

Trade unions' inflation expectations and the second-round effect in South Africa

TEMITOPE L.A. LESHORO*

Abstract:

Inflation expectations play a critical role in the formation of prices and wages. Hence, the South African Reserve Bank (SARB) reacts to inflation's direct effects by tightening the monetary policy in order to avoid any second-round effects. The study we conducted attempts to investigate whether the inflation rate are led by inflation expectations or vice versa. We analyse quarterly data using the Toda-Yamamoto causality technique and three different measures of inflation expectations of the trade union representatives. We also investigate the role of the exchange rate in leading or lagging the inflation rate. Overall, the results obtained demonstrate that the inflation and the exchange rates have bidirectional causality, while unidirectional causality exists from the inflation rate to inflation expectations. We therefore conclude that a second-round effect of inflation cannot be induced by changes in the inflation expectations of the trade unions, and provide some policy recommendations.

* University of South Africa,
email: lesholat@unisa.ac.za

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The causes of inflation in South Africa and in many other emerging economies, and the power of the trade unions in influencing the inflation rate, direct our attention to the possible importance of the so-called second-round effect in the country, as alluded to by Kantor and Kavli (2011). The second-round effect occurs when, due to the growth in prices, businesses and trade unions expect a further increase in inflation. Therefore, both prices and wages rise because businesses are able to set higher prices, while trade unions have the bargaining power to negotiate wage increases. This will cause an increase in the inflation rate – the second-round effect – which occurs when higher inflation expectations are self-fulfilling. The implication, therefore, is that inflation expectations lead to inflation, and if this is not controlled it can be detrimental to the economy. Given the belief that all increases in inflation would lead to a second-round effect, the South African Reserve Bank (SARB) endeavours to avoid such second-



round effects by increasing the repo rate, irrespective of what caused the initial increases in inflation. Indeed, according to Mboweni (2005), inflation expectations are critical in the formation of prices and wages. But are all inflation expectations self-fulfilling? Do all first-round effects lead to second-round effects? This study investigates whether the trade unions' inflation expectations lead or lag the inflation rate in South Africa, such that given higher inflation expectations of the trade unions, higher inflation might ensue.

There are two main measures of inflation, namely headline inflation and core inflation. While headline inflation includes the prices of all goods and services, core inflation excludes commodity prices and oil prices. Sharp commodity and oil prices fluctuations lead some economists to prefer core inflation. However, headline inflation is more inclusive, as it incorporates the prices of all goods and services within the consumers' basket. The Monetary Policy Committee (MPC) of SARB, along with the Minister of Finance, conduct monetary policy by targeting the headline inflation within a flexible inflation-targeting framework, of 3% to 6%.

SARB also initially targeted the consumer price index for metropolitan and other urban areas, which excludes mortgage interest (CPIX), but later changed its target to the headline CPI (Hammond, 2011). An inflation target range involves the movement of the inflation rate within and outside the target, as a result of the effects of supply shocks; this is the first-round effect. The use of a target enables SARB to determine how long it must wait before intervening to bring inflation back within the inflation target range (SARB, 2016). However, the typical reaction by SARB to the first-round effect is to avoid the second-round effect by tightening monetary policy (Kantor and Kavli, 2011).

SARB, being aware of the importance of the price expectations of trade unions and of the business and financial sectors in influencing the inflation rate, commissioned the Bureau of Economic Research (BER) to regularly conduct inflation expectations surveys. This is because, while inflation expectations management is a policy tool in achieving price stability, it is also important for monitoring how monetary policy effectively keeps prices stable within an economy (Kamada et al., 2015).

Many countries have adopted the inflation targeting (IT) framework with the aim to achieve price stability along with sustained economic growth. New Zealand was the first country to introduce and adopt this framework in 1990. South Africa was the first African country to formally adopt the IT framework in February 2000, with the target achieved in 2002, and was followed by Ghana in 2007 (Heintz and Ndikumana, 2010). However, the Congress of South African Trade Unions (COSATU) has greatly antagonized this framework. More recently, as a result of the fluctuations in commodity prices and the global financial crisis, inflation expectations worsened, resulting in worldwide scepticism with regard to inflation targeting (Frankel, 2012).

This study investigates whether the inflation expectations of the South African trade unions lead the current inflation rate in the country, or vice versa. While many studies have analysed inflation expectations in different ways, there have not been studies analysing the causes and effects of the inflation expectations of trade unions. Particularly, none on inflation rates using the Toda-Yamamoto causality technique for South Africa (Rossouw et al., 2011; Kantor and Kavli, 2011; Kabundi et al., 2014).

1. Literature review

Roussouw et al. (2011) investigate inflation expectations and inflation credibility in South Africa using survey data. They describe inflation credibility as the views on past movements of inflation. The study adopts a logistic regression model and a multinomial logit model for inflation expectations and inflation credibility, respectively. Using a set of demographic characteristics as explanatory variables, the authors find that different income groups have different inflation expectations, that past inflation (inflation credibility) differs between genders, and that it does not lead to higher inflation expectations.

Kantor and Kavli (2011) carry out a bivariate model using simple Granger causality tests to examine the direction of causality, as well as they analyse cross-correlation. Their study observes the causality between CPIX inflation, CPI inflation, and the inflation expectations of three groups of participants, namely, the financial sector, the business sector, and trade unions. The conventional Granger causality test used is subject to changes in the lag length, and different directions of causality are obtained when the lag length is changed. A limitation of the conventional Granger causality test is that, it is affected by the stationarity of the variables. Kantor and Kavli's study estimate the model with all variables in first difference form, since they find them to be all integrated of order one, $I(1)$. The study found that the inflation expectations of all groups of participants do not lead the inflation rate, but the inflation rate leads the inflation expectations of all participants except the business representatives, whose inflation expectations are not influenced by the current inflation rate. However, the study did not consider the possible effects of the real exchange rate, which is an important determinant of the inflation rate.

In a later study, Kabundi and Schaling (2013) examine the relationship between lagged inflation and inflation expectations in South Africa. The study was carried out to observe whether SARB has successfully anchored the expectations of the private sector as well as the credibility of the inflation target since the adoption of the target. First, the research found economic agents to be backward-looking rather than forward-looking, contrary to what the inflation targeting (IT) framework assumes. Second, using simple Granger causality tests, which are prone to lag length distortions, they found bidirectional causality between lagged inflation and inflation expectations. However, contrary to Kabundi and Schaling's study, Leshoro and Kollamparambil's (2016) found economic agents to be forward-looking, as one would expect in an IT regime. The reason for the contradictory results between the two studies could be due to the use of different econometric techniques and different measures of inflation expectations.

Leshoro and Kollamparambil (2016) estimate the hybrid new Keynesian Phillips curve (HNKPC) using different measures of inflation expectations, demand side variables, and data frequencies, employing both ordinary least squares (OLS) and the generalised method of moments (GMM). Their results are in line with the assumption of monetary policy, of forward-looking behaviour. Economic policies and monetary policies, in particular, require economic agents to be forward-looking because changes in prices should not occur before remedial measures are applied (Keynes, 1923). However, the study does not consider whether inflation expectations lead or lag inflation; rather, it observes if expected inflation drives the inflation rate, in order to determine whether economic agents are backward or forward looking.

In a panel study by Kabundi et al. (2014), aggregate inflation expectations were used for the expectations of three classes of agents, namely, business, trade unions and analysts. They

used only the two-year ahead inflation expectations measure for the three groups. Using simple Granger causality tests and fixed-effects panel-data regression, the study finds that the inflation expectations of different agents are heterogeneous. However, changes in inflation cause changes in inflation expectations of business and trade unions. Thus, given that inflation Granger-causes inflation expectations, the result indicates that the inflation expectations of business and trade unions are not well anchored.

Dadam and Viegi (2015) analyse the effect of the labour market as a constraint on the conduct of monetary policy in South Africa. The study investigates the importance of inflation expectations in determining wage inflation. The study uses different econometric techniques such as ordinary least squares (OLS), a dynamic stochastic general equilibrium model, and line graphs within the specifications of the new Keynesian wage Phillips curve and a reduced form traditional Phillips curve. The results indicate a strong correlation between wage inflation and the inflation expectations of the trade unions. The study therefore shows that changes in wages might be controlled by regulating inflation expectations. This is because inflation expectations are extremely important in determining wage inflation, especially under the inflation targeting regime, as alluded to by Mboweni (2005).

Finally, Sibanda et al. (2015) assess the impact of oil prices and the exchange rate on inflation expectations, using monthly time-series from July 2002 to March 2013. Their study finds that both oil prices and exchange rates have strong and significant positive impacts on the inflation rate. They also find that inflation expectations have a significant effect on the inflation rate, and conclude that low and stable inflation with well-anchored inflation expectations will assist monetary authorities to achieve their monetary policy objectives.

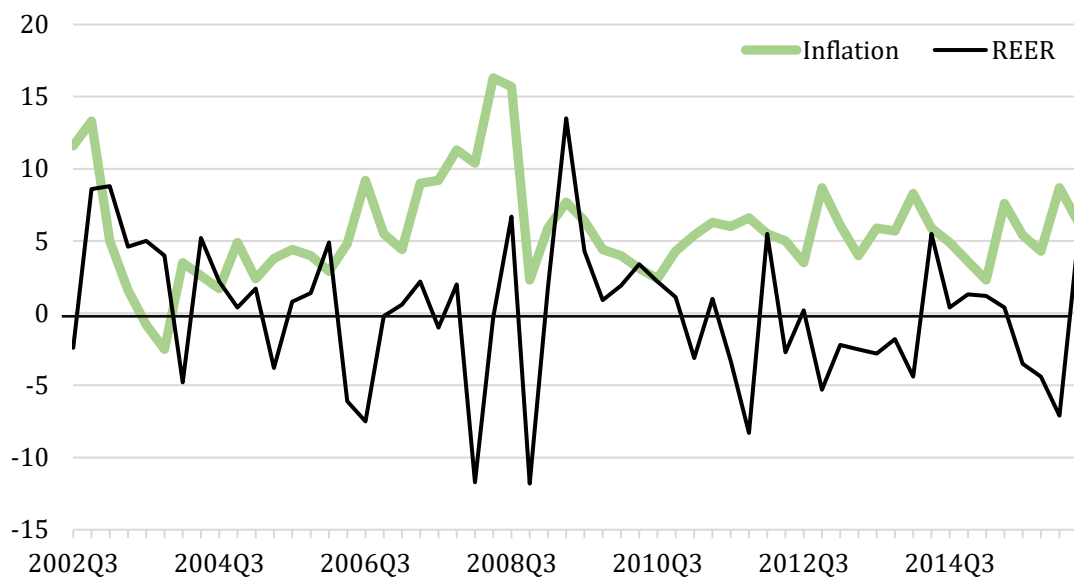
2. Data and methodology

The variables used in our analysis are the inflation rate, three measures of inflation expectations, namely, trade unions' inflation expectations in the current year, one year ahead and two years ahead, and the real effective exchange rate (REER). All series were obtained from the South African Reserve Bank (SARB) database. The inflation rate is the total of consumer prices for all the urban areas, seasonally adjusted at the annual rate (this is the headline inflation that SARB targets). Trade union inflation expectations were obtained from the quarterly survey conducted by the BER on behalf of and published by SARB. The sample used in this study is from the third quarter of 2002 to the second quarter of 2016. This is the period of adoption of the inflation targeting framework.

As shown in figure 1, the inflation and the exchange rates display co-movement, showing positive movements in the early 2000s, and later moving in opposite directions. This reveals that there may be a relationship between the two variables.

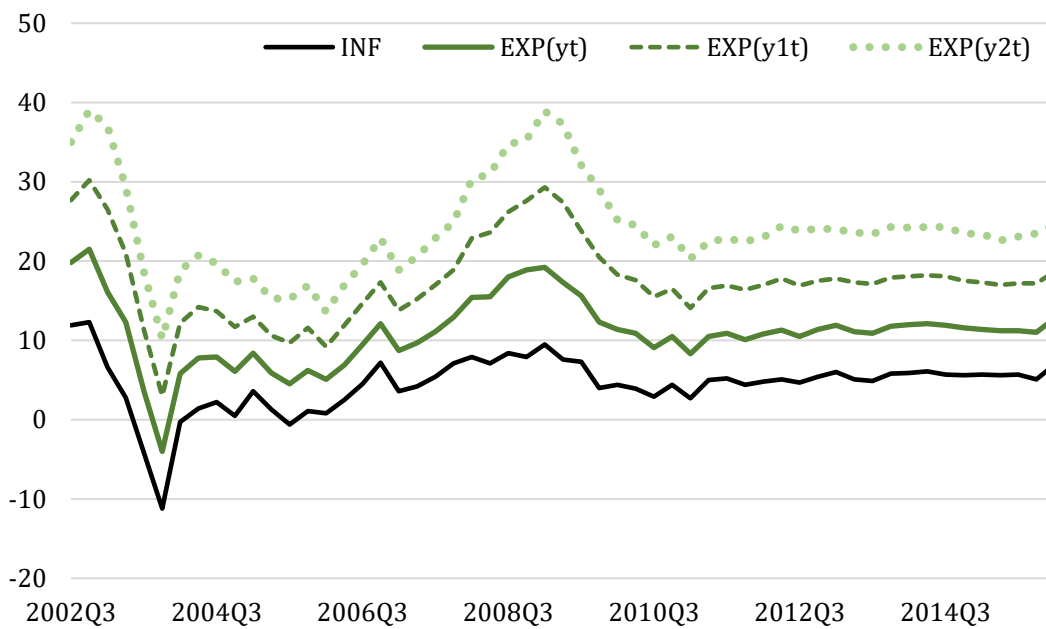
Figure 2 shows the plot of the inflation rate (denoted by *INF*) and the three different measures of inflation expectations of the trade union representatives: *EXP(yt)* for expectations in the current year, expectations in the current year, *EXP(y1t)* for expectations one year ahead, and *EXP(y2t)* for expectations two years ahead. All these variables tend to move closely together, with the same peaks and troughs. This does not imply causation or effect; hence, we cannot deduce from the graph whether economic agents are forward-looking or backward-looking. Besides, forward- or backward-looking inflation expectations are beyond the scope of this current study.

Figure 1 – The inflation rate and the real exchange rate (2002Q3 to 2016Q2), percentage points



Source: SARB database (2016).

Figure 2 – The inflation rate and trade unions' inflation expectations, percentage points



Source: SARB database (2016).

2.1. Methodology

We adopt the Toda-Yamamoto approach to causality, to estimate the direction of causality between the current inflation rate and the three different inflation expectations of the trade unions, namely, trade union inflation expectations in the current year, one year ahead and two years ahead. The Toda-Yamamoto causality technique is more advanced than the conventional Granger causality test (Granger, 1969). This causality technique is unique because it makes use of vector autoregression (VAR). The variables do not necessarily have to be fixed, the order of integration of each variable does not have to be the same, and the variables do not have to be cointegrated (Toda and Yamamoto, 1995). The series can be integrated of any order, for example $I(0)$, $I(1)$ or $I(2)$. However, the maximum order of integration should be lower than or equal to the maximum lag length. This technique makes use of the Wald statistic rather than the F -statistics, used in the conventional Granger causality analysis. In order for the simple Granger causality technique to be used, all the variables have to be stationary in levels, otherwise the F -statistics will give a spurious result. However, in the case of Wald statistic of the Toda-Yamamoto technique, even if the variables are integrated of different orders, this does not result in spurious results.

An advantage of the Toda-Yamamoto causality technique over the conventional Granger causality technique is that, since the maximum lag length is determined in the VAR, it does not change, hence the result is reliable. In terms of the conventional Granger causality technique the lag length can be changed, which means that the technique suffers from the effects of the lags (Akçay, 2011). Caporale et al. (2002) note that if an important variable is omitted within a model, this adversely affects the validity of the inference in the case of a bivariate VAR, which thus results in invalid results and conclusions. However, this study adopts a multivariate VAR model, while also including the real exchange rate that was omitted for example in the earlier study by Kantor and Kavli (2011). It is essential to note that causality here simply means that one variable leads or lags the other, and not that one variable determines the other.

The model to be estimated is as follows:

$$INF = \lambda_0 + \lambda_1 EXP_{yt} + \lambda_2 EXP_{y1t} + \lambda_3 EXP_{y2t} + \lambda_4 REER_t + \varepsilon_t \quad (1)$$

Where INF is inflation rate obtained from the consumer price index; EXP_{yt} is the inflation expectation of trade union representatives in the current year; EXP_{y1t} is the inflation expectation of trade union representatives one year ahead; EXP_{y2t} is the inflation expectation of trade union representatives two years ahead and $REER_t$ is the real effective exchange rate.

The multivariate Toda-Yamamoto VAR causality system for the inflation rate is:

$$INF_t = \alpha_0 + \sum_{m=1}^{k+d} \alpha_{1m} INF_{t-m} + \sum_{n=1}^{k+d} \alpha_{2n} EXP_{yt-n} + \sum_{p=1}^{k+d} \alpha_{3p} EXP_{y1t-p} + \sum_{q=1}^{k+d} \alpha_{4q} EXP_{y2t-q} + \sum_{r=1}^{k+d} \alpha_{5r} REER_{t-r} + \varepsilon_t \quad (2)$$

$$EXP_{yt} = \beta_0 + \sum_{m=1}^{k+d} \beta_{1m} INF_{t-m} + \sum_{n=1}^{k+d} \beta_{2n} EXP_{yt-n} + \sum_{p=1}^{k+d} \beta_{3p} EXP_{y1t-p} + \sum_{q=1}^{k+d} \beta_{4q} EXP_{y2t-q} + \sum_{r=1}^{k+d} \beta_{5r} REER_{t-r} + \eta_t \quad (3)$$

$$EXP_{y1t} = \phi_0 + \sum_{m=1}^{k+d} \phi_{1m} INF_{t-m} + \sum_{n=1}^{k+d} \phi_{2n} EXP_{yt-n} + \sum_{p=1}^{k+d} \phi_{3p} EXP_{y1t-p} + \sum_{q=1}^{k+d} \phi_{4q} EXP_{y2t-q} + \sum_{r=1}^{k+d} \phi_{5r} REER_{t-r} + \nu_t \quad (4)$$

$$EXP_{y2t} = \delta_0 + \sum_{m=1}^{k+d} \delta_{1m} INF_{t-m} + \sum_{n=1}^{k+d} \delta_{2n} EXP_{yt-n} + \sum_{p=1}^{k+d} \delta_{3p} EXP_{y1t-p} + \sum_{q=1}^{k+d} \delta_{4q} EXP_{y2t-q} + \sum_{r=1}^{k+d} \delta_{5r} REER_{t-r} + \mu_t \quad (5)$$

$$REER_t = \gamma_0 + \sum_{m=1}^{k+d} \gamma_{1m} INF_{t-m} + \sum_{n=1}^{k+d} \gamma_{2n} EXP_{yt-n} + \sum_{p=1}^{k+d} \gamma_{3p} EXP_{y1t-p} + \sum_{q=1}^{k+d} \gamma_{4q} EXP_{y2t-q} + \sum_{r=1}^{k+d} \gamma_{5r} REER_{t-r} + v_t \quad (6)$$

The Toda-Yamamoto causality technique estimates an augmented VAR ($k + d_{max}$) model using the asymptotic chi-squared distribution with k degrees of freedom, where k is the maximum lag length and d_{max} is the maximum order of integration. The maximum lag length, k , is obtained using the Akaike information criterion (AIC), which is then augmented by the

maximum order of integration, d_{max} . The seemingly unrelated regression (SUR) method is used, in terms of which each of the variables in turn is regressed on the others from (1) to $(k + d_{max})$. The hypothesis to be tested for each model is that each explanatory variable does not Granger cause the dependent variable, against the alternative hypothesis that it does. However, in this case, the causality of all the explanatory variables in equation 2, except *INF*, will be tested, while in equations 3 to 6, only the causality of *INF* against each dependent variable will be tested.

The result will be confirmed as a unidirectional causality if the coefficient of an explanatory variable in one model is statistically significantly different from zero while it is not in the opposite model. For instance, if the coefficient of *REER*, α_{5r} , in model 2 is statistically significantly different from zero, but the coefficient of *INF*, γ_{1m} in model 6 is not statistically significantly different from zero. In such case, the analysis would conclude that *REER* Granger causes inflation, but that inflation does not lead *REER*.

3. Discussion of results

EvIEWS 9 was used for all computations. As shown in table 1, the results of DF-GLS, Phillips Perron (PP) and Zivot-Andrews tests for stationarity show that the inflation rate and the exchange rate were stationary at 5% and 1% levels of significance respectively. Since all three measures of inflation expectations of the trade union representatives became stationary after taking their first difference, all at 1% significance level, the maximum order of integration is one, $I(1)$.

Table 1 – Stationarity tests results

	Levels			First difference		Implication
	DF-GLS	Phillips Perron	Zivot-Andrews	DF-GLS	Phillips Perron	
<i>INFL</i>	-3.525**	-4.090**	-4.685**	-	-	I(0)
<i>EXP_{yt}</i>	-3.415**	-2.070	-4.258	-	-6.330***	I(1)
<i>EXP_{y1t}</i>	-1.866	-2.127	-3.761	-6.025***	-6.537***	I(1)
<i>EXP_{y2t}</i>	-2.269	-2.267	-3.527	-6.347***	-8.192***	I(1)
<i>REER_t</i>	-6.584***	-6.783***	-8.162***	-	-	I(0)

*** statistically significant at 1%, ** statistically significant at 5%.

The maximum lag length was obtained from the VAR model. This is the first step of the Toda-Yamamoto causality technique with which the maximum order of integration obtained above will be augmented. The chosen lag length using the Akaike information criterion (AIC) is 2. The causality test was therefore carried out using the SUR method, where each variable was regressed on the others with a VAR of lag (1) to (3). The causality test results obtained are shown in table 2.

Table 2 – Results of the multivariate inflation expectations model

Null hypothesis	<i>k</i>	<i>k</i> + <i>d</i> _{max}	χ^2 stats	<i>p</i> -value	Decision	Direction of causality
<i>EXP</i> _{<i>y</i><i>t</i>} does not Granger cause <i>INF</i>	2	2 + 1 = 3	5.200	0.158	Not rejected	No causality
<i>EXP</i> _{<i>y</i><i>1t</i>} does not Granger cause <i>INF</i>	2	2 + 1 = 3	0.580	0.901	Not rejected	No causality
<i>EXP</i> _{<i>y</i><i>2t</i>} does not Granger cause <i>INF</i>	2	2 + 1 = 3	2.961	0.398	Not rejected	No causality
<i>REER</i> does not Granger cause <i>INF</i>	2	2 + 1 = 3	6.412	0.093*	Rejected at 10%	<i>REER</i> → <i>INF</i>
<i>INF</i> does not Granger cause <i>EXP</i> _{<i>y</i><i>t</i>}	2	2 + 1 = 3	48.270	0.000***	Rejected at 1%	<i>INF</i> → <i>EXP</i> _{<i>y</i><i>t</i>}
<i>INF</i> does not Granger cause <i>EXP</i> _{<i>y</i><i>1t</i>}	2	2 + 1 = 3	20.125	0.000***	Rejected at 1%	<i>INF</i> → <i>EXP</i> _{<i>y</i><i>1t</i>}
<i>INF</i> does not Granger cause <i>EXP</i> _{<i>y</i><i>2t</i>}	2	2 + 1 = 3	9.633	0.022**	Rejected at 5%	<i>INF</i> → <i>EXP</i> _{<i>y</i><i>2t</i>}
<i>INF</i> does not Granger cause <i>REER</i>	2	2 + 1 = 3	10.699	0.014**	Rejected at 5%	<i>INF</i> → <i>REER</i>

* statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

The results show that there is unidirectional causality from the inflation rate to inflation expectations of the trade union representatives from the current period to two years ahead. This means that while the inflation rate leads inflation expectations of trade union representatives in South Africa, it is not led by their inflation expectations. The result therefore supports the findings of Kantor and Kavli (2011). The inflation expectations of trade union representatives do not appear to have any effect on inflation rates; however, the level of inflation rate leads trade union representatives' inflation expectations. Since inflation does not follow any measure of inflationary expectations, the trade unions may expect the inflation rate to increase further and therefore demand higher wages, but according to the result obtained, the realised increase in wages based on their inflation expectations will not cause inflation to increase. Hence, South Africa does not suffer from the second-round effect of inflation caused by the trade unions.

However, there is a bidirectional causality between the inflation rate and *REER*, which is an important variable that Kantor and Kavli's study omitted. The null hypotheses that *INF* does not Granger cause *REER* and that *REER* does not Granger cause *INF* were rejected at the 5% and 10% levels of significance, respectively. Due to the bidirectional relationship between inflation and the exchange rate, whereby inflation leads the exchange rate and it is also led by it, both variables are thus important in each model. This further confirms the conclusion reached by Kantor and Kavli (2011) that the strength in the exchange rate probably drives the inflation rate in both directions, and it is not necessarily driven by inflationary expectations.

4. Conclusions

Ultimately, this study investigated the causality between the inflation rate and different measures of inflation expectations of the trade union representatives, as well as between the inflation rate and the exchange rate. The importance of the exchange rate in inflation dynamics cannot be overlooked, hence its inclusion in the inflation rate model. The results show that while the inflation rate and the exchange rate exhibit bidirectional causality, the inflation rate does not follow any of the measures of inflation expectations of the trade unions. There is

unidirectional causality from the inflation rate to the expected inflation. Therefore, trade union inflation expectations do not lead to the second-round effect of the inflation rate.

This means that if trade unions expect inflation to increase further, following an initial increase in the inflation rate, and thereby demand higher wages, this action will not result in higher inflation rates.

Thus, the fact that SARB bases its monetary policy on the potential effect of inflation expectations on the inflation rate is a cause for significant concern. This is because, according to SARB policy, the inflation expectations of trade unions need to be taken into account in order to observe possible changes in inflation. However, based on the findings of this study, changes in the inflation rate do not follow changes in inflation expectations of the trade union representatives. However, changes in the inflation rate follow changes in the exchange rate, while changes in exchange rate are also caused by changes in inflation rate.

It is, therefore, advisable that the monetary authorities review their stance and change their focus on the economic variables that lead the inflation rate in South Africa rather than 'using a blanket approach', that inflation expectations automatically lead inflation rates. Given the bidirectional causality between the inflation and the exchange rates, it is important for monetary authorities, in battling inflation, to redirect their attention to regulating the exchange rate. By continuously curbing inflation, not due to the inflation expectations of the trade unions, monetary authorities will indirectly be able to regulate the exchange rate.

References

- Akçay S. (2011), "The Causal Relationship between Producer Price Index and Consumer Price Index: Empirical Evidence from Selected European Countries", *International Journal of Economics and Finance*, 3 (6), pp. 227-232.
- Caporale G.M., Katsimi M. and Pittis N. (2002), "Causality Links between Consumer and Producer Prices: Some Empirical Evidence", *Southern Economic Journal*, 68 (3), pp. 703-711.
- Dadam V. and Viegli N. (2015), "Labour Market and Monetary Policy in South Africa", *ERSA Working Paper*, no. 551, September, Cape Town, South Africa: Economic Research Southern Africa.
- Frankel J. (2012), "The Death of Inflation Targeting", *voxeu.org*, 12 June, available at: <https://voxeu.org/article/inflation-targeting-dead-long-live-nominal-gdp-targeting>.
- Granger C.W.J. (1969), "Investigating Causal Relationships by Econometric Models and Cross-Spectral Models", *Econometrica*, 37(3), pp. 424-438.
- Hammond G. (2011), "State of the Art of Inflation Targeting", *Centre for Central Banking Studies Handbook* no. 29, London: Bank of England.
- Heintz J. and Ndikumana L. (2010), "Is There a Case for Formal Inflation Targeting in Sub-Saharan Africa?", *AFDB Working Paper Series*, no. 108, April, Tunis: African Development Bank Group.
- Kabundi A. and Schaling E. (2013), "Inflation and Inflation Expectations in South Africa: An attempt at Explanation", *South African Journal of Economics*, Vol. 81 No. 3, pp. 346-355.
- Kabundi A., Schaling E. and Some M. (2014), "Monetary Policy and Heterogenous Inflation Expectations in South Africa", *ERSA Working Paper*, no. 422, Cape Town, South Africa: Economic Research Southern Africa.
- Kamada K., Nakajim, J. and Nishiguchi S. (2015), "Are Household Inflation Expectations Anchored in Japan?", *Bank of Japan Working Paper Series*, no. 15-E-8, July, Tokyo: Bank of Japan.
- Kantor B. and Kavli H. (2011), "Inflation and Inflation Expectations in South Africa: The Observed Absence of Second Round Effects", Paper presented at the ESSA 2011 Biennial Conference, 5-7 Sept. 2011, Stellenbosch University.
- Keynes J. M. (1923), *A Tract on Monetary Reform*. London: Macmillan.
- Leshoro T. and Kollamparambil U. (2016), "Inflation or Output Targeting? Monetary Policy Appropriateness in South Africa", *PSL Quarterly Review*, 69 (276), pp. 77-104.
- Mboweni T.T. (2005), "Monetary and Economic Trends in South Africa", Statement of the Monetary Policy Committee, Victoria, 13 October 2005.

- Rossouw J., Padayachee V. and Bosch A. (2011), "A Comparison of Inflation Expectations and Inflation Credibility in South Africa: Results from Survey Data", *South African Journal of Economic and Management Sciences*, 14 (3), pp. 263-281.
- South African Reserve Bank (SARB) (2016), *Statistics website*, available at www.resbank.co.za
- Sibanda K., Hove P. and Murwirapachena G. (2015), "Oil Prices, Exchange Rates and Inflation Expectations in South Africa", *International Business & Economics Research Journal*, 14 (4), pp. 587-602.
- Toda H.Y. and Yamamoto T. (1995), "Statistical Inference in Vector Autoregressions with Possibly Integrated Processes", *Journal of Econometrics*, 66 (1-2), pp. 225-250.