

Food inflation in Lesotho: Implications for monetary policy

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Abstract

The article examines the transmission mechanism between food and nonfood prices in Lesotho within the vector autoregression framework for the period 2003–2012. The results confirm that food inflation in Lesotho is more persistent than nonfood and headline inflation. This implies that shocks to food inflation have had a more lasting adverse impact on food prices than is the case for nonfood inflation. The findings also support the existence of a significant transmission of shocks between food and nonfood prices. As a result, the monetary authorities have to be vigilant when supply shocks hit food, since such shocks could be propagated into nonfood prices and could exert upward pressure on nonfood, headline and core inflation.

Keywords: *Core inflation, food inflation, Lesotho, monetary policy, nonfood inflation*

1 Introduction

Rising food prices in recent years have raised concerns about the reliability of measures of core inflation in informing monetary policy decisions. Core inflation aims to reflect underlying inflation by minimising or excluding short-term volatile categories from headline inflation, which often results in the exclusion of food (and energy) items. Cutler (2001) shows that the growing focus on core inflation, which captures underlying inflationary pressures rather than transitory fluctuations in prices, can improve the efficiency of monetary policy. This could be justified, since the purpose of monetary authorities is to come up with policies that are consistent with the medium-term goals of promoting and maintaining price stability and achieving sustainable growth.

Although measures of underlying inflation play a crucial role in monetary policy considerations, the increasing volatility and significance of food price movements deserve special attention from policymakers. As Rangasamy (2011) highlights, changes in food prices can have a considerable impact on headline inflation: 1) food inflation can influence overall inflation through its weight, relative to other elements within the inflation index. This means the contribution of food prices to the headline price index will be greater if food items constitute a larger share of the consumption basket; 2) food price increases can generate second-round effects on aggregate inflation by affecting inflation expectations and wages, resulting in higher core inflation in the future (Cecchetti & Moessner, 2008).

Nevertheless, Walsh (2011) argues that the greater weight and higher volatility of food prices do not, on their own, justify the minimisation of food price movements in core inflation measures. The discounting of food prices from such measures is rather justified if they are less volatile than nonfood prices, experience relatively low persistence, or have little impact on headline inflation over short intervals. Otherwise, headline inflation or any core index that assigns more weight to food inflation can perform better in guiding policymakers. Therefore, it is essential to analyse the role food prices play in overall inflation, since changes in food prices can exert upward pressure on nonfood, headline and core inflation, thus hindering future growth by increasing uncertainty in economic planning (Davis, 2012).

From 2003–2012, overall inflation in Lesotho was generally subdued and well entrenched within a single-digit territory (see Figure A1, Appendix). Throughout that period, food inflation averaged 8.02 per cent, while nonfood and headline inflation averaged 5.32 per cent and 6.26 per cent, respectively. On the other hand, the volatility of food, nonfood and headline inflation, as measured by the standard deviations, were approximately 5.08, 1.97 and 2.40 respectively (see Table A1 and Figure A2, Appendix). These show that on average food inflation in Lesotho was higher and more volatile than nonfood and headline inflation, which implies that the dissipation of food price shocks could result in higher inflation expectations for both nonfood and headline inflation. Thus, the main objective of this article is to analyse the transmission mechanism between food and nonfood prices in Lesotho. The article complements the work of Thamae (2012) by employing a rich monthly dataset and tracing the impact of shocks between food and nonfood inflation using the impulse response functions from the vector autoregression (VAR) analysis.

The rest of the article is structured as follows. The section below reviews the literature on the role of food inflation and its impact on monetary policy. Next, the focus falls on the persistence of food and nonfood inflation, while the subsequent section analyses the transmission mechanism between the price of food and nonfood products. The article ends with concluding remarks.

2 Theoretical and empirical review of literature

Inflation is generally defined as a sustained increase in the price level of goods and services. Its measurement, represented by different price indices, acts as a basis for designing macroeconomic policies (particularly monetary policy frameworks) and guides policy-related decision-making. However, price indices are characterised by frequent movements that policymakers have to contend with. Such fluctuations in price indices basically result from changes in the prices of subcomponents within which volatile food prices are found. The sources of such movements in food prices can be explained by the two major theories of inflation – the monetarist and the structuralist hypotheses. The former advocates for demand-side factors such as expansionary fiscal and monetary policies as sources of inflationary pressures,

while the latter emphasises the supply-side sources of inflation (Friedman, 1963; Adu & Marbuah, 2011).

According to Rangasamy (2011), shocks from domestic demand, supply and cost factors can have a bearing on domestic food price trends, which in turn affect the dynamics of overall inflation. Furthermore, international factors such as changes in exchange rates, rising input costs, increasing demand and declining supply can also exert mounting pressure on food inflation in the international market. However, the extent to which higher global food prices are transmitted into higher domestic prices depends on the pricing techniques of international producers, exchange rate depreciation/appreciation and the methods of import parity pricing. Jongwanich and Park (2011) note other influences that may distort the pass-through effects from global food shocks to domestic prices. These include government subsidies and price controls on basic food commodities, and the existence of time lag in passing higher input prices to consumers.

In general, food price movements can have both a direct and an indirect impact on headline inflation. For example, food inflation can directly influence overall inflation through its weight relative to other elements within the inflation index. This means that the contribution food prices make to the headline price index will be greater if food items form a larger share of the consumption basket. Conversely, increases in food prices can indirectly affect overall inflation through their effect on inflationary expectations, wages and the price of other commodities, which could result in higher inflation in the future. These second-round effects show that the net overall impact of changes in food prices on aggregate inflation not only depends on the share food commodities fills in the consumption basket, but also on transmission effects between food and nonfood prices (Cecchetti & Moessner, 2008; Rangasamy, 2011).

Empirical analyses of the role food prices play in overall inflation and the implications for monetary policy also exist in the literature, with the results varying between the Global North and Global South. For instance, Davidson *et al.* (2012), who explored a variety of factors that could explain retail food price inflation in the United Kingdom, found that retail food inflation over recent years has been more volatile and higher than nonfood price inflation. World-wide, food prices and exchange rates are the major drivers of retail food prices, while other factors such as manufacturing costs, unemployment and earnings are deemed less important. The price of oil also has an indirect impact on domestic retail prices, especially given its effect on world agricultural commodity prices. Since the impact world commodity prices have on retail food price inflation depends on the duration of the shock, the authors believe understanding the dynamics of commodity price shocks on domestic retail prices could steer macroeconomic policy.

In China, Porter (2010) investigated the main drivers of inflation and discovered that supply and foreign demand pressures have a substantial impact on overall nonfood inflation. Although the impact of domestic demand pressures is limited, the

study indicates that it indirectly influences nonfood inflation through impacting on domestic food prices. Furthermore, a rise in food inflation on the Chinese mainland increased inflation in non-mainland regions. In their examination of the role of food prices in overall inflation in India, Mishra and Roy (2011) found that food price inflation is consistently higher and more persistent than that of nonfood commodities and has a significant pass-through to nonfood inflation. Again, the study revealed that while moderate co-movements exist between domestic and international food price inflation, there is a strong correlation between changes in food prices relative to nonfood prices and headline inflation.

Rangasamy (2011), who analysed trends in food price movements within the South African economy, discovered that such movements play a major role in generating inflationary episodes in that country. Apart from their higher volatility, greater persistence and larger contribution to headline inflation, the results show that developments in food prices have strong second-round impacts, and thus merit special attention from monetary authorities. In measuring price indices in Peru, Armas *et al.* (2009) found that food commodities suffer frequent relative price changes due to seasonality and supply shocks, and also have a quantitatively high weighting in the consumption basket. As a result, they suggest that monetary policy in such a 'noisy' environment needs to track a number of inflation indicators and to assess the value of information on a real-time basis. However, in investigating their proposition, the authors discovered no suitable indicator that works best at all times.

Habermeier *et al.* (2009), who reviewed inflationary developments associated with food and energy price shocks in different countries, found that surging food and energy prices (due to global excess demand as well as supply factors) are the main drivers of inflation. The rate of overall inflation was also found to be higher than that of core inflation, which excludes food and energy items, with the existence of a large gap between headline and core inflation measures. Moreover, the study found underlying inflation in most of those countries to be rising along with overall inflation, indicating the presence of second-round effects. Within the Central African Economic and Monetary Community (CEMAC), Caceres *et al.* (2011) noted that global food and energy prices are the main drivers of noncore inflation, with the largest effect of such shocks occurring after four or five quarters in terms of noncore inflation. However, the second-round effects in that region were revealed to be less significant.

Hussain and Zaman (2008), who analysed the dynamics of inflation in Bangladesh, found that headline inflation is driven mainly by movements in food prices. Besides persistent increases in certain food commodities, the larger weight and the greater magnitude of food price inflation relative to nonfood inflation were cited as the reasons why food price movements play a major role in overall inflation within that country. In line with the observation that inflationary pressures facing the Bangladesh economy are dominated by food price inflation, Shahiduzzaman (2009) looked at how to measure core inflation in that economy. Focusing on the

common measure that excludes some volatile food products as well as the trimmed mean approach, the study discovered that these measures of core inflation had a strong relationship with money growth and could, therefore, credibly be used for the purpose of monetary policy formulation.

In the analyses provided by Walsh (2011) and Thamae (2012) in developing countries and in Lesotho respectively, food price inflation was found to be significantly higher than nonfood inflation. This gives the implication that core inflation measures which ignore food price developments are likely to reflect lower inflation, even in the long run, than overall measures. In addition, food price shocks have been found to be relatively persistent and highly volatile, meaning that their slow dissipation can result in higher inflation expectations for both food and headline inflation. The results also reveal that food price shocks are quickly disseminated into nonfood prices. Based on such a strong transmission effect as well as the observed high volatility of and right skew to food prices, the studies thus conclude that core inflation measures which minimise food price movements are likely to underestimate the medium-term effects of food price shocks. Therefore, the following sections analyse the persistence of food and nonfood inflation in Lesotho, and trace the impact of shocks between food and nonfood prices using the impulse response functions from the VAR analysis.

3 Persistence of food and nonfood inflation

Following Pivetta and Reis (2006) as well as Rangasamy (2009), it is assumed that inflation results from a univariate autoregressive (AR) process such that:

$$\pi_t^m = \sum_{i=1}^k \beta_i \pi_{t-i}^m + \varepsilon_t \quad (1)$$

where π_t is the inflation rate at time period t , μ and α_i are parameters, ε_t is the white noise error term and k is the optimal lag length based on the information criteria. According to Andrews and Chen (1994), Levin and Piger (2004) and Clark (2006), the most informative scalar measure for assessing inflation persistence is captured by the sum of AR coefficients, defined as:

$$\lambda = \sum_{i=1}^k \alpha_i \quad (2)$$

A value of λ close to zero implies that the effect of the shock on inflation is short-lived. Conversely, if λ is close to or greater than unity, then the shock on inflation is long-lasting.

On the other hand, in line with Marques (2005), the persistence estimate that allows for a time-varying mean rather than simply a break in the mean is given by the following function:

$$\pi_t^m = \sum_{i=1}^k \beta_i \pi_{t-i}^m + \varepsilon_t \quad (3)$$

and Equation 3 can be reparameterised as follows:

$$\pi_t^m = \sum_{i=1}^{k-1} \delta_i \pi_{t-i}^m + \lambda \pi_{t-1}^m + \varepsilon_t \quad (4)$$

where

$$\lambda = \sum_{i=1}^k \beta_i \quad (5)$$

and

$$\delta_i = \sum_{j=1+i}^k \beta_j \quad (6)$$

The persistence estimate (λ) is captured by the sum of AR coefficients (β_i) while ε_t is the white noise error term and k is the optimal lag length based on the information criteria. Given that π_t^m denotes the deviations from the mean, the inflation series in (4) is stationary and, as a result, model specifications are limited.

The study employs the standard maximum likelihood autoregressive integrated moving average (ARIMA) approach to estimate (4), in order to determine persistence estimates for food, nonfood and headline inflation. Lag length is selected on the basis of the Schwarz-Bayesian information criterion (SBIC). The monthly time-series data on consumer price index (CPI) for Lesotho is used and the data are obtained from Lesotho Bureau of Statistics (BOS), with the time period spanning January 2003 to December 2012.¹ Food commodities² constitute about 37 per cent of the CPI basket, while the remainder is made up of nonfood items.³ The share of staples (cereals and vegetables), mainly imported from neighbouring South Africa, make up about 62 per cent of the food basket, while services form approximately 32 per cent of nonfood items. The inflation rate for each month is then calculated on a year-on-year basis, and the Hodrik-Prescott (HP) filter is applied to approximate the time-varying mean of inflation (see Figure A1, Appendix).

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- 1 The analysis is restricted to 2003–2012, due to the unavailability of monthly data prior to 2002.
 - 2 They include bread and cereals, meat and fish, milk and eggs, oil and fats, fruits and vegetables, and other food products.
 - 3 These are beverages and tobacco, clothing and footwear, energy and water, furniture and household appliances, equipment and maintenance, health and transport, recreation and culture, communications and education, and other goods and services.

Table 1: Persistence estimates for food, nonfood and headline inflation

Model	Lag length	β_1	β_2	λ
Food inflation		1.3854	-0.4146	0.9708
		(0.1144)	(0.1161)	
		[0.0000]	[0.0005]	
Nonfood inflation		1.2256	-0.3090	0.9166
		(0.0975)	(0.0973)	
		[0.0000]	[0.0019]	
Headline inflation		1.2386	-0.2989	0.9397
		(0.0897)	(0.0900)	
		[0.0000]	[0.0012]	

Source: Own computations with data from Lesotho BOS.

Notes: Standard errors in parentheses and p-values in brackets.

As shown in Table 1, the persistence estimates for food, nonfood and headline inflation are 0.97, 0.92 and 0.94, respectively. These results confirm that food inflation is more persistent than nonfood and headline inflation, indicating that food inflation takes a longer time to revert to its mean level following a shock than nonfood inflation does. As a result, shocks to food inflation seem to have had a more lasting adverse impact on food prices than is the case for nonfood inflation. These findings, which are similar to those reported by Rangasamy (2011) and Thamae (2012), imply that food inflation could be the major source of underlying inflationary pressures within the economy of Lesotho.

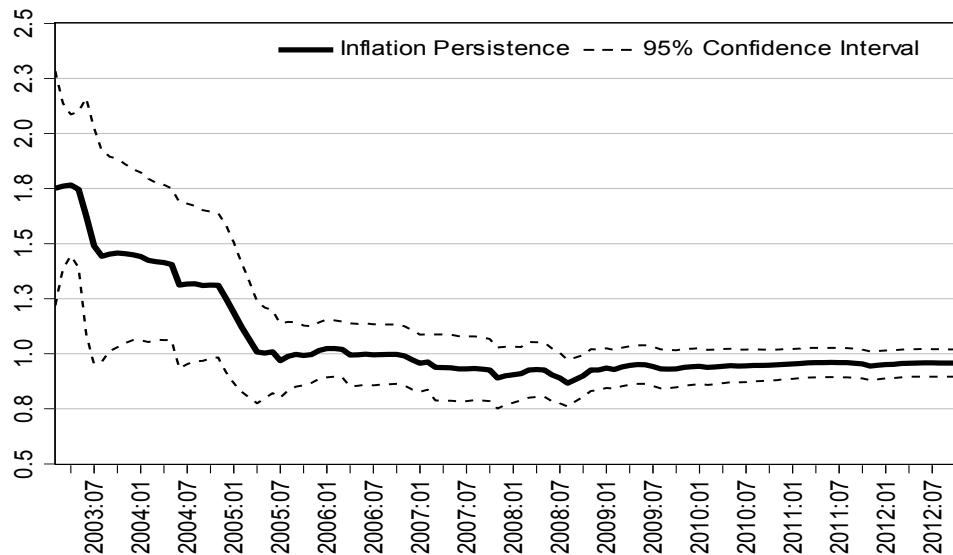


Figure 1: Recursive estimates for the persistence of headline inflation

Source: Own computations using data from Lesotho BOS.

Figure 1 depicts the recursive estimates for the persistence of overall inflation. It is apparent that inflation in Lesotho has been highly persistent throughout the period covered, even though its persistence has declined over time. In line with Rangasamy (2009), such a drop in persistence may be attributable to developments in terms of globalisation and inflation-targeting regimes in neighbouring South Africa, the country with which Lesotho has a fixed exchange rate policy where its currency (loti) is pegged at par to the South African rand. However, these reasons warrant detailed future investigations of the impact of globalisation and changes in monetary policy regimes in South Africa on inflation dynamics in Lesotho.

4 Transmission mechanism between food and nonfood prices

According to Walsh (2011), the transmission of shocks between food and nonfood inflation has some important implications on the efficiency of monetary policy. For example, given the greater volatility, magnitude and persistence of food inflation, the strong propagation between food and nonfood prices could require a much more rapid monetary policy response to curb the increase in nonfood inflation. In order to analyse the significance of such transmission mechanisms, the impulse response functions are derived from the following two-equation VAR for food and nonfood prices, with the optimal lag length of one being chosen by the SBIC:

$$\pi_t^f = \varphi^{ff} \pi_{t-1}^f + \varphi^{nf} \pi_{t-1}^n + \varepsilon_t^f \quad (6)$$

$$\pi_t^n = \varphi^{fn} \pi_{t-1}^f + \varphi^{nn} \pi_{t-1}^n + \varepsilon_t^n \quad (7)$$

where π_t^f is food inflation, π_t^n is nonfood inflation and φ 's are the parameters to be estimated.

Using the standard maximum likelihood techniques, Equations 7 and 8 are estimated jointly and the four estimated impulse responses are shown in Figure 2.

The upper left chart shows that the initial response of food price level to its own shock is approximately 1.1 per cent, while that of nonfood prices in the lower right chart is about 0.5 per cent. These results are not surprising given that food inflation is found to be more persistent than nonfood inflation, hence its shocks seem to have had a more lasting adverse impact on food prices than is the case for nonfood inflation. On the other hand, the lower left (upper right) chart shows that a one per cent shock to food (nonfood) prices increases the nonfood (food) price level by 0.13 (0.24) per cent, thereby supporting the existence of significant transmission of shocks between food and nonfood prices in Lesotho. Therefore, the monetary authorities should be vigilant when supply shocks hit food, since such shocks could be propagated into nonfood prices, resulting in upward pressure on nonfood, headline and core inflation (as also argued by IMF, 2010).

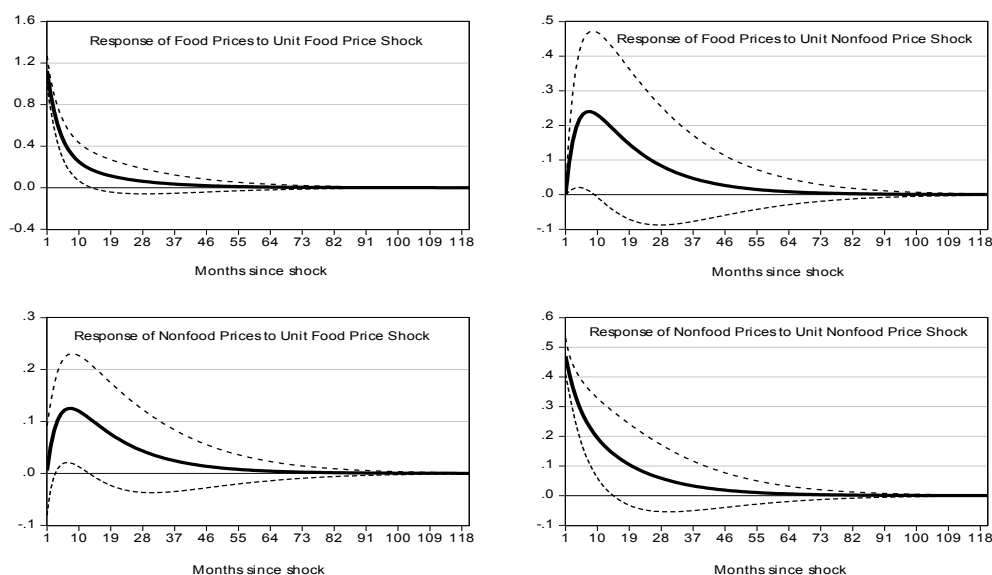


Figure 2: Responses to food and nonfood price shocks

Source: Own computations with data from Lesotho BOS.

5 Conclusion

The article investigates the significance of the propagation mechanism between food and nonfood prices in Lesotho within the VAR framework using the monthly data from January 2003 to December 2012. The results confirm that food inflation in Lesotho is more persistent than nonfood and headline inflation. This implies that shocks to food inflation seem to have had a more lasting adverse impact on food prices than is the case for nonfood inflation. Furthermore, overall inflation is found to be highly persistent throughout the period covered, even though its persistence has been declining over time. Nevertheless, such a drop in persistence might be due to the impact of globalisation and changes in monetary policy regimes in South Africa, the country with which Lesotho has a fixed exchange rate policy.

On the other hand, the findings support the existence of significant transmission of shocks between food and nonfood prices. As a result, monetary authorities have to be vigilant when supply shocks hit food, since such shocks could be propagated into nonfood prices and result in upward pressure on nonfood, headline and core inflation. Given that food commodities as a category constitutes a larger part of the consumption basket in Lesotho, and the country is constrained in terms of monetary policy due to its fixed exchange rate regime, the article confirms the findings of an earlier study (Adu & Marbuah, 2011) that the removal of supply-side constraints and productivity enhancement, especially in the agricultural sector, as well as a close coordination between fiscal and monetary policies, could help to maintain disinflationary trends and meet future inflation targets.

Biographical notes

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Appendix

Table A1: Mean and volatility of food, nonfood and headline inflation

Period	Mean			Volatility (standard deviation)		
	Food	Nonfood	Headline	Food	Nonfood	Headline
2003–2005	3.86	5.93	5.22	3.45	2.18	1.72
2006–2009	12.07	6.01	8.06	4.34	1.74	2.31
2010–2012	6.77	3.79	4.91	2.92	0.98	1.44
2003–2012	8.02	5.32	6.26	5.08	1.97	2.40

Source: Own computations with data from Lesotho BOS.

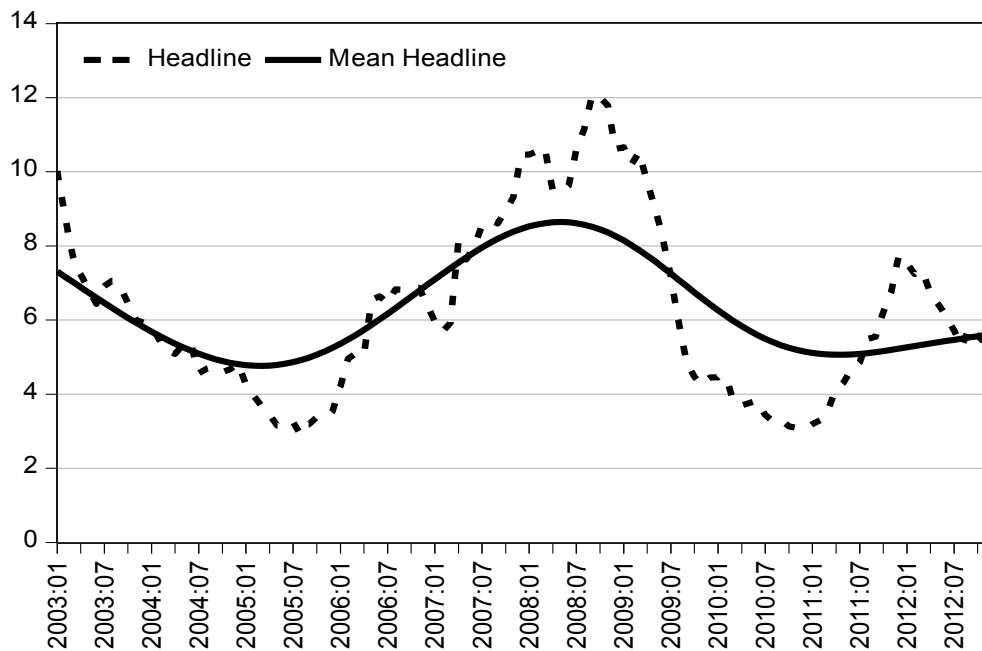


Figure A1: Headline inflation and mean headline inflation (in percent)

Source: Own computations with data from Lesotho BOS.

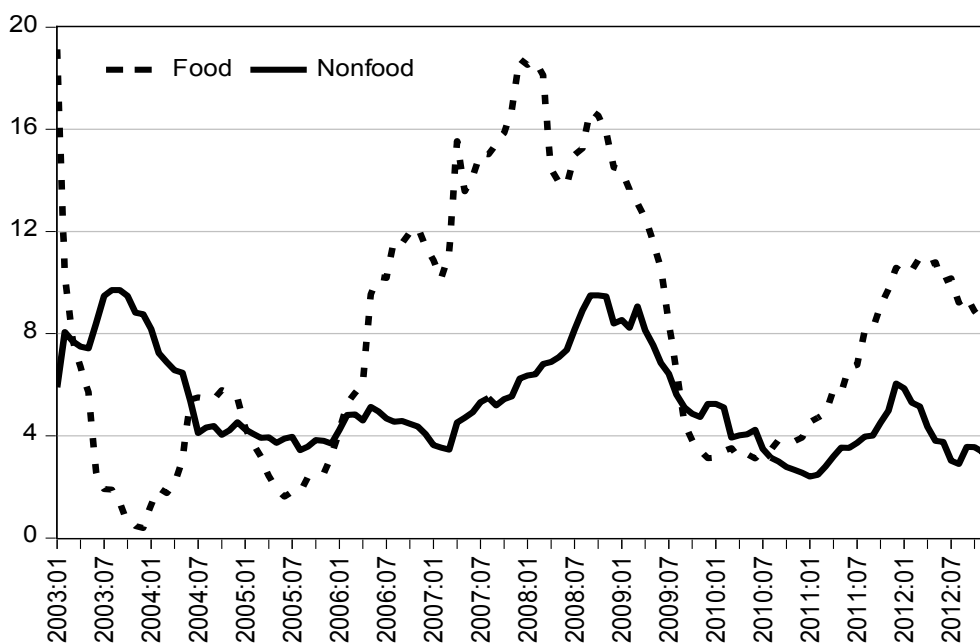


Figure A2: Food and nonfood inflation (in percent)

Source: Own computations with data from Lesotho BOS.