, peaking at \$106 in June. The inflation rate had also trended upward, troughing at 5.8% in January and moderating to a peak of 6.6% in May and June. During the second half, both the inflation rate and the price of oil fell relatively sharply. During December, the price of oil plummeted to a trough of \$59 a barrel and the inflation rate plummeted to a trough of 5.3%. There was however a momentary increase in the inflation rate from 6.3% in July to 6.4% in August. In addition, despite sharp monthly

declines in the price of oil throughout the second half, the inflation rate moderated from September (5.9%) to November (5.8%).

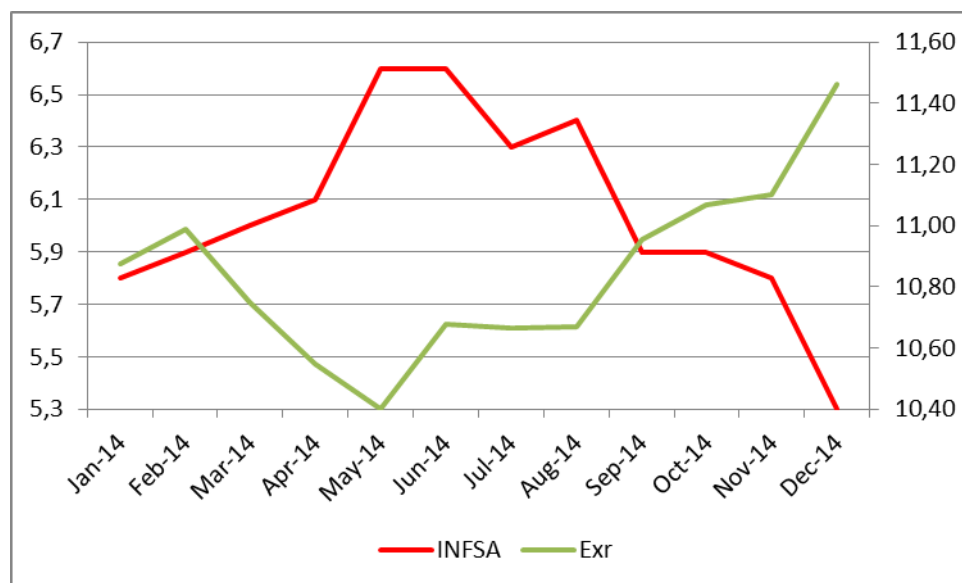
Figure 57: The 2014 Relationship Between the South African Inflation Rate and Price of Oil



The second figure below shows the relationship between the inflation rate and the rand/dollar exchange rate. Graphically, there was a counterintuitive negative correlation between the inflation rate and the exchange rate. Given this counterintuitive relationship, it could be argued that there was no relationship between these two variables and any indication of a relationship is spurious. However, even if this relationship is not visually evident, it does not mean that there was no pass-through. Calculated from data obtained from the SARB, it shown that during the 180 months from 2000 to 2014, the exchange rate had only been greater than R10/\$ for 29 months. These 29 months makes up 16% of the 180 months under review. Given this data it can be argued that the exchange rate had been unusually elevated since November 2013. It can be further argued that this unusual elevation contributed to the inflation rate remaining elevated regardless of other factors. For example, during the second half of 2014, had it not been for these unusually elevated exchange rate levels, the inflation rates might have seen a steeper drop in response to the steep fall in the price of oil. Furthermore, the moderation in the inflation rate from September to November could have been as a result of these elevated exchange rate levels. It was also during this time that the exchange rate depreciated sharply from R10.67/\$ in August to R10.95 in September and R11.

09 in November. However, the rand also depreciated sharply in from May to June at a time when the inflation rate moderated despite the sharp increase in the price of oil.

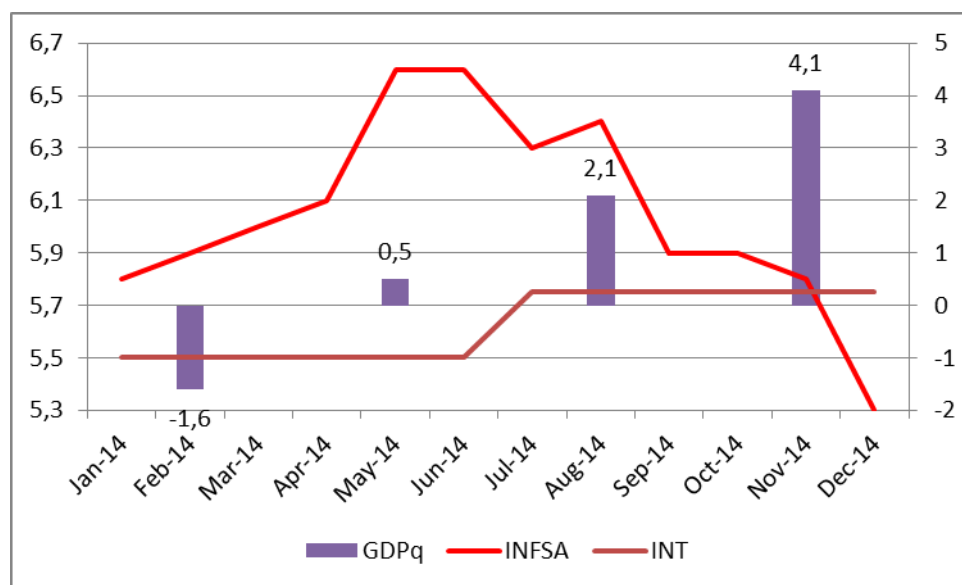
Figure 58: The Relationship Between the South African Inflation Rate and Rand/Dollar Exchange Rate



The third graph shows a relationship between the inflation rate and the GDP growth rate. Once again, the relationship between the GDP growth rate and the inflation rate does not reflect behaviour as would be forecasted within an IT framework. However, the significant increase in the GDP growth rate from 0.5% in the second quarter to 2.1% in the third quarter could help explain the momentary increase in the inflation rate in August. The fourth quarter increase in the GDP growth rate to 4.1% could also help to explain the moderation from September to November. It does not however explain the sharp fall in the inflation rate in December. The only viable explanation up to this point is the sharp drop in the price of oil. It should be noted that the GDP growth rate had decreased significantly from 2.2% in 2013 to 1.5% in 2014, the weakest it had been since 2009 and the second weakest growth rate for the entire observation period. The third weakest growth rate during the observation period was 2% in 2001.

The interest rate was added to the graph to perhaps help explain the increase in the August inflation rate increase. If it is the case that interest rates have a positive relationship with the inflation over a shorter term, then once again, the August inflation rate increase could be a lagged response to the increase in the interest rate. The interest rate was increased by a marginal 25 basis points from 5.5% in June to 5.75% in July.

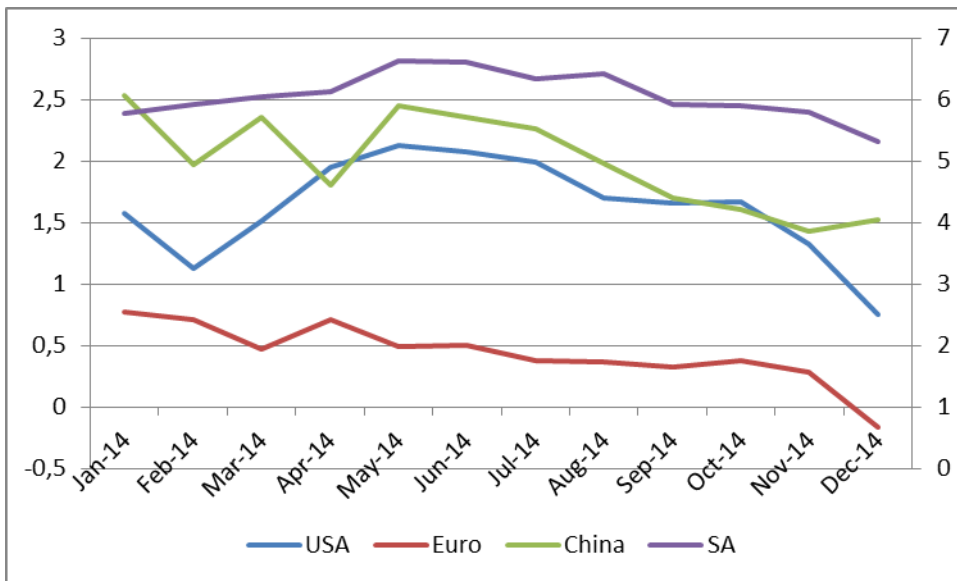
Figure 59: The Relationship Between the Inflation Rate, GDP Growth Rate and Interest Rate



The last graph is to show the relationship between the South African inflation rate and the inflation rates of the reference countries. Unlike the other graphs, the South African inflation is shown on the right vertical axis. This provides a more detailed illustration of the relationship between the respective variables.

The South African and US inflation rates generally exhibited similar trends during the first and second halves of the year whereas the inflation rates of the Euro area and China generally trended downwards. However, both China and the Euro area displayed a more moderating trend in the first half and similar to South Africa and the US, a sharp downward trend in the second half. What is of significance is that, during the second half, the South African inflation mimicked the behaviour of the US inflation rate, but with a one month lagged response. This could also help explain the moderation in the South African inflation rate from September to November. After having dropped sharply from 2% in July to 1.7% in August, the US inflation rate moderated at 1.7% in September and October. The inflation rates for all reference countries moderated in June and could help explain why the inflation rate in South Africa also moderated in June.

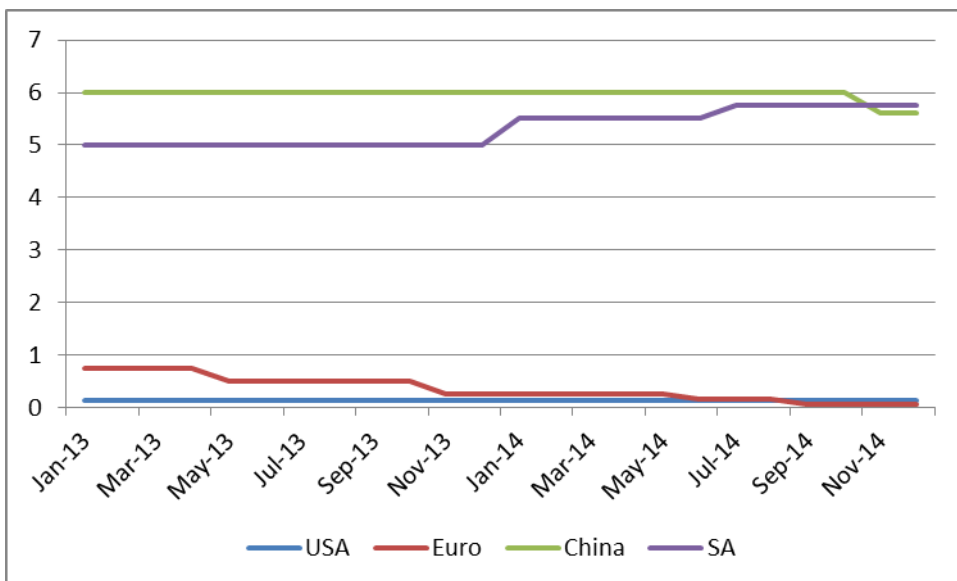
Figure 60: The 2016 Inflation Rates



6.15.3 The 2013 and 2014 Interest Rates

During the 2013 narrative, the interest rates were not included. The reason for this exclusion was the fact that the South African interest rates were changed in the first month of 2014, hence the narrative about the interest rates might have been disjointed. It also allows for a much more expansive narrative to be built to over a period of two years and conclude this part of the narrative on a more in-depth note.

Figure 61: The 2013, 2014 Interest Rates



During the 2013 period, South Africa, the US and China had kept their interest rates unchanged. All three countries experienced significant inflation rate volatility but the inflation rates of South Africa and the US remained approximately unchanged in the first and last month of 2013.

The US started the year with 1.6% in January, peaked at 2% in February and July 2013, troughed at 1% in October 2013, and ended the year with 1.5% in December. South Africa started the year at 5.4% in January, peaked at 6.4% in August, troughed at 5.3% in November and ended the year with 5.4% in December. China had started the year with a trough of 2% in January, peaked at 3.2% in February, and ended the year with 2.5% in December.

The Euro area however trended downwards, starting the year with a peak of 2% in January, troughed at 0.7% in October and ended the year with 0.8% in December. During the same period, it had reduced its interest rates by a cumulative 50 basis points from 0.75% in April, to 0.5% in May and 0.25% in November.

During the 2014 period, it was only the US that kept its interest rates unchanged. It should be once again noted that since 2008, these interest rates were at historically low levels, and yet, by December 2014, the inflation rate (0.8%) had reached its lowest level since October 2009. Prior to the financial crisis in late 2008, the inflation rate had never decreased to below 1% during the period under review. December 2008 was the first time it had decreased to below 1% during the entire period under review.

The Euro area had continued to decrease its interest rates from 0.25% in May 2014 to 0.15% in June and 0.05% in September. Its interest rates had also been at historically low levels since 2009. By December 2014 however, its inflation rate had turned negative for the first time since October 2009.

China's inflation rate of 1.4% in November 2014 was its lowest since November 2009. China however started decreasing its interest in June 2012, from a relatively high 6.56% in May 2012 to 6.31%. In November 2014, it decreased its interest rates from 6% in October to 5.6%. It should be noted that given its volatile behaviour since June 2012, it is unclear how the inflation rate was influenced by the lower interest rates. Unlike South Africa, the US and the EU area, its inflation rate increased in December 2014 which could mean that China is very responsive to a change in the interest rate.

South Africa maintained an interest rate of 5% for the whole of 2013 and only increased it by 50 basis points in January 2014. In July 2014, it increased the interest rate once again by 25 basis points. In January 2014, the inflation rate accelerated to 5.8% from 5.4% in December

2013, peaking at 6.6% in May and June. The inflation rate only reversed its sharply upward trend in July, when the trend in the price oil started to trend downwards.

6.15.4 The Preliminary Analysis for 2014

During the first half of 2014, the elevated and increasing price of oil might have accelerated the inflation rate. Had it not been for the unusually elevated levels of the exchange rate, the inflation rate might not have been as high as it had been; especially given the weak GDP growth rates and lower interest rates. However, the inflation rate had moderated in June, possibly due to a moderation in the inflation rates of South Africa's largest trading partners. In other words, during June, less inflation was being imported into the country.

During the second half, the inflation rate trended downwards as a result of the sharp drop in the price of oil. The inflation rate moderated from September to November quite possibly due to a sharp increase in the GDP growth rate, a one month lagged response to the moderation in the inflation rate of the US, and the continued elevated and depreciating exchange rates. The increase in the inflation rate in August might have primarily been a response to the sharp third quarter increase in the GDP growth rate and perhaps a lagged response to the increase in the interest rate

It is noted that the increase in the interest rate in January 2014 might have contributed to the acceleration in the inflation rate during the first half of 2014. As possible proof, the historically low inflation rates in the US and EU had only led to historically low inflation rates.

6.16 THE FINAL ANALYSIS OF THE NARRATIVE

As noted in chapter 1.3, the specific question is primarily aimed at looking at the rationale of increasing the interest rates during a low economic growth period. However, as elaborated on in chapter 4, given the conflicting empirical results and lack of consensus on inflation rate outcomes; it became necessary to understand the behaviour of the inflation rate in South Africa.

In chapter 5 it is noted that in order to begin with the process of explaining the behaviour of the inflation rate, the events surrounding the 29 February was used as an anchor by which to identify the principle dependent variables. These included the interest rates, the exchange rates and the price of oil. Not only was the narrative aimed at determining whether the selections of these variables were valid, but they also aimed to identify additional explanatory variables. Given that the SARB is the main authority on the inflation rate, the narrative always generally started with what the SARB identified as the main explanatory variables. The additional subsections, namely the graphic narrative, reference countries and interests were added to either support or dispute the SARB's narrative as well as find answers that are not provided by the SARB.

6.16.1 The Main Explanatory Variables According to the SARB

The table below lists what the SARB's narrative suggested was the main explanatory variables. The main explanatory variables mentioned by the SARB are divided into the primary and secondary explanatory variables. The primary variables are what the SARB considered to be the primary drivers of the inflation rate and the secondary variables are the variables that moderated or accelerated the effects of the primary variables.

It should be noted that to classify the variables, careful consideration was given to the wording of the SARB's reports. For example, in 2009 there are no primary explanatory variables because the SARB did not indicate which variables it considered to be the primary drivers of inflation. It just stated that the variables listed 'contained' the inflation rate.

Table 2: Primary and Secondary Explanatory Variables According to the SARB

Year	Primary Explanatory Variables	Secondary Explanatory Variables
2000	Price of Oil, Food Prices	Exchange rate
2001	Transport Costs, Exchange Rate	Imported Inflation*
2002	Exchange Rate, Price of Oil, Food Prices	Imported Inflation
2003	Exchange Rate	Imported Inflation
2004	Exchange Rate, Interest Rates, Food Prices, Price of Oil***	Imported Inflation**, Price of Oil***
2005	Price of Oil	Exchange Rate

2006	Exchange Rate, Price of Oil, Food Prices	
2007	Price of Oil, Commodity Prices, Growth in China and India, Food Prices****	
2008	Wages, Productivity Growth	Price of Oil, Exchange Rate
2009		Exchange Rate, Imported Inflation, GDP Growth Rate
2010		GDP Growth Rate (Global and Domestic), Exchange Rate
2011	Non-durable Goods, Imported Inflation	Price of Oil, Food Prices, Global GDP Growth Rates
2012	Food and Non-Alcoholic beverages prices, Petrol Prices	
2013	Petrol Prices	
2014	Price of Oil, Food Prices, Exchange Rate	

* Trading partner countries had lower inflation rates

** Trading Partners inflation rates were lower because of the lower oil price

*** It was not clear whether the SARB viewed the price of oil as a mere secondary moderating influence or a primary influence. The price of oil did however trend upwards with the inflation rate.

****The food prices accelerated because of the growth in demand in the world's largest countries

6.16.2 The 2000 Narrative vs the 2014 Narrative

The first thing that stands out is that the SARB's narrative during the observation period generally ended the way it had started. Both 2000 and 2014 had the same structural narrative where the price of oil and food prices was the primary explanatory variables and the exchange rate was the secondary explanatory variable. In other words, the inflation rate was primarily influenced by the price of oil and food price; and the exchange rate had the secondary effect of either moderating or accelerating the effects of the price of oil and food prices on the inflation rate. However, it is not necessarily the case that this structural narrative was evident in all years.

6.16.3 The Price of Oil

As shown in the table, the price of oil was listed as the primary explanatory variable in 7 of the 15 years under review. It was also listed as a secondary explanatory variable in 3 of those years but it should be noted that it was listed as both a primary and secondary explanatory variable in 2004. In total, the price of oil was listed as a main variable in 9 of the 15 years under review. However, in the years where it was not listed, the price of oil still played a role worth mentioning. These are elaborated on below.

In 2001, transport costs were listed as a primary explanatory variable and the SARB stated that diesel and fuel were the main factors influencing transport costs (using data extracted from the Department of Energy, it is shown that the price of diesel and petrol generally correlates at 90% with the price of oil). In addition, the SARB stated that price of oil minimised the impact that the depreciating rand had on the secondary explanatory variable, imported inflation. Figure 7 in chapter 6.2.2 also shows that the price of oil generally trended with the inflation rate for most of the year thus suggesting that the price of oil had a more profound impact than was suggested by the SARB.

In 2003, the price of oil generally did not trend with inflation rate, but in chapter 6.4.2, it was suggested that by observing figure 14, the steep rise in the price of oil in the fourth quarter moderated the fall of the inflation rate in that same quarter.

In 2009 and 2010, the SARB did not indicate that the Price of Oil was either a primary or secondary explanatory variable, but in its assessment of 2010, it did mention the Price of Oil to be “the biggest risk to the inflation outlook in the near future”. Figure 42 shows that there was generally no correlation between the inflation rate and the price of oil in 2009. In 2010 however, the inflation rate did trend weakly with the price of oil in the first three quarters of 2010 and more strongly in the fourth quarter which validated the SARB’s inflation outlook concerns

In 2012 and 2013, the petrol price was listed as a primary variable and the petrol price is of course directly influenced by the price of oil. However, as shown by figure 53 in chapter 6.13.1 and figure 58 in chapter 6.14.1, it is difficult to determine the exact relationship between the inflation rate and the indirect influence of the price of oil.

6.16.4 The Exchange Rate

The exchange rate was listed as a main explanatory variable in 11 of the 15 years under review, 6 of which was primary variable and 5 of which was the secondary variable. However, the exchange rate featured prominently in 2011 despite not being listed. It is observed in figure 49 under chapter 6.12.1 and elaborated on in chapter 6.12.5, that the exchange rate trended upwards with the inflation rate during the second half of 2011. It is also suggested that the acceleration in the inflation rate during this half was likely a lagged response to a generally significant depreciation of the rand. If this observation is accepted as valid, the exchange rate featured in 12 of the 15 years under review.

It was only in 2007, 2012 and 2013 that relationship between the inflation rate and the exchange rate could not be established with a certain degree of confidence.

In 2007, the inflation rate did not correlate with the exchange rate but it was also during this year that the inflation rate trended very strongly with the price of oil.

In 2012, it was generally difficult to ascertain the exact cause of the inflation rate using the graphic analysis. The relationship between the inflation rate and the exchange rate was also unclear in 2013. In chapter 6.14.1, it is noted that the SARB asserted that despite the depreciating rand, the pass-through in 2013 was limited.

6.16.5 The Relationship Between the Exchange Rate and the Dollar

It was observed on chapter 6.4.6 that there is a strong correlation between the rand and the dollar. Given the size of the South African economy to the US economy (as noted in chapter 4.2), it is more likely that the rand is a function of the dollar. If this is the case and one of the primary explanatory variables is the exchange rate, then it suggests that the inflation rate is generally a function of influences external to the economy and not as a consequence of monetary policy. Chapters 6.4.1 and 6.7.1 also notes the SARB's characterisation of the rand as being influenced by the dollar. This point is elaborated on in chapter 6.13.4.

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6.16.6 The Interest Rates

Despite the interest rate being touted as the primary tool through which it implements its monetary policy, the SARB only identified the interest rate as a main explanatory variable in 2004. However, as noted in chapter 6.5.1, the SARB contradicted the IT framework by stating that the lower interest rate in 2004 contributed towards keeping the inflation rate low. Given the mechanisation behind the IT framework, it would have been assumed that a lower inflation rate would have helped keep the inflation rate at an elevated level.

Similarly, in 2001 and outlined in chapter 6.2.1, the SARB also asserted that a decline in mortgage bond rates had contributed to reducing the inflation rate from a peak of 7.8% to a trough of 4%. In that year, interest rates had been decreased by 250 basis points. Since mortgage bond rates and interest rates are linked, the logical assumption is that a reduction in the interest rates reduced the inflation rates. This sequence of events and the SARB's statement once again contradicts the IT framework.

Also in 2001, the SARB indirectly credited the interest rates for ensuring price stability. More specifically, it credited monetary policy as a factor in ensuring price stability (although it should be noted that the SARB did not identify monetary policy as a main explanatory variable). If IT is the core framework of monetary policy, then it must be assumed that the SARB is saying that the interest rates had an impact on the inflation rate within the IT framework. In 2002 however, the inflation rate escalated rapidly to a relatively unstable November 2002 peak of 12.9%. In addition, in explaining its interest rate reduction, it incorrectly asserted that “the risk of missing the inflation target in 2002 was small” (chapter 6.2.5). This forecast was of course, profoundly incorrect.

Similarly in 2006, the SARB again cited monetary policy as a significant factor in curbing the inflation rate but in 2007, the inflation rate accelerated to a December 2007 peak of 9%. This acceleration continued into 2008 where it peaked at 13.7% in August. The SARB attributed the acceleration in August to “higher wage inflation and slowing productivity growth”, but it is not clear how significantly these two factors contributed to the inflation rate. What is clear though is that the SARB identified the price of oil and the exchange rate as two of the primary explanatory variables and figure 30 shows that the inflation rate ‘interacted’ strongly with both variables. Given that both of these variables (price of oil and exchange rate) are

more likely a function of influences external to the domestic economy, it is more likely that the inflation rate was influenced by events external to the economy and not by monetary policy.

Lastly, the SARB provides no details to defend its crediting of monetary policy in 2001 and 2006 nor does it provide substantial explanations as to why monetary policy failed in the years that followed. It can be verified though that by looking at Figure 7; figure 10; figure 33 and figure 38, in 2001; 2002; 2007 and 2008, the inflation rate trended strongly with the price of oil.

6.16.7 The Relationship Between the Interest Rates and the Exchange Rate

Other than what has been mentioned above, where the SARB suggested that the interest rate impacted the inflation rate, it was usually through its interaction with the exchange rate. For example, In 2001 (chapter 6.2.1), the interest rates were raised due to what can only be interpreted as an attempt to protect the value of the rand. As noted in section 6.2.1, the interest rates were raised as a direct response to the increase in bond yields resulting from the depreciating rand. In 2002 and 2003, the SARB also attributed the improvement in the performance of the rand to the higher interest rates.

6.16.8 The relationship Between the Interest Rate and Debt

As noted in chapter 6.1.2, 2000's household debt had already begun to grow faster than household income. By the fourth quarter of 2005, the ratio of debt to disposable income reached a 'new record level of 65.5%' (chapter 6.6.3). It was this acceleration in debt levels that contributed significantly to the record real household expenditure growth rate which in turn, contributed significantly to the strong GDP growth rate in that year. The acceleration in the debt ratio of 2005 was partly as a result of the record low interest rates at the time. It is noted that despite these record low interest rates, significantly high GDP growth rates and strong domestic consumption, the inflation rate remained comparatively low.

The inflation rate started to accelerate in 2006 which prompted the reserve bank to increase the interest rates. As noted in chapter 6.7.4, the increased interest rates did not curb spending

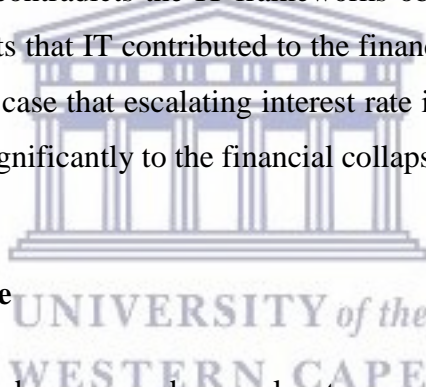
which the SARB partly attributed to the “low level of debt servicing costs”. In chapter 6.8.1, it is noted that the real household expenditure growth rate began to slow down in 2007 due to the higher inflation rate. Furthermore, the SARB asserted this slowdown was “exacerbated” by rise in the debt servicing costs. In other words, not only was inflation eating away at the purchasing power of consumers, so was the rising interest rates. It should also be noted that during this time (2007), the inflation rate had continued rise rapidly from ‘6% in January to a peak of 9% in December and the interest rates had peaked at 11% by December’.

In chapter 6.12.2, it was concluded that although decreasing the interest rates had encouraged consumers to take out more debt, an increase in the interest rate did not discourage them from acquiring more debt. It was more likely that the increased interest rates only accelerated both the debt burden and the inflation rate to unsustainable levels. Although the debt ratio declined since its peak of 89% in the first quarter of 2008, it only managed to trough at 78% by the end of 2014. This seemingly contradicts the IT frameworks objective of ensuring long term economic stability and suggests that IT contributed to the financial collapse of 2008. In other words, it might have been the case that escalating interest rate in the US accelerated the debt burden and thus contributed significantly to the financial collapse.

6.16.9 The GDP Growth Rate

The GDP growth rate was listed as a secondary explanatory variable in 2009, 2010 and 2011. This would suggest that within the IT framework, monetary policy had succeeded in getting the desired inflationary results. During this time, the inflation rate began at 8.1% in January 2009, trended downwards to a trough of 3.2% in September 2010, started trending upward and ended the period with 6.1% in December 2011.

24 months prior to January 2009, the interest rate was at 9% and had been part of an increasing interest rate cycle since June 2006. By the end of this upward cycle, the interest rate was at a peak of 12% in November 2008 after which it was decreased to 11.5% in December 2008. Given this information, it could be assumed that after just over 24 months of interest rate increases, GDP growth finally responded and fell from 3.2% in 2008 to -1.5% in 2009. However, the world’s GDP growth rate had also fallen from 1.8% in 2008 to -1.7% in 2009.



Given the size of South Africa's economy relative to the world economy, it is more likely the case that the drop in output was more a function of the world economy than a function of monetary policy. It is shown in chapter 6.9.2 that the SARB confirmed this assertion when it said that the financial crisis of 2008 led to a "highly synchronised global recession".

6.16.10 The GDP Growth Rate and its Role within the IT Framework

The IT framework generally suggests that it is able to forecast a fairly reliable approximation of the inflation rate. However, since output precedes the inflation rate, it would first have to forecast a fairly reliable approximation of the GDP growth rate. In addition, for the IT framework to hold, the GDP growth rate would have to correlate with the inflation rate (either contemporaneously or with an acceptable lag) and respond to interest rate changes.

In chapter 6.14.2, it was noted that there were multiple instances of incorrect GDP growth rate forecasts with approximations that were vastly different to the actual GDP growth rates in both magnitude and direction. It was suggested that the SARB does not have the necessary tools to forecast growth rates with any degree of certainty over the long term. Its tools may only be able to forecast growth rates over a period of less than one year.

It was also shown on several occasions that the inflation rate did not respond to the GDP growth rate and the GDP growth rate did not respond to interest rates changes. For example, in 2006 (chapter 6.7.4), the SARB acknowledged that the GDP growth rate did not respond strongly to the increase in the interest rate. During this year, the SARB increased the interest rate 4 times for a cumulative total of 200 basis points but the GDP growth rate had still finished stronger in 2006 than in 2005 while the inflation rate continued to escalate. In 2007, the GDP growth rate was lower than in 2006 but the inflation rate still escalated rapidly and the interest rate also continued to trend upwards with the inflation rate. As noted in chapter 6.8.3, the SARB acknowledged that in 2007, the inflation rate did not respond to the lower GDP growth rate.

Similarly in 2008, the inflation rate did not respond to the relatively lower GDP growth rates and the SARB attributed this inconsistency to higher wages and slower productivity growth. It states these two explanatory variables offset the “inflation-containing effect of waning demand”. However, once again, it is not clear how this was the case.

In 2010, it is shown that the interest rate decreases that occurred in 2010 was eventually followed by an increase in the inflation rate, but failed to produce any subsequent increase in the GDP growth rate.

The inconsistent relationship between the GDP growth rate and the inflation rate was even more pronounced in 2014. During the first half of 2014, when the growth rates were at -1.6% and 0.5% for the first and second quarter respectively, the inflation rate had a sharp upward trend. During the second half, when the GDP growth rates rebounded strongly to 2.1% in the third quarter and 4.1% in the fourth quarter, the inflation rate reversed its trend and declined significantly.

Lastly, it was noted in chapter 6.12.4 that in 2011, the SARB had implied that the factors influencing the domestic inflation rate was external to the economy and beyond its control. It is noted in chapter 6.12.1 that the international inflation rates accelerated despite the weak global GDP growth rate. In other words, the behaviour of the global inflation rate was also inconsistent with what would be forecasted within an IT framework.

6.16.11 The Observed Relationship Between the GDP Growth Rate and the Inflation Rate

Despite the generally poor understanding of the relationship between output and inflation (Blanchard, et al. 2010:7), the narrative made an attempt to see whether this relationship exists. For example, at the beginning of the narrative in 2000 and noted in chapter 6.1.1, the SARB stated that there was “little indication of endogenously generated inflation”. However, by observing figure 4, it was suggested that the GDP growth rate (an endogenous variable) played a moderating role, as would be the case with a secondary explanatory variable. The SARB also noted that the global downturn at the time was less evident in South Africa, which suggests that the growth rate was a more a function of domestic rather than global influences. Given these observations, it could be argued that the inflation rate was also partly a function

of endogenous influences. However, this was a tentative observation and this sort of behaviour was generally not observed in the years that followed.

The table below demonstrates what was observed via the graphical analysis. The categorizations and their meaning are as follows:

- Trending Strongly (TS): The GDP growth rate and inflation rate correlated strongly and positively
- No Trend (NT): There was no observed correlation
- Tentatively Observed Correlation (TOC): It was observed that there might be some correlation but this correlation cannot be established with certainty
- Threshold: The inflation rate responds to the 3% threshold, as hypothesised in section 5.1a
- Above 3% GDP Growth Rate (>3%): The GDP grew at rates above 3% in all 4 quarters
- Not Responding to Threshold: The GDP growth rate does not respond to the 3% threshold



Date	TS	NT	TOC	Threshold	>3%	NRT
2000			X		X	
2001	X			X		
2002		X		X		
2003		X		X		
2004		X			X	
2005		X		X		
2006		X			X	
2007		X			X	
2008			X			X
2009			X			X
2010			X			X
2011		X				X
2012			X			X
2013		X				X
2014		X				X
Total	1	9	5	4	4	7

As shown in the table, there was no trend observed in 9 of the 15 years under review. There was also a tentatively observed correlation in 5 of those 15 years. As noted above, in the

years where a relationship was tentatively observed, it cannot be claimed with certainty whether there was any correlation. It could thus be argued that at best, the relationship between the inflation rate and the GDP growth rate was relatively weak in 14 of the 15 years under review.

It also noted that the relationship with the hypothesised 3% threshold could only be observed in 4 of the 15 years and only where GDP did not grow at a rate of above 3% in all 4 quarters. This observed relationship with the threshold was only observed in years prior to 2008. Starting in 2008, there seems to be a complete breakdown in the hypothesised relationship. It should once again be clarified that is only a hypothesis derived from an attempt to find a suitable proxy for the GDP growth rate. Whether it is valid will not be elaborated on any further but it does emphasise the need for a more imaginative approach to understanding the relationship between the GDP growth rate and the inflation rate.

6.16.12 Imported Inflation

Although the SARB had identified imported inflation as secondary explanatory variables from 2001 to 2004, it was usually also identified as a function of some other main explanatory variables. From 2001 to 2003, imported inflation was identified as function of the exchange rate. In 2004 however, the SARB identified imported inflation as a function of the inflation rates of South Africa's trading partners.

Although imported inflation was not listed as a main variable in 2000, the SARB did note once again suggest that it is a function of the exchange rate and not a function of the inflation rates of trading partners. Figure 5 demonstrates why this is the case.

6.16.13 The Inflation Rate Relationship Between South Africa and the Reference Areas

It was observed throughout the narrative that South Africa's inflation rate generally trended in the same direction as the US inflation rate. These observations were made for 13 of the 15 years under review.

The relationship between these two inflation rates was unclear in 2010 and 2011. In 2011, the SARB did however note that the inflation rates of South Africa's trading partners were placing upward pressure on the domestic inflation rate.

Lastly, South Africa's inflation rate was generally higher and although all inflation rates generally trended upwards, South Africa's inflation rate accelerated faster. It was suggested that this was because of the fact that South Africa's interest rates were considerably higher than that of the reference areas.

6.16.14 The Food Price

Throughout the narrative, not a lot of emphasis has been placed on the food price because it was never clear as to how significantly the food price influenced the inflation rate. As noted in chapter 6.1.1, during 2000, the food price never generated any endogenous (or domestic) inflationary pressures and the ECB (2013a:68) also pointed out that the food prices generally "have had relatively little effect" on the inflation rate. In addition, the domestic price of food had generally been a function of international food prices and thus was not particularly susceptible to domestic monetary policy. Even in 2001 where the international food prices are less visible in domestic prices, the SARB indicated that the domestic food price was a more a function of the exchange rate which in turn, is more likely a function of the dollar.

Any further research on this area might need to definitively clarify the role of food prices in influencing the inflation rate.

6.16.15 Does Inflation Targeting Work?

In chapter 3.2, it was noted that Brito and Bystedt lists 3 strands of thought on the impact of IT in developing countries. These are:

1. Developing economies' "lack of institutional maturity and consistency of macroeconomic fundamentals could undermine credibility and give worse results"
2. The implementation of IT should improve the credibility of the central bank and "lead to better macroeconomic outcomes".
3. IT contributes "very little to lower inflation" and only succeeds in acting as "conservative window-dressing".

The first strand is negated by the fact that South Africa has a sound macroeconomic framework (chapter 4.1) and the second strand cannot be verified because of the tenuous relationship between output and inflation. In addition, the reports and data provide no concrete indication that increasing the interest rate lowers inflation and vice versa. The observed behaviour of the relationship between the inflation rate and the interest rate suggests that it is more likely that 1) the interest rate responds to the inflation rate and 2) the relationship between the two variables are positive. Given the information presented in the narrative, the only strand that seemingly applies to South Africa's monetary policy is the third, which is that IT does not lower inflation and as such, can be termed, "conservative window-dressing".

In addition, the narrative suggests that:

- The two variables that features most prominently in explaining the behaviour of the inflation rate are the price of oil and the exchange rate
- The price of oil and exchange rate are more likely a function of factors external to the economy
- The SARB had on several occasions failed to correctly forecast the inflation rate
- The SARB selectively credits monetary policy for inflation stability without providing any credible explanation for this assertion and fails to account for when the inflation rate becomes unstable
- Where the SARB credits monetary policy for inflation stability, factors external to the economy influences the inflation rate.
- An increase in the interest rate can only reduce inflation through its influence on the exchange rate
- The increase in the interest rate more likely increases debt to unsustainable levels and does not succeed in reducing output
- The increase in debt more likely adds additional cost of consumer goods and services which accelerates the inflation rate
- Unsustainable debt creates long term debt problems which leads to a structurally damaging economic collapse rather than some gradual, sustainable decrease in output
- The GDP growth rate is more a function of the World GDP growth rate than a function of domestic monetary policy

- The relationship between the GDP growth rate and the inflation rate is weak and the SARB seems unable to provide a reliable forecast of the GDP growth rate beyond a year.

It is this last suggestion that is pivotal to answering the question of whether IT works. According to the IT framework, causality should run from interest rates to output and from output to inflation. By that logic, the validity of the IT framework should not be analysed in terms of the relationship between interest rates and output but rather, the relationship between output and inflation. If it can be established that there is a clear relationship between output and inflation, then it can be concluded that, for example, an increase in the interest rates does indeed lead to a decrease in the inflation rate. If a relationship between output and inflation cannot be established, then from a purely mathematical standpoint, any model based on the IT framework will inevitably fall apart. Any further analysis to determine the relationship between the interest rate and the inflation rate would be irrational unless a point is reached where a clear relationship between output and inflation can be established. For the most part however, the relationship between output and inflation seems to be tenuous at best and can only be observed in 2001. In addition, IT would not be able to function as a predictive framework if it cannot forecast the outcomes of its explanatory variables. As noted above, the SARB's ability to forecast GDP growth rates is generally weak which, from a purely mathematical standpoint, negates IT as a reliable framework to forecast future inflation.

CHAPTER SEVEN: EMPIRICAL ANALYSIS OF QUANTITATIVE OUTPUTS

It was noted in chapter 5.3 that the quantitative outputs interrogate the validity of the quantitative conclusions. It was also noted that there are two parts to developing the model, the second of which will be derived from the Qualitative Narrative. Chapter 7 will start by justifying the choice of model and explanatory variables based on the qualitative conclusions in chapter 6. The outputs from the OLS regression will be presented and it will be determined if the outputs substantiates the conclusions in the qualitative historical narrative.

7.1 THE MODEL

Based on the observations made throughout the narrative, it was generally suggested that the explanatory variables have a ‘more contemporaneous’ relationship with the inflation rate. What this means is that, where an explanatory variable has a lagged month response to the inflation rate, these lags are generally either zero or one. Based on these observations, it was decided that a simple OLS model would be needed to confirm whether these observations are justified.

Other models that were considered included the Vector Autoregressive models where each variable is explained by “its own lagged variables” (Stock & Watson. 2001:101). However, given the information in the narrative, this would require a greater understanding of how debt produces a multiplier effect in the inflation rate. Another model that was considered falls within the Autoregressive Conditional Heteroscedasticity(ARCH) set of models and takes into consideration that financial variables often suffer from “autocorrelated heteroscedasticity” (Gujarati. 2011:239). More specifically, a variant of the ARCH models (GARCH), the Generalised ARCH model was to be applied. The GARCH model is more widely applied and remedies some of the shortcomings of the ARCH, particularly with regard to producing a more parsimonious model (Gujarati. 2011:246). However, several sources have indicated that the number of observations were not sufficient to produce reliable results.

7.2 THE EXPLANATORY VARIABLES

As was noted in chapter 5.3.2, the variables were chosen to simplify the model and to avoid any multicollinearity problems. For example, although the narrative spoke at length about the inflation rates of South Africa's largest trading partners, these inflation rates won't be introduced into the model since it would inevitably correlate with the price of oil. The variables that will be included are the interest rates, the price of oil, the exchange rate, and the '3% threshold'. The inclusion of these variables was justified by the conclusions derived from the narrative.

In chapter 6.9.5 of the narrative, it was noted that the two variables that always featured prominently was the price of oil and the exchange rate. It was even proposed that the collapse in the inflation rate at the end of 2008 was not a function of output, but rather, a function of the price of oil. It was also suggested that whereas the price of oil seemed "largely contemporaneous" in larger economies, it responded with a lag of one month in South Africa. It was suggested in chapters 6.5.2, 6.10 and 6.12.5 that the exchange rate also responded with a one month lag.

Although the interest rate generally seems to follow the inflation rate rather than determine it, it was also suggested that there is a positive relationship running from the interest rate to the inflation rate. For example, it might be the case that whereas the interest rates are increased in response to an increase in the inflation rate, the increase in the inflation rate results in an increase in the inflation rate. The relationship between these variables was elaborated on in chapters 6.3.5, 6.4.4, 6.5.4, 6.10.4, and 6.15.4. As was the case with the price of oil and the exchange rate, it was also suggested that interest responds with a one month lag.

It also seemed to be the case that 3% threshold featured as a viable indicator of inflation behaviour prior to 2008. However, it could be argued that since this hypothesis fell apart in 2008, it should not be included. However, another argument could be made that the 3% threshold did not necessarily fall apart, but rather, was distorted by multiple events during a time when the world economy was experiencing significant volatility.

7.3 ESTIMATING THE DETERMINANTS OF THE INFLATION RATE

The model will be implemented by running a simple regression via the Stata statistical package. As was noted above, each variable, excluding the GDP dummy, will be differenced for the purpose of looking at the effect that a change in an explanatory has on the change in the inflation rate. It was also noted that the thesis is specifically interested in the direction and relative magnitude of the coefficients. The variables be denoted as follows:

- IntR1 – The interest rate lagged by one month
- Exr1 – The exchange rate lagged by one month
- OilP1 – The price of oil lagged by one month
- GDPdum – The dummy variable for the ‘3% threshold’, where
 - 1 is the GDP growth rate of equal to or less than 3%
 - 0 is the GDP Growth rate of greater than 3%

Source	SS	df	MS			
Model	28.604054	4	7.15101351	Number of obs =	178	
Residual	37.3386992	173	.215830631	F(4, 173) =	33.13	
Total	65.9427533	177	.372557928	Prob > F =	0.0000	
				R-squared =	0.4338	
				Adj R-squared =	0.4207	
				Root MSE =	.46458	

Infr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IntR1	.7511828	.0960305	7.82	0.000	.5616405	.9407252
ExR1	.4140491	.1136891	3.64	0.000	.1896529	.6384453
OilP1	.0453982	.0067325	6.74	0.000	.0321097	.0586867
GDPdum	-.1540165	.0729707	-2.11	0.036	-.298044	-.0099891
_cons	.0851437	.0475786	1.79	0.075	-.0087655	.1790529

The table above shows the output and generally suggests that the narrative produced reliable conclusions. All the variables, excluding the GDP dummy, have a positive relationship with the inflation rate. For robustness, lags of zero and two were also inputted into the regression. The results showed that the magnitude for each coefficient, excluding the GDP dummy, was less than when the variables were given a lag of one. This decrease in the magnitude was most pronounced in the coefficient of the interest rate, which suggests that an increase in the interest rate correlates most intensely with the inflation rate, a month after its change. Although this particular point won't be elaborated on, an interesting observation is that, where the 'one month lagged' rule was applied, the magnitude of the negative coefficient of

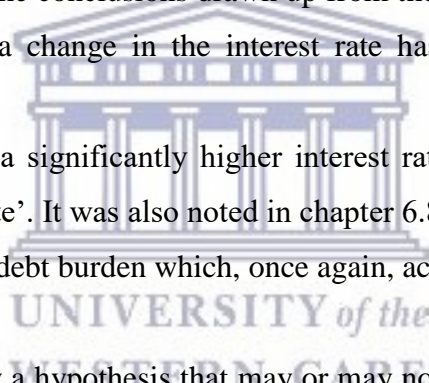
the GDP dummy increased. In addition, the adjusted R-Squared decreased significantly which implies that the 'one month lagged' rule gives a more accurate explanation of the variation in the inflation rate.

It is also observed that a change in the exchange rate has a significantly more profound impact in the inflation rate than the price of oil. This was explored in chapter 6.2.2 where it was suggested that the exchange rate has a greater impact. It was also suggested in chapter 6.5.5 that for the price of oil to have a more profound impact, its change would have to be significantly greater than the change in the exchange rate. The OLS seems to confirm that this is indeed the case. However, what is surprising is that the price of oil does not seem to exhibit significant pass-through to the inflation rate. This seems at odds with the narrative and requires further discussion. It is however in line with existing literature.

What is not surprising, given the conclusions drawn up from the narrative, especially through the graphic analysis, is that a change in the interest rate has the greatest impact on the inflation rate.

It was noted in 6.7.5 that a 'a significantly higher interest rate seems to contribute to the acceleration in the inflation rate'. It was also noted in chapter 6.8.5 that increasing the interest rates only seems to add to the debt burden which, once again, accelerates the inflation rate.

Lastly, although it is generally a hypothesis that may or may not be valid in the long run, the GDP dummy does suggest that a GDP growth rate of below 3% leads to a negative change in the inflation rate. It might confirm that there is indeed a relationship between the inflation rate and output, but what it does not confirm is that this relationship operates within an IT framework.



CHAPTER EIGHT: THE CONCLUSION

8.1 INTRODUCTION

The thesis was composed of 8 chapters. Chapter one provided an introduction to the thesis as well as the question that needed to be answered and the justification for asking this question. Chapter two and three summarised the relevant theoretical literature and empirical literature whereas chapter 4 provided a summary of the South African economy and the 2008 financial crises. Chapter five will introduce the methodology and quantitative outputs. Chapter 8 will conclude the thesis with the main findings and the policy recommendations.

8.2 MAIN FINDINGS: INCREASING INTEREST RATES IN A LOW GROWTH ENVIRONMENT

The specific objective of the thesis was to investigate the feasibility of increasing the interest rates in a low growth environment. It was suggested that, contrary to what is suggested by the IT framework, an increase in the interest rate increases the inflation rate. It was also suggested that if an increase in the interest rate decreases output, then it might not be prudent to increase the interest rate in a low growth environment. Three steps were taken to verify whether these two suggestions might hold merit.

8.2.1 The Empirical Consensus on IT

The first step was to investigate the existing empirical literature on the general performance of IT and more specifically, the performance of IT after the 2008 financial crisis. It was found that the research suggests that there is a general lack of consensus on the performance of IT, before and after the economic crisis. Various modelling techniques had been used which necessitated the use of a different approach to gain a more in-depth understanding of the behaviour of the inflation and the performance of IT.

8.2.2 The Conclusions of the Historical Narrative

To gain an in-depth understanding, a qualitative historical narrative was utilised which simply aims to tell the story of the inflation rate. The narrative was derived from the data and reports of the main authority on South Africa's IT, the SARB. The narrative also utilised the data and reports of the USA's Fed, the EU's ECB, and China's PBC as well as data from the World Bank and IMF.

The narrative suggested that the inflation rate is mainly a function of the price of oil and the exchange rate. More importantly, these two variables are more likely determined by factors external economy which implies that domestic monetary policy aren't able to substantially influence the inflation rate.

It was also noted that the SARB had generally failed to give a reliable forecast of the GDP growth rate. By failing to forecast a reliable approximation of the GDP growth rate, the SARB would not be able to forecast a reliable approximation of the inflation rate within an IT framework. It would be reasonable to assume that this assessment is correct, given the fact that the SARB had generally failed to give a reliable approximate forecast of the inflation rate. Given the mathematically logical conclusion that the IT framework does not hold, it is once again reasonable to assume that monetary policy does not substantially influence the inflation rate. The narrative did in fact find that there is very little information to contradict the conclusion that the relationship between output and inflation is tenuous. The thesis suggested that a 3% threshold could be used to identify whether this relationship exists. It was however emphasized that this threshold is hypothetical and does not provide conclusive evidence of the relationship between the inflation rate and the GDP growth rate.

If it is the case that the narrative is correct in its conclusions and the SARB is generally unable to manage the inflation rate, from a purely mathematical perspective, it would be irrational to evaluate the relationship between interest rates and inflation rates within an IT framework. To put it more bluntly, the logic of mathematics makes it unnecessary to include the IT framework as an assessment tool when answering the question of whether an increase in the interest rate increases inflation.

In answering the specific question, it is noted that the graphic narratives suggest that the interest rate has a more contemporaneous positive relationship with the inflation rate. The SARB had also implied that this positive relationship exists. This would further suggest that

IT does not produce the outcomes as suggested by its framework. In addition, increasing the interest rates did not necessarily reduce consumption and hence, did not reduce output. The only observable outcome was an increase in the debt burden to seemingly unsustainable levels which could have contributed to a long term low growth environment. In fact, it seems to be the case that the only variable that seemingly connects inflation rates, GDP growth rates and interest rates are debt. The narrative suggested that debt leads to an increase in the cost of goods and services which helps to accelerate the inflation rate. Furthermore, the SARB concluded that increased interest rates ‘exacerbates’ the impact of inflation. The narrative further suggested that this leads to unsustainable debt levels which collapse output instead of producing macroeconomic stability.

8.2.3 The Outputs of the Quantitative Model

As noted previously, the thesis was primarily focused on a qualitative centred narrative and the outputs of the quantitative model were used to determine whether the conclusions from this narrative are valid. The model and the explanatory variables were also chosen based on these qualitative conclusions. The thesis was primarily interested in the direction and relative magnitude of the coefficients.

The model generally gave substance to what was suggested by the narrative. The model suggested that the price of oil and the exchange rate increases the inflation rate and that the exchange rate has a more substantive impact on the inflation rate than the price of oil. What was confusing however is that the model also suggested that the price of oil has a fairly marginal impact on the inflation rate, contrary to what the narrative suggested. The model also suggested that the inflation rate decreases when GDP grows at or below a rate of 3%. However, once again, this is hypothetical and should be subjected to further analysis.

Most importantly, the model generally suggested that the narrative may be correct in its assertion that there is positive relationship between the interest rate and the inflation rate. It may also be the case that this relationship is most pronounced one month after the change in the interest rate. The model cannot claim to have detected causality, but given the SARB’s own admissions and the general observations in the narrative, it may be the case that inflation does indeed lead to an increase in the interest rate. It should however be noted that the model’s design is not particularly sophisticated and further research should be conducted to

definitively conclude on the relationship between the inflation rate and the interest rate. In building this sophisticated model, it would seem to be the case that debt plays a pivotal role.

8.2.4 A Simple Scenario

Correlation does not imply causation hence the thesis cannot claim to have found the answer to the relationship between interest rates and inflation. It also cannot claim to have found definitive proof of the negative impact of increasing the interest rate in a low growth environment. However, given the qualitative conclusions and quantitative outputs, it seems more probable that interest rates does have a positive relationship with the inflation rate and that increasing the interest rate within a low growth and high debt environment would have consequences that is less than desirable. To conclude this section and provide some substantive reasoning to this probability, a simple scenario was constructed to highlight the possible interactions between the relevant variables as suggested by the narrative and the model. This scenario is as follows.

In 2000, person X has a real income of R10000 a month, a debt burden of R10000 and a debt repayment obligation of R400 a month. Assume that the inflation rate and the rate of wage increases remains at 0% for the entire period under review. Also assume that person X does not save. Due to the low interest rates, Person X continues to accumulate debt and by 2014, that Person X has a debt burden of R80000 and a debt repayment obligation of R4500 a month. In 2000, Person X could contribute towards growing the economy by spending R9600 a month. In 2014, person X could only spend R5500 a month which is reflected in the declining GDP growth rate. This significant reduction in spending is also reflected in the increasing unemployment rate.

Let us assume that in 2000, Person X's spending helped employ Person Y. In 2014 however, Person Y had to be retrenched because Person X did not spend enough money. Whereas Person Y had a real income of R5000 in 2000, s/he has an income R0 in 2014. At this point, not only is person X's reduced spending power reducing the GDP growth, but person Y's lack of income is accelerating the reduction in the GDP growth rate.

Let us now assume that in 2000, the inflation rate and the rate of wage increases are greater than zero but equal to each other (it is still assumed that the real income is R10000). However, halfway through the period under review, the interest rates are increased which

increases the cost of production. This increased cost of production leads to an increase in the cost of consumer goods and services, effectively accelerating the inflation rate to levels that are greater than the rate of wage increases. By 2014, the inflation rate had reduced Person X's real income by R500 and s/he only has R5000 to contribute to the economy. However, the increase in interest rates also increased person X's monthly debt obligations which reduces his/her spending power by another R1000, effectively leaving person X with only R4000 a month to contribute towards growing the economy. At this point, Person X is contributing too little and the factory at which Person Y had worked previously has to shut down. The factory owner has to sell all the assets which include all moveable and immovable assets. Several people become unemployed and given the cost of the assets (especially the sunk costs), it would take years for another factory to be built. Due to these lost jobs and Person X's own reduced spending power, the economy enters into a recession and the factory that employs Person X, shuts down. Person X now has a real income of R0 and a debt burden of R80000 while the economy will take years to recover from the structural damage caused by the factory closures. The economy effectively enters into a period of long term low growth and high unemployment. However, the scenario does not take into consideration a period in which the economy is already within a period of low growth.

If in 2014, the economy had already been a period of low growth, how would an increase in the interest rate affect Person X? Let us assume that Person X has a certain skill that would allow him/her to find employment within a year. However, let us now assume that Person X did in fact save money and s/he has enough money to service the debt obligations. In 2014, the Central Bank decides to increase the interest rate which increases production costs, accelerates inflation and reduces the real value of Person X's savings (we assume that the interest rates on savings is less than the inflation rate). Person X has already reduced his/her consumption spending and this is reflected in the low GDP growth rate. However, after the interest rate increase, Person X has to implement further reductions in spending which is once again reflected in an even lower GDP growth rate. This reduced spending leads to additional factory closures and job losses which pushes the economy into a period of recession. A point is reached where the factory closures and increased unemployment leads to an oversupply of persons with the same skills as Person X, hence making it improbable that s/he would find employment within a year. Before the interest rate increase, Person X would have found employment within a year and would have contributed towards the economy through increased spending. The economy would have begun a process of recovering. However, the

oversupply of labour results in Person X finding employment after a year which extends the period of low growth and high unemployment.

8.3 POLICY RECOMMENDATIONS

Both the quantitative historical narrative and the qualitative model suggest that the IT does not produce the results as intended by its framework. In addition, the SARB had conceded that this statement holds true. Mathematically, it would seem irrational to implement a model that produces substantially incorrect approximations in both direction and magnitude. It would seem more rational and logical that after approximately 17 years of applying a framework that produces unreliable results, the SARB would have rethink its implementation and either 1) interrogate and improve on the current model or 2) discard IT in its entirety in favour of a more reliable framework. The thesis cannot claim to have an answer to the IT conundrum and hence, cannot make any policy recommendations with a substantive amount of evidence and reasoning to validate these recommendations. However, what the thesis can state with a certain degree of confidence is that further research on the effectiveness of IT and the relationship between the inflation rate and the interest rate would need to be prioritised and the recommendations implemented.



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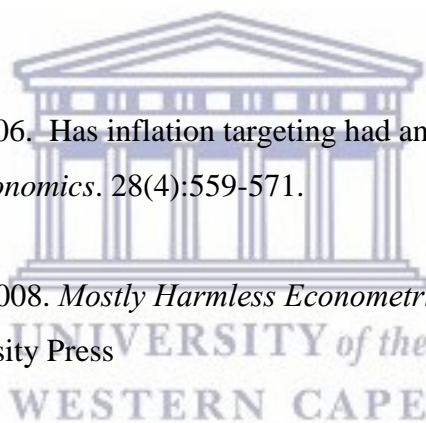
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