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Food Inflation in Sub-Saharan Africa: Causes and Policy Implications

by C. Emre Alper, Niko Hobdari, and Ali Uppal

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Abstract

This paper analyzes food inflation trends in Sub-Saharan Africa (SSA) from 2000 to 2016 using two novel datasets of disaggregated CPI baskets. Unlike advance and other emerging market economies, average food inflation is higher, more volatile, and similarly persistent as non-food non-fuel (NF/NF) inflation, especially in low-income countries (LICs) in SSA. This finding suggest that central banks in LICs with high and persistent food inflation should continue to pay attention to headline inflation to anchor inflation expectations. We also find that high food prices are driven mainly by non-tradable food in SSA and there is incomplete pass-through from world food and fuel prices and exchange rates to domestic food prices. Other policy levers include reducing tariffs and improving storage and transport infrastructure to reduce food pressures.

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I. INTRODUCTION

"Because shocks to commodity price inflation are typically beyond the control of policymakers, hard to predict, and often not sustained, central banks seeking to establish credibility are generally better off setting and communicating their monetary policy in terms of underlying inflation rather than headline inflation."— IMF, 2011

For a long time, the consensus in the literature has been that central banks should not respond to changes in food and energy prices as such changes tend to be quickly reversed and that they are highly volatile (Motley, 1997; Mishkin, 2007; Kiley, 2008). Indeed, the textbook approach is that monetary policy should 'look through' supply shocks such as a sudden increase in food prices (Mohanty, 2014). This view has been internalized by central banks across the world and while most central banks continue to target headline inflation, their policy decisions are often informed by measures of "core" inflation that strip the impact of food and energy prices, which are seen as providing a clearer image of underlying price developments.[2]

Using inflation measures excluding food and fuel prices to gauge the monetary policy stance is not only prevalent in advanced economies (AEs), but also in a growing number of emerging market economies (EMs) and low-income countries (LICs), including more recently in a number of SSA countries with evolving monetary frameworks. Indeed, central banking in SSA has transformed over the past few decades. Prior to the 1990s, interest rates were largely administratively controlled and central banks were required to abide by the doctrines of the fiscal authorities which largely directed monetary policy to fill government financing gaps. Furthermore, parallel foreign exchange markets were ubiquitous during this period reflecting exchange rate controls in a context of monetary financing of large fiscal deficits. Since then, however, there have been two key developments in SSA. First was the move towards more flexible exchange rate regimes and second was that price stability became the *de jure* principal aim of monetary policy in most countries. The result of these reforms is that monetary policy frameworks in SSA are now increasingly aligned with those in AEs (Ajakaiye and O'Connell, 2011; IMF, 2014). As part of this alignment, a growing number of central banks in SSA have also emphasized the use of core inflation in a similar way to those in AEs.[3]

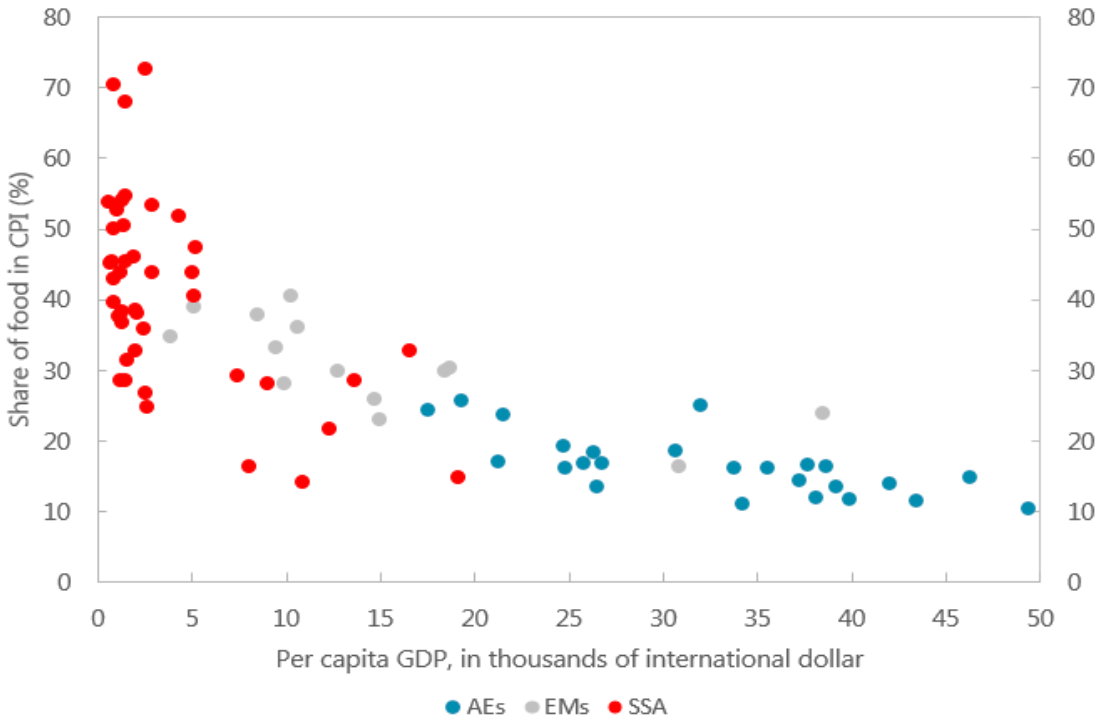
However, while food price inflation is less persistent than non-food price inflation in the AEs, recent evidence shows that this is not necessarily the case for LICs, leading some to argue that food prices should not be excluded from core measures of inflation in these countries (Walsh, 2011; Rangasamy, 2011; Durevall et al., 2013). In addition, a higher share of food in the

[2] This can be seen from statements made by the Governors of central banks in AEs. For example, see Bernanke (2007) and King (2010) for statements stressing the importance of core inflation relating to the USA and UK respectively.

[3] See, for example, for Kenya: Monetary Policy Committee Reports from the Central Bank of Kenya (2009, 2015); for Uganda: Biryabarema (2015); for Ethiopia: Durevall et al. (2013); and for South Africa OECD (2012).

consumption basket of LICs makes core inflation a poor measure of changes in the cost of living (Furceri et al., 2015; Durevall et al., 2013). Indeed, the share of food in the consumption basket is 40 percent on average in SSA while the equivalent for AEs and EMs is 15 and 30 percent, respectively (Figure I.1).

Figure I.1: Share of Food in the Consumption Basket



Source: Country statistical sources, WEO database and Haver Analytics.

Against this background, using two novel datasets we compare average food inflation with that of non-food non-fuel (NF/NF) in SSA, as well comparing their volatility and persistence. We also assess whether food inflation drives NF/NF inflation in SSA. This is followed by an assessment of the importance of the pass-through from international food prices, fuel prices, and exchange rates in explaining domestic food inflation. Finally, using highly disaggregated food items, we assess whether these external drivers have heterogeneous effects on the different food items.

Our findings for the period 2000 to 2016 indicate the following:

- Food inflation has been higher than, more volatile than, and at least as persistent as NF/NF inflation, especially in LICs. In the aftermath of the 2007-2008 international food price surge, from 2009 onwards, food inflation has on average remained higher than NF/NF inflation (1.4 percentage points per year) and more volatile. On average, however, it is significantly less persistent than NF/NF inflation. Our regression results on the drivers of persistence suggest that improvements in macroeconomic management across SSA, and also the adoption of

forward-looking monetary policy frameworks in a number of countries are associated with less persistent food inflation relative to NF/NF inflation.

- Granger causality tests indicate that, across the majority of countries in SSA, food inflation does not cause NF/NF inflation, nor does NF/NF inflation always cause food inflation.
- Over a third of SSA countries have experienced statistically significant pass-through to domestic food prices from changes in world food prices and in exchange rates. The average pass-throughs are 32 and 17 percent, respectively.
- Higher food inflation in SSA is most prominent in LICs. Food inflation is higher in fresh (and thus non- tradable) food items. In addition,[4] and there are more countries with a statistically significant pass-through from world food prices and exchanges rates to non-fresh food prices.

Taken together, these findings suggest that measures of inflation that exclude food prices would likely underestimate underlying price pressures in SSA and other LICs where food inflation remains significantly high and persistent. In such cases, monetary policy should continue to monitor food inflation and seek to reduce the second-round impact of food price shocks on NF/NF prices.[5] Additionally, by focusing their efforts to establish credibility, central banks may also reduce the persistence of food inflation. Another conclusion is that policies that increase tradability of food items, including, for example, reducing tariffs and improving storage and transportation infrastructure could potentially reduce food inflation pressures in LICs.

The remainder of the paper is organized as follows: Section II describes the two datasets; Section III describes food and NF/NF inflation dynamics, including assessing the drivers of inflation persistence; Section IV explores external and structural drivers of food inflation using pass-through regressions; and Section V concludes with policy implications.

[4] Due to the shortage of adequate infrastructure for transportation and storage of food in SSA, many fresh food items (such as meat, fish, fruit, and vegetables) are likely to be non-tradable, whilst non-fresh food items (such as packaged milk, bakery, sugar, coffee, and oils) are considered to be tradable.

[5] This is consistent with Catao and Cheng (2010) and Anand et al. (2014).

II. DATA

We form two novel datasets on consumer prices in SSA countries, both non-seasonally adjusted, by gathering detailed monthly CPI statistics from January 2000 to May 2016 for SSA countries from published reports in country statistical agencies, and IMF staff data based on submissions by country authorities.

- The first dataset on SSA CPI consists of monthly data on headline CPI and its 12 major subcomponents (Table II.1) during 2000-16 for 41 SSA countries.[6] Other than monthly price series for the headline CPI and its subcomponents, we also gathered CPI basket weights for each country during 2000 to 2016. For the remainder of this paper, "food prices" refer to item number 1 in Table II.1, "Food and Nonalcoholic Beverages"; fuel prices refer to item number 4 "Housing, water, electricity, gas and other fuels"; and NF/NF is calculated by subtracting item number 1 and item number 4 from headline CPI after multiplying them with their respective weights and then reweighing the difference.[7] There are on average 171 months (over 14 years) of observations with a minimum of 114 (Republic of Congo) and a maximum of 197 (Benin, Botswana, Central African Republic, Ghana, Guinea, Kenya, Madagascar, Nigeria, and Togo) observations.

Table II.1: CPI Subcomponents

1 Food and Nonalcoholic Beverages
2 Alcoholic Beverages, Tobacco, and Narcotics
3 Clothing and Footwear
4 Housing, Water, Electricity, Gas, and other Fuels
5 Furnishings, Household Equipment, and Routine Household Maintenance
6 Health
7 Transport
8 Communication
9 Recreation and Culture
10 Education
11 Restaurants and Hotels
12 Miscellaneous Goods and Services

[6] CPI data exists for 44 SSA countries, however, we excluded three countries reflecting lack of exchange rate data (Zimbabwe) and short data span (Equatorial Guinea and Eritrea). A list of the 41 SSA countries is available in Annex 2 Table A.2.

[7] For monetary policy purposes food, fuel, and NF/NF price definitions are not standard in SSA countries. For example, in Uganda, NF/NF prices include processed foods; in Kenya fuel prices also include category number 7, "Transportation"; and in Nigeria, fuel prices are more refined than the items under category 4. We use the same definition for each SSA country due to data availability and comparability purposes. In the analysis section we compare food to NF/NF prices due to the prevalence of government administration of fuel prices.

- The second dataset consists of monthly data on highly detailed food subcomponents (up to 91 items) as well as their CPI weights for 20 SSA countries (Annex 2 Table A.3). For comparability to international food prices, we aggregate the food price series using their individual consumption basket weights into 9 categories: bakery, coffee, fish, fruit, meat, milk, oils, sugar, and vegetables. These categories are fairly representative of a typical food basket: on average these 9 categories make up 87 percent of the food basket. There is on average around 8.5 years of monthly data with a minimum of just under 4 years of monthly observations (Ghana) and a maximum of nearly 15 years of monthly observations (Madagascar).

For the purposes of this paper, we classify the SSA countries with 2015 per capita GDP valued by purchasing power parity greater than US$5,000 as middle-income and the remaining as low-income countries.[8] Based on this classification, in the first dataset 11 are middle-income and 30 are low-income countries (Annex 2 Table A.2), and in the second dataset 5 are middle-income and 15 are low-income countries (Annex 2 Table A.3).

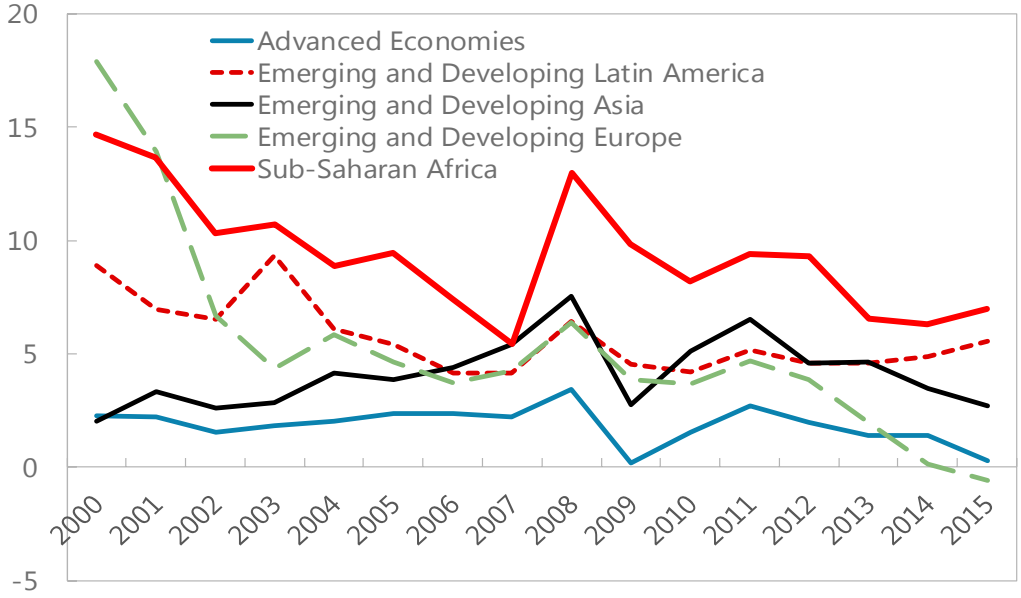
In addition to the two novel datasets above, the analysis in the following sections of this paper uses a number of other macroeconomic series as well as structural indicators (see Annex 2 Table A.1 for a summary of sources and definitions).

III. INFLATION IN SSA IN THE NEW MILLENNIUM

Headline consumer price inflation in SSA has, on average, been on a trend decline over the last two decades, reflecting improved macroeconomic policy management in most countries in the region. Nevertheless, inflation in SSA remained well above the levels prevailing in other regions (Figure III.1). The experience with disinflation in SSA has also varied widely: about a quarter of SSA countries actually experienced increasing inflation trends during 2000-16, and consumer price inflation dispersion in SSA remained much higher relative to AEs or EMs.

[8] Per capita GDP values are obtained from the IMF's April 2016 WEO database.

Figure III.1: Annual Consumer Price Inflation Across the World (%)



Source: WEO database.

A. Average Inflation

We first derive average quarterly inflation rates from monthly indices for 41 SSA countries. The annualized quarterly inflation rates for the full sample of countries as well as various sub-groupings reveal that food inflation is greater than NF/NF inflation for all main sub-groupings (Table III.1).[9] For the full sample of 41 SSA countries, the annual average difference is close to 1.8 percentage points during 2000-16. This is a non-trivial difference: over the 16-year span included in this paper, food inflation has been cumulatively higher by over thirty percentage points relative to NF/NF inflation. While Table III.1 uses a simple country average to derive the values for the different sub-groupings, the key result, that food inflation consistently exceeds NF/NF inflation, is robust to using GDP valued in purchasing power parity weighted averages (Annex 2 Table A.4).

The largest difference between food and NF/NF inflation is among the members of the Central African Economic and Monetary Community (CEMAC) and the East African Community (EAC), where the difference on average is about 2½ percentage points per year. MICs turn out to be more similar to AEs[10] while LICs have experienced higher food inflation compared to NF/NF inflation on average by around 2.1 percentage points annually.

[9] See Table A.2 in the Annex 2 for the lists of countries that make up each sub-group.

[10] Box 3.3 in IMF (2016).

The wedge between food and NF/NF inflation has narrowed since 2009 (i.e., following the international food price surge of 2007-08), but is still close to 1.4 percentage points annually. Around sixty percent of this decline in the wedge has been driven by lower food inflation. Indeed, inflation for most food sub-groupings experienced a reduction since 2009 with the exception of EAC countries where the difference between food and NF/NF inflation actually increased to just over 3 percentage points per year.

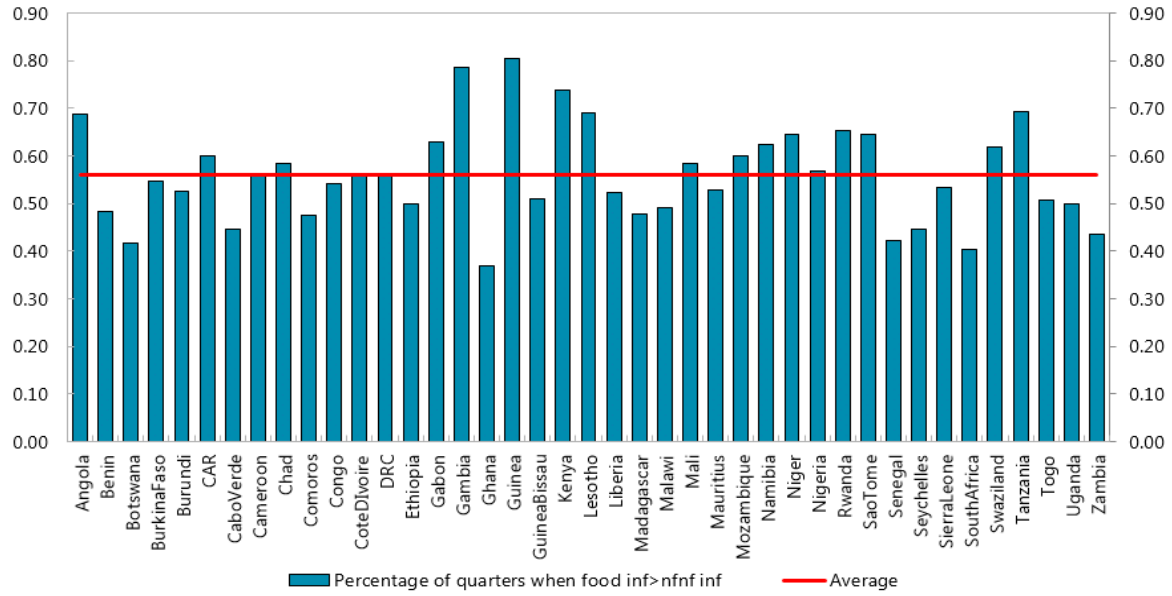
Table III.1: Average Inflation Rates in SSA and Sub-groups

		Average Inflation (%, QoQ, annualized, simple average)							
		Time period: 2000-2016				Time period: 2009-2016			
	No. of countries	Headline	Food	NF/NF	Food minus NF/NF	Headline	Food	NF/NF	Food minus NF/NF
SSA	41	6.75	7.70	5.92	1.78	5.82	6.42	5.05	1.37
MIC	11	6.54	7.39	6.54	0.85	5.58	5.88	5.48	0.39
LIC	30	6.83	7.82	5.68	2.13	5.90	6.61	4.89	1.72
WAEMU	8	2.19	3.37	1.63	1.74	1.49	2.23	1.14	1.09
CEMAC	5	2.98	3.92	1.64	2.28	2.42	3.29	1.33	1.96
EAC 5	5	7.29	8.82	6.25	2.58	7.23	9.02	5.95	3.06
Oil Exporters	5	6.76	7.68	6.49	1.18	6.19	6.84	5.85	0.98
Fragile	13	7.42	8.27	6.51	1.76	6.23	6.76	5.33	1.43

Source: Country statistical sources and authors' calculations.

Country-specific average inflation information (Annex 2 Table A.5) reveals that 90 percent of SSA countries from 2000 to 2016 experienced food inflation exceeding NF/NF inflation. For the 2009-16 period, which excludes the 2007-08 international food price surge, the figure drops to just over 70 percent of SSA countries witnessing food inflation exceeding NF/NF inflation. Another way to assess the cross-country variation between food and NF/NF inflation is to just look at the percentage of quarters when food inflation is greater than NF/NF inflation (Figure III.2). About ¾ of countries in SSA have quarterly food inflation greater than NF/NF inflation more than half the time over the period 2000-16. On average in SSA, quarterly food inflation is greater than quarterly NF/NF inflation about sixty percent of the time. These two observations indicate higher persistence of food inflation relative to NF/NF inflation. However, when looking at the 2009-16 period only, over half of the countries saw a decline in the percentage of quarters when food inflation is greater than NF/NF inflation while only a third saw a rise and a tenth saw no change. This suggests that the persistence of food inflation may have declined in the latter period.

Figure III.2: Share of quarters with Food Inflation exceeding NF/NF Inflation (2000-16)



Source: Author calculations.

We therefore conclude that food inflation has been an important contributor to headline inflation in the vast majority of SSA countries from 2000 to 2016. However, food inflation appears to be a less significant, albeit still important, driver of headline inflation since 2009. This result is likely driven by the exclusion of the international food price surge but other factors such as an increased resilience to food price shocks, including the 2011 drought in the Horn of Africa. More modernized central banks and improved macroeconomic management may have played an important a role.

B. Volatility of Inflation

Using quarterly average inflation, volatility is calculated as the coefficient of variation (i.e., the standard deviation divided by the mean multiplied by 100) for each country in the sample. We then show the median volatility for the same country groupings in SSA (Table III.2).[11] We observe that the volatility of food inflation in SSA is over 50 percent higher than that of NF/NF inflation. However, the differences in volatilities of food and NF/NF inflation is driven by LICs as the difference in the volatilities is negligible for MICs. The difference is highest for members of the West African Economic and Monetary Union (WAEMU), but for CEMAC and the oil exporters food inflation is less volatile than NF/NF inflation, on average.[12]

[11] Volatility increases significantly as the mean approaches zero and in such cases may not necessarily reflect an actual increase in the standard deviation. Therefore, some countries will have extremely large volatilities because of near-zero inflation rates. The median (instead of a simple mean) of all the countries in different groupings will be less affected by such outliers.

[12] Both CEMAC and Oil Exporters are a sample of five countries and have three countries overlapping.

The difference of the median volatilities of food inflation and NF/NF inflation has increased slightly relative to NF/NF inflation since 2009 in SSA, despite the broad stability in global food prices. This appears to be driven by a nearly 50 percent increase in the difference for LICs.

Table III.2: Volatility of Inflation Rates in SSA and Sub-groups

		Volatility (as measured by coefficient of variation)							
		Time period: 2000-2016				Time period: 2009-2016			
	No. of countries	Headline	Food	NF/NF	Food minus NF/NF	Headline	Food	NF/NF	Food minus NF/NF
SSA	41	1.20	1.82	1.16	0.66	1.26	1.87	1.08	0.78
MIC	11	0.85	1.08	1.02	0.06	0.74	0.98	1.01	-0.03
LIC	30	1.31	1.91	1.27	0.64	1.42	2.04	1.09	0.95
WAEMU	8	3.37	5.01	3.19	1.82	3.80	5.66	3.66	2.00
CEMAC	5	2.29	2.23	2.81	-0.58	2.44	2.24	3.53	-1.29
EAC 5	5	1.27	1.96	1.12	0.84	1.15	1.87	1.08	0.78
Oil Exporters	5	0.79	1.82	2.66	-0.84	0.54	1.70	1.65	0.04
Fragile	13	1.34	1.96	1.44	0.52	1.29	1.87	1.09	0.77

Notes: The median volatility is used for each grouping.
Source: Country statistical sources and authors' calculations.

Country-specific inflation volatility (Annex 2 Table A.6) reveals that there is considerable heterogeneity in the volatilities across different countries. Indeed, across both the 2000-16 and 2009-16 periods close to half of the countries have broadly similar volatilities for food and NF/NF inflation but as the table above indicates, the median volatility for food inflation across both periods is higher than that for NF/NF inflation. [13]

We therefore conclude that food inflation in SSA is, on average, more volatile than NF/NF inflation during both the 2000-16 and 2009-16 periods, but also note the considerable heterogeneity across countries.

C. Persistence of Inflation

We next turn to persistence of shocks to food and NF/NF inflation in SSA. As discussed earlier, if food price shocks are relatively transitory, this could support the focus on inflation excluding food in assessing the monetary policy stance.[14]

[13] One could alternatively estimate autoregressive conditional heteroscedasticity models to get time-varying volatility of inflation. However, the data frequency (quarterly) is low for such estimations, and indeed, ARCH LM tests indicate that of the 42 countries only 10 of them had ARCH effects in headline inflation, 5 in food inflation and 3 in NFNF inflation.

[14] See also da Silva Filho and Figueiredo (2015) on importance of volatility and persistence for constructing the core inflation measure using evidence from Brazil.

There are various alternative methods to calculate the persistence of a series. One approach (Andrews and Chen, 1994) to measure persistence is to calculate the sum of the autoregressive coefficients (SARC).

We therefore estimate a country-by-country univariate regression of the following form:

$$\pi_t^Z = \sum_{i=1}^{L} \beta_i \, \pi_{t-i}^Z + \sum_{i=1}^{4} \rho_i Q_{i,t} + \varepsilon_t^Z \qquad (1)$$

where π_t^Z represents annualized quarterly inflation for item Z (food or NF/NF) at t. $Q_{i,t}$ represent quarterly time dummies to control for seasonal variation.

For each country in the sample, we estimate the autoregressive equation for both food and NF/NF inflation, four times with the number of quarterly lags, L, ranging between 1 and 4. The number of lags is selected on the basis of the Akaike Information Criterion and then the β coefficients are summed up to yield the SARC. A higher estimate of the SARC indicates greater persistence. Medians of the SARC estimates across all the countries in our sample reveal that, contrary to conventional wisdom, food inflation is more persistent than NF/NF inflation in SSA over the period 2000-16 (Table III.3). However, from 2009 onwards (i.e., after stripping out the effect of the international food price shock in 2007-08), food inflation is significantly less persistent than NF/NF inflation. This result is driven by the decreasing persistence of food inflation in LICs.

Table III.3: Persistence of Different Inflation Rates – Whole Sample

		Inflation Persistence - SARC Estimates							
		Time Period: 2000-2016				Time Period: 2009-2016			
	No. of countries	Headline	Food	NF/NF	Food minus NFNF	Headline	Food	NF/NF	Food minus NFNF
SSA	41	0.35	0.24	0.23	0.01	0.26	0.07	0.25	-0.17
MIC	11	0.45	0.43	0.31	0.12	0.26	0.16	0.08	0.08
LIC	30	0.33	0.18	0.18	0.00	0.26	0.05	0.26	-0.20
WAEMU	8	0.19	0.15	0.10	0.05	-0.11	-0.19	0.21	-0.40
CEMAC	5	-0.06	-0.11	-0.37	0.27	0.02	-0.13	-0.47	0.34
EAC 5	5	0.28	0.13	0.56	-0.43	0.26	0.07	0.55	-0.48
Oil Exporters	5	-0.02	0.03	-0.02	0.06	0.13	-0.02	-0.02	0.01
Fragile	13	0.08	0.04	0.01	0.03	0.12	-0.11	0.31	-0.42

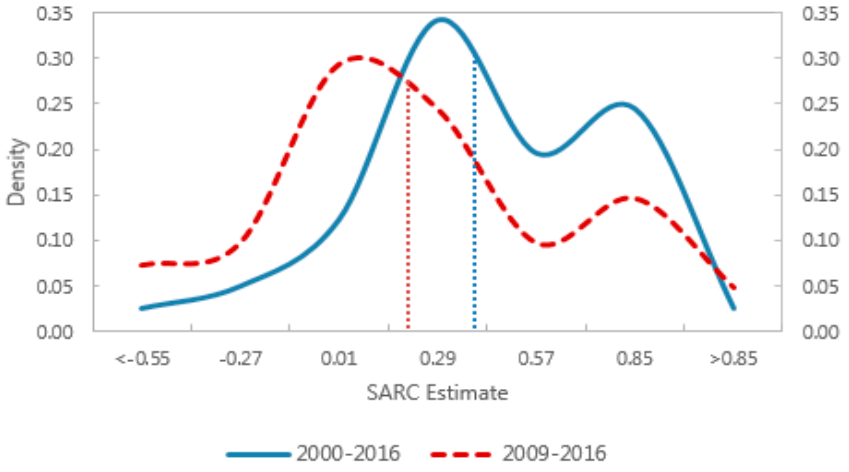
Notes: Inflation used for these calculations is QoQ, annualized. The median SARC estimate is used for each grouping.
Source: Author calculations

SARC estimates for each country (Annex 2 Table A.7) and Figure III.3 below provide the distribution of these estimates. The distribution of the SARC estimates for food inflation appears to have shifted down and leftwards from the period 2000-16 to 2009-16 (Figure III.3 Panel A). This shows that the decreasing persistence of food inflation is broadly representative across SSA.

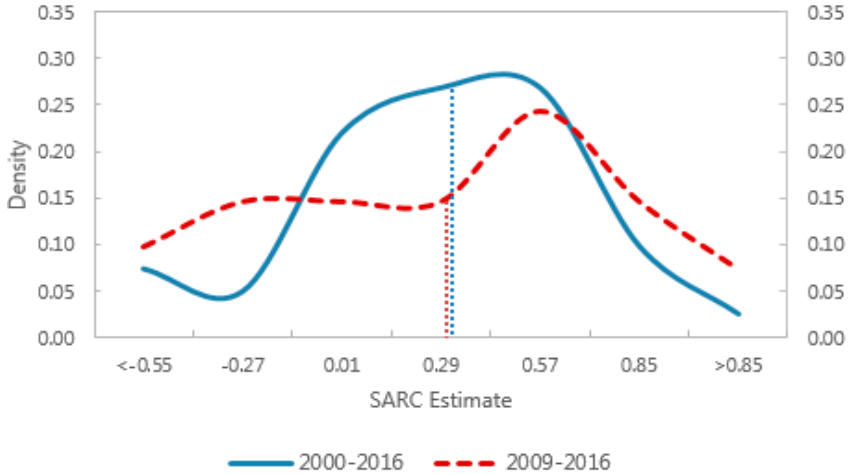
The persistence estimates of NF/NF inflation show a flattening of the distribution with the mean remaining broadly the same (Figure III.3 Panel B).[15]

Figure III.3: Distribution of Inflation Persistence (SARC Estimates) across SSA

Panel A – Food Inflation SARC Estimates



Panel B – NF/NF Inflation SARC Estimates



Notes: Vertical lines represent the means. Inflation used for these calculations is QoQ, annualized.
Source: Author calculations

The above finding corresponds with the summary results in Table III.3. That is, in the period from 2000 to 2016, food inflation was at least as persistent as NF/NF inflation (and in many cases more

[15] To check for robustness of the results, we also apply an alternative (nonparametric) method for measuring persistence (Dias and Marques, 2010). This approach also finds that the distribution of the nonparametric estimates of food inflation persistence flattens and shifts leftwards suggesting that food inflation is becoming less persistent (Annex 1).

persistent) with around 60 percent of countries experiencing food inflation that is more persistent than NF/NF inflation. But in the 2009-16 period, food inflation has become much less persistent, with close to 70 percent of countries in SSA witnessing a fall in the persistence of food inflation since the 2000-16 period. Indeed, in the 2009-16 period, food inflation is less persistent than NF/NF inflation in over 60 percent of countries.

The shift in the distribution seems to reflect, in part, the exclusion of the international food price surge of 2007-08.[16]

Given the different distribution in 2009-16, we attempt to identify which factors affect persistence of food inflation relative to NF/NF inflation (i.e., the wedge between the two) during this period. As this period has seen significant institutional development, particularly in monetary policy frameworks (IMF, 2015), we expect that improved monetary policy management (e.g., through inflation targeting) has helped anchor inflation expectations and would therefore reduce the persistence of food inflation relative to NF/NF inflation.

To test our hypothesis, we run a cross-sectional regression on the wedge between the persistence of food and NF/NF inflation on an index that measures macroeconomic management (a higher value on this index indicates that monetary and exchange policies promote price stability and better aggregate demand policy framework including on fiscal policy) and a dummy variable for countries that have inflation targeting. We also include a number of structural variables, such as GDP per capita, a categorical variable capturing the de Jure central bank independence from government financing (Jacome et al (2012), total droughts, logistics index capturing the quality of infrastructure for storage and transportation, as controls (Table III.4).[17] We also include the share of China imports to control for the dampening effect on NF/NF inflation from increasing Chinese imports in SSA.

Furthermore, we estimate persistence of food inflation and NF/NF inflation separately with the identical specification. This would allow us to ascertain whether the changes in the wedge are being driven by changes in the persistence of food inflation or NF/NF inflation.

[16] Looking at the periods 2000-06 and 2000-07, on average, food inflation was more persistent than NF/NF inflation for less than 60 percent of countries in SSA. However, in the period 2000-08 (i.e., including the food price shocks), this rises to around 70 percent.

[17] We calculate each structural variable by averaging available data from 2000 to 2015 except for total droughts which is the sum of the total number of droughts over the same time period (see Annex 2 Table A.11). Note that given the data availability for the structural variables, our sample of 41 SSA countries is reduced to 24 countries of which 22 are LICs while 2 are MICs.

Table III.4: Regression on the Estimates of the Persistence (SARC) of Food Inflation, NFNF Inflation, and the Wedge in the 2009-16 Period

VARIABLES	(1) SARC_Food	(2) SARC_NFNF	(3) SARC_Wedge
Dummy_Inflation_Target	-0.79**	0.43	-1.22**
	[0.335]	[0.375]	[0.515]
CPIA_Macro	-0.63*	0.29	-0.92*
	[0.296]	[0.332]	[0.455]
PPP_GDP_PC	0.02	-0.10	0.12
	[0.112]	[0.126]	[0.172]
Total_Droughts	-0.05	-0.02	-0.03
	[0.058]	[0.065]	[0.089]
Logistics_Index	0.45	0.52	-0.07
	[0.519]	[0.582]	[0.799]
Food_trade_balance	-0.00	0.01	-0.01
	[0.012]	[0.013]	[0.018]
China_Imports	-0.03	0.04*	-0.08**
	[0.020]	[0.022]	[0.030]
CB_Loan_Govt	-0.12	-0.19	0.06
	[0.144]	[0.162]	[0.222]
Dummy_ER_Peg	-0.93***	-0.01	-0.92**
	[0.230]	[0.258]	[0.353]
Dummy_Fragile	-0.89**	0.05	-0.93
	[0.346]	[0.388]	[0.532]
Constant	3.41*	-1.60	5.01*
	[1.582]	[1.774]	[2.433]
Observations	24	24	24
R-squared	0.623	0.503	0.591

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

The results in the final column confirm our hypothesis that having an inflation target and better macroeconomic management (as measured by the CPIA Macro index) is associated with a smaller wedge between the persistence of food inflation and NF/NF inflation. Results in columns one and two indicate that the decrease in the wedge is driven by the negative correlation between these institutional variables and food persistence. This suggests that improvements in monetary policy management may, through better anchoring of inflation expectations, lead to food price shocks being considered transitory.

Only two of the controls are statistically significant. First, more imports from China are associated with a lower wedge. This is driven by more persistent NF/NF inflation. Given imports from China will be largely nonfood imports, we would expect that increasing the amount of imports from China is likely to increase the persistence of NF/NF inflation. Second, having an exchange rate peg is also associated with a lower wedge. This is driven by less persistent food inflation. Exchange rate pegs can promote price stability (Ghosh et al., 1996) and in a similar way to the effect of having an inflation target, a peg can therefore help anchor inflation expectations leading food price

shocks to be considered transitory. After controlling for the CPIA macro, share of Chinese imports, inflation targeting and the exchange rate peg dummies, remaining structural variables were not statistically significant possibly also due to the small sample size or collinearity with CPIA macro and other variables.

We therefore conclude that shocks to food prices were at least as persistent as shocks to NF/NF prices in SSA during 2000-16. However, since 2009, for the majority of countries in SSA, shocks to food prices are less persistent than shocks to NF/NF prices. Furthermore, we find that improved macroeconomic management, in particular, policies promoting price stability and anchoring inflation expectations reduce the persistence of food inflation relative to NF/NF inflation.

D. Transmission Mechanism To and From Food Prices

We next test for potential second-order effects of food inflation in order to ascertain whether food inflation drives NF/NF inflation. Clearly, if food inflation drove NF/NF inflation significantly, then ignoring food inflation could lead to misguided monetary policy. We use Granger-causality tests between food and NF/NF inflation and find that the second-order effects from food inflation is limited.[18] Empirical tests suggest that in only a fifth of the sample there is one-way Granger-causality from food to NF/NF inflation (Annex 2 Table A.12). In another fifth of the sample, the Granger causation runs both ways.

The monetary policy framework does not seem to make a difference, with food inflation Granger-causing NF/NF inflation both in countries operating a form of forward-looking monetary policy framework (such as Kenya and South Africa), and in countries with exchange rate pegs (such as Cameroon, Gabon, and Mali, which are part of regional currency unions).

We conclude that neither food inflation nor NF/NF inflation drives the other in SSA.[19]

Recapping, the findings presented in this section suggest the following for SSA:

- Average food inflation is consistently higher than NF/NF inflation during 2000-16.
- Food inflation is on average more volatile than NF/NF inflation throughout 2000-16.
- Food price shocks have been at least as persistent as NF/NF price shocks on average during 2000-16. However, since 2009, the persistence of food price shocks has declined markedly for the majority of countries in SSA. Findings suggest that improved central bank credibility and monetary policy management have played an important role. Indeed, central banks across have been modernizing and building credibility of late (Ajakaiye and O'Connell, 2011; IMF, 2015).

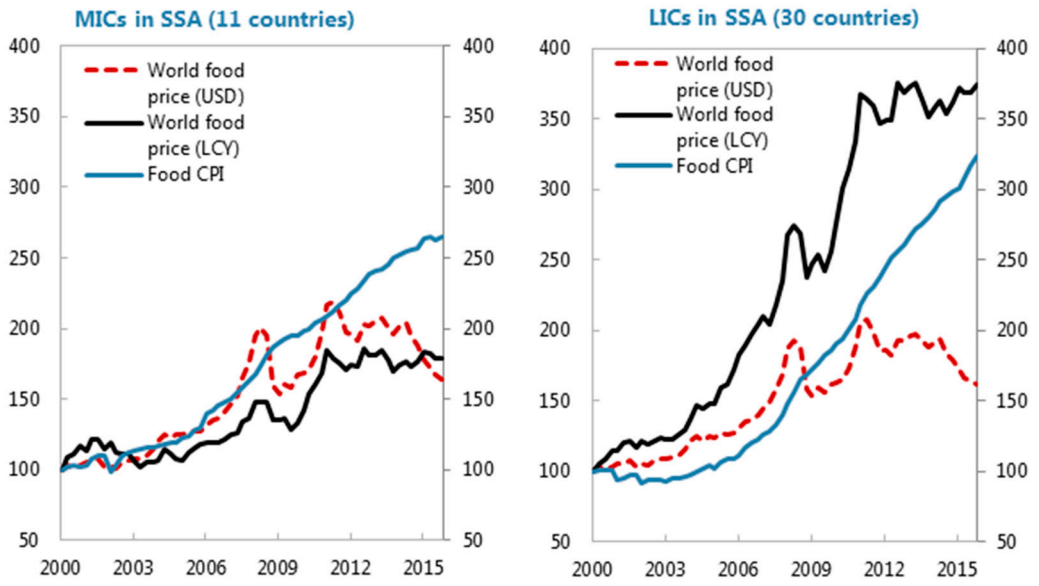
[18] We use a vector auto regression of monthly food inflation on monthly NF/NF inflation with six lags and monthly time dummies to control for seasonality.

[19] These results are robust to changing the time horizon from 2000-2016 to 2009-2016.

IV. DRIVERS OF FOOD PRICES IN SSA

Having assessed some of the key characteristics of food inflation in SSA, we next assess the external and structural drivers of food prices in SSA during 2000-16. While domestic food prices in SSA countries have been correlated with global food prices, the strength of the correlation seems to have weakened markedly in recent years. Indeed, domestic food prices in SSA have continued to increase at a rapid pace lately, despite international food prices having plateaued since 2010 (Figure IV.1).[20] The figure therefore suggests that at least part of the reason for rising food prices is domestically driven. The domestic food price increase has been particularly pronounced in LICs, although this appears to be driven, in part, by movements in exchange rates. Indeed, we found in the previous section that exchange rate pegs could guard against such movements and hence reduce the persistence of food inflation. The next section explores the external drivers systematically.

Figure IV.1: Domestic and World Food Price Developments



Source: Author calculations.

[20] To calculate the world food prices in local currency, we use international prices (in US$) for the nine food subcomponents (meat, fish, milk and eggs, bakery, vegetables, fruits, sugar, oils, and coffee) and country-specific weights to compute the equivalent world market price of the domestic food consumption basket (in US$)—that is, the price that a consumer of that country would pay if they were to buy that commodity basket in the world market. We then convert these into domestic currency using each country's exchange rate. Given data availability, we use the food weights of 20 out of 41 countries from our second dataset (Annex 2 Table A.3). The mean weights of LICs and MICs from these 20 countries is then applied to all the 41 countries in our first dataset.

(continued…)

A. External Drivers of Food Inflation in SSA

This section quantifies pass-throughs from world food and fuel inflation, and exchange rate depreciation to domestic food inflation in SSA. Given the limited time span, the analysis is based on the full sample only. We estimate a country-by-country regression of quarterly domestic food inflation on current and 4 lags of: quarterly world food inflation; quarterly world fuel price inflation; and quarterly nominal exchange rate depreciation[21] and control for 4 lags of domestic food inflation. We also include a time trend and quarterly dummies to control for seasonal variation. The regression is estimated using the following equation:

$$\pi_t^{DOM} = \sum_{i=1}^{4} \beta_i \pi_{t-i}^{DOM} + \sum_{i=0}^{4} \gamma_i \pi_{t-i}^{INT} + \sum_{i=0}^{4} \delta_i F_{t-i}^{INT} + \sum_{i=0}^{4} \kappa_i E_{t-i}^{USD} + \sum_{i=1}^{4} \rho_i Q_{i,t} + t + \varepsilon_t \qquad (2)$$

where π_t^{DOM} is annualized quarterly domestic food inflation at t, π_t^{INT} is annualized quarterly world food inflation at time t, F_t^{INT} is annualized quarterly world fuel inflation at time t, and E_t^{USD} denotes the annualized quarterly nominal depreciation of domestic currency with respect to the US$ at time t. $Q_{i,t}$ represents quarterly time dummies and t reflects the linear time trend. The pass-throughs from world food inflation, world fuel inflation, and exchange rates to domestic food inflation is computed as the sum of the coefficients on world food inflation, world fuel inflation, and nominal exchange rate depreciations, respectively.[22]

The average pass-throughs to domestic food inflation from world food inflation, fuel inflation, and exchange rate depreciation were 32, 2, and 17 percent, respectively (Table IV.1).[23] Country-specific pass-throughs suggest that over one third of the countries have statistically significant pass-throughs from world food inflation and exchange rate depreciation, while less than ten percent have statistically significant pass-through from world fuel inflation (Annex 2 Table A.8).

[21] World food prices in US$ are calculated for the nine food subcomponents using country-specific weights to compute the equivalent world market price of the domestic food consumption basket. World fuel prices are in US$ and the exchange rate is the value of US$ in local currency. The specification is similar to Furceri et al (2015).

[22] The pass through regressions could benefit from other control variables including time-varying international food markup in each country. Yet this is not available quarterly for our sample of countries.

[23] A world food inflation pass-through of 32% indicates that for a 100% increase in world food prices in a given year, domestic food prices would increase by 32% within that year.

Table IV.1: Pass-Through Coefficients by Type – Whole Sample

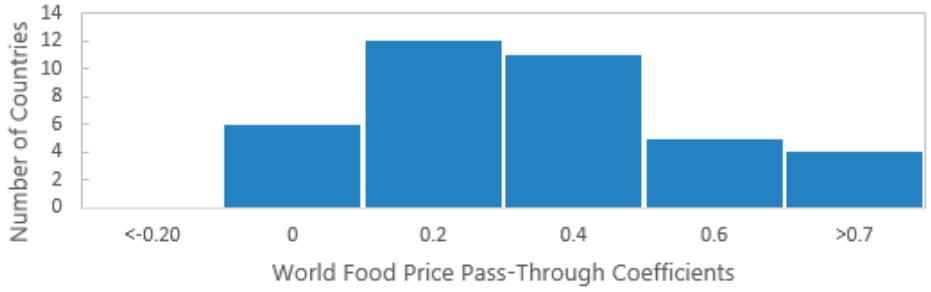
	World Food Price Pass-Through	World Fuel Price Pass-Through	Exchange Rate Pass-Through
Average of total sample	32%	2%	17%
Average of statistically significant results	61%	7%	43%
Percentage of results statistically significant	34%	7%	37%

Source: Author calculations

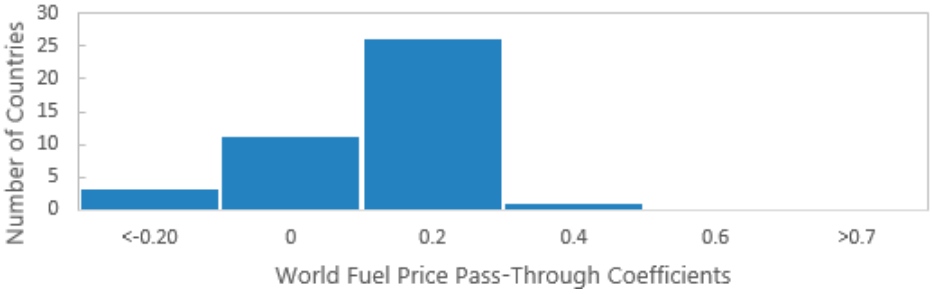
The distribution of the pass-through coefficients for world food prices is broadly centered between 0 and 40 percent, with many countries having a higher pass-through than this (Figure IV.2 Panel A). All but one of the pass-through coefficients for world fuel prices below 20 percent (Figure IV.2 Panel B). The pass-through coefficients for exchange rates are similar to world food prices and broadly centered between 0 and 40 percent with many countries having a higher pass-through.

Figure IV.2: Distribution of Pass-Through Coefficients

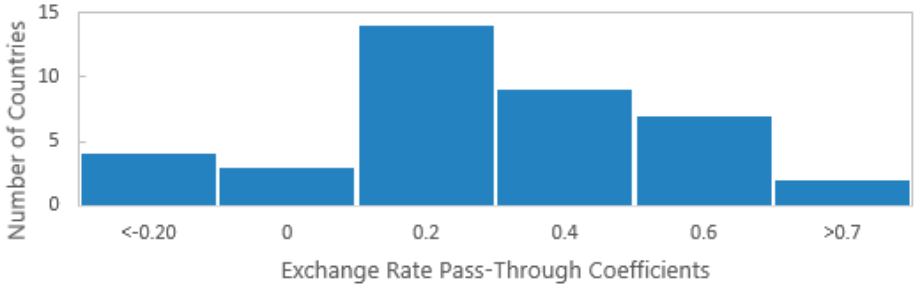
Panel A – World Food Price Pass-Through



Panel B – World Fuel Price Pass-Through



Panel C – Exchange Rate Pass-Through



Source: Author calculations

These estimated pass-through coefficients, which are similar in magnitude to the results for AEs and EMs,[24] suggest that there is incomplete pass-through in SSA from world food and fuel prices, and exchange rates to domestic food prices. We further our analysis by exploring potential structural and domestic drivers of food inflation in the next section.

B. Structural Drivers of Food Inflation SSA

The dataset for 20 SSA countries with detailed information on food weights for nine food subcomponents suggests that higher food inflation is broadly driven by fresh (and non-tradable) food items across SSA, including in both MICs and LICs (Table IV.2). Furthermore, the difference between fresh food inflation and non-fresh food inflation is greatest for LICs at 2.7 percentage points. This also suggests that the wedge between food and NF/NF inflation is being driven to a great extent by fresh food items. Moreover, country-specific data shows that around three quarters of the countries in our second dataset have fresh food inflation greater than non-fresh food inflation (Annex 2 Table A.9).

Table IV.2: Average Inflation for Disaggregated CPI

		Average Inflation (%, QoQ, Annualized)												
	Number of observations	Total food basket	Fresh					Non-Fresh						Fresh minus Non-fresh
			Meat	Fish	Fruit	Vegetables	Total	Milk	Bakery	Sugar	Coffee	Oil	Total	
SSA	674	8.35	8.64	9.46	8.29	9.04	9.25	6.95	7.44	7.86	6.31	7.87	7.31	1.94
MIC	220	6.81	7.09	7.53	6.64	7.14	7.08	6.50	6.82	7.86	6.85	7.15	6.71	0.38
LIC	454	9.09	9.39	10.52	9.21	10.00	10.30	7.20	7.74	7.87	5.99	8.30	7.60	2.70

Source: CPI data from country statistical sources, 20 countries.

Fresh food inflation is also consistently less volatile than non-fresh food inflation (Table IV.3). Country-specific data reveals that for three quarters of the countries in our sample, fresh food inflation is less volatile than non-fresh food inflation (Annex 2 Table A.10).

Table IV.3: Volatility of Disaggregated Inflation

		Volatility (coefficient of variation)												
	Number of observations	Total food basket	Fresh					Non-Fresh						Fresh minus Non-fresh
			Meat	Fish	Fruit	Vegetables	Total	Milk	Bakery	Sugar	Coffee	Oil	Total	
SSA	674	1.66	1.61	1.82	3.31	2.75	1.59	1.99	2.64	3.64	1.68	2.87	2.30	-0.71
MIC	220	1.60	1.85	2.16	3.12	2.56	1.66	2.81	2.28	1.56	1.22	2.71	2.00	-0.33
LIC	454	1.65	1.51	1.67	3.31	2.75	1.54	1.48	2.76	4.48	1.96	2.92	2.40	-0.86

Source: CPI data from country statistical sources, 20 countries.

[24] Box 3.3, IMF (2016).

(continued…)

Next, we use the pass-through regression estimated in equation (2), except with fewer lags[25], on the nine food categories (as well as on the fresh and non-fresh foods composite) for the 20 SSA countries in our second dataset. Two key differences in this regression is that we use country-specific food weights and that domestic food inflation is based solely on the combined inflation of the nine food categories. These nine food categories are broadly representative of the weight of food in the consumption basket and represent about 87% of the food basket on average (Annex 2 Table A.3).

The estimated pass-through from world food and fuel inflation, and nominal exchange rate depreciation to domestic food inflation is 19, 3, and 14 percent, respectively. While these estimates are slightly lower than those from the larger sample the proportion of significant results are higher (Table IV.4). Although of the same magnitude, only 15% of the pass-through coefficients for fresh food were statistically significant (3 countries) while over a third of countries had a statistically significant pass-through to non-fresh foods. The pass-through from exchange rates to fresh food was 10 percent while that to non-fresh food was 24 percent. Both fresh and non-fresh food categories had close to half of the countries possessing a statistically significant pass-through from exchange rates. As in our larger sample, the pass-through from world fuel prices is broadly negligible.[26]

Table IV.4: Disaggregated Pass-Through Coefficients by Type

	Total food basket	Fresh					Non-Fresh					
		Meat	Fish	Fruit	Vegetables	Total	Milk	Bakery	Sugar	Coffee	Oils	Total
Number of countries	20	20	18	15	19	20	19	20	15	12	18	20
World Food Price Pass-Through	19%	9%	17%	20%	21%	19%	7%	13%	-4%	2%	35%	20%
	(0.35)	(0.10)	(0.17)	(0.13)	(0.16)	(0.15)	(0.16)	(0.30)	(0.07)	(0.17)	(0.50)	(0.35)
World Fuel Price Pass-Through	3%	6%	7%	5%	-4%	2%	3%	5%	-6%	-8%	8%	3%
	(0.15)	(0.10)	(0.11)	(0.00)	(0.00)	(0.05)	(0.05)	(0.10)	(0.00)	(0.08)	(0.11)	(0.2)
Exchange Rate Pass-Through	14%	19%	4%	34%	9%	10%	11%	17%	92%	15%	11%	24%
	(0.45)	(0.20)	(0.33)	(0.47)	(0.16)	(0.40)	(0.26)	(0.35)	(0.40)	(0.17)	(0.33)	(0.45)

Notes: Numbers in parentheses indicate the proportion of the sample that was significant. For example, in relation to meat, 10% of the world food price pass-through coefficients were significant. Ethiopia was excluded in calculating the average of exchange rate coefficients for total food basket, total fresh, total non-fresh, meat, vegetables, milk, and bakery given it was an outlier. Ghana was excluded in calculating the average of the world food price coefficient for sugar given it was an outlier.
Source: Author calculations

[25] We reduced the number of lags to 1 to ensure sufficient degrees of freedom as the sample is shorter for the detailed food sample.

[26] Summary results in Table IV.4 is based on simple averages for the 20 countries excluding the outliers as highlighted in the note to the table.

The findings in this section suggest that external drivers alone cannot explain all the variation in domestic food inflation in SSA and that structural and domestic drivers also play an important role. Indeed, we find that food inflation has been driven by food that is largely non-tradable (i.e., fresh food). We also find that there is more pass-through to non-fresh food than to fresh food. This suggests incomplete/limited tradability for perishable food items in SSA. This could reflect a number of factors such as shortage of storage capacity for perishable food, and/or inadequate transport infrastructure.

V. CONCLUSIONS

This paper describes food inflation trends in SSA from 2000 to 2016 and explores its causes, in particular why it was high and persistent, as well as policy implications.

We find that over the period from 2000 to 2016, food inflation has been on average 1.8 percentage points per year higher than NF/NF inflation; food inflation has been more volatile than NF/NF inflation; and food inflation has been at least as persistent as NF/NF inflation. Excluding the 2007-08 global food price surge (i.e., since 2009) food inflation has, on average, become less persistent. In addition, the differences across the two time periods also masks considerable heterogeneity between different economies in SSA. For example, while on average in SSA food inflation is significantly less persistent than NF/NF inflation from 2009 to 2016, for many countries food inflation has become more persistent.

Our findings also suggest that in countries where central banks have adopted forward-looking monetary policy frameworks, food inflation tends to be less persistent than NF/NF inflation. We also find that improved macroeconomic management is associated with food inflation being less persistent than NF/NF inflation. Moreover, we find that increasing integration with China as captured by the share of imports from China, reduces the persistence of food inflation relative to NF/NF inflation.

Granger causality tests on food and NF/NF inflation do not yield a definitive conclusion on whether food inflation causes NF/NF inflation across SSA. Nevertheless, in around a fifth of the sample of 41 countries, there is a one-way causality from food inflation to NF/NF inflation.

Taken together, these findings suggest that, given the high level of food inflation and its prominence in the consumption basket, using measures of core inflation that exclude food prices to assess the monetary stance would not be appropriate. This is especially the case in countries where persistence of food prices is as high as that of NF/NF prices (currently over a third of SSA countries).

We also documented that over a third of SSA countries have experienced statistically significant pass-through to domestic food prices from world food prices and exchange rates with an average

pass-through of 32 and 17 percent, respectively. We find that higher food inflation is largely driven by fresh (and non-tradable) food items, and that more countries have statistically significant pass-through from world food prices and exchanges rates to non-fresh food prices than to fresh food prices.

The analysis in the paper has two important policies implications. First, central banks and fiscal authorities in SSA and other LICs should take food prices into consideration when assessing the appropriate stance of monetary and fiscal policy Second, improving the tradability of food—for example, by reducing tariffs and improving transport and storage infrastructure—and structural measures to increase productivity in the agricultural sector could decrease food price pressures and therefore improve welfare.

The relationship between improved central bank credibility and the persistence of food inflation would be an interesting area to explore further, particularly as central banks in SSA and other LICs have modernized rapidly over the last few decades. Moreover, exploring the demand and supply determinants of food inflation in LICs would also be an important avenue for future research, and help with more precise policy prescriptions for SSA and other LICs.

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ANNEX I. NONPARAMETRIC ESTIMATION OF PERSISTENCE

We utilize the nonparametric approach for measuring persistence developed by Dias and Marques (2010). Their measure of persistence relies on the idea that there is a relationship between persistence and mean reversion. Broadly speaking, following a shock, persistent series converge to their long-run mean more slowly than less persistent series. Persistent series therefore exhibit a lower level of mean reversion than non-persistent series.

The authors then define persistence, denoted γ, as the unconditional probability of a stationary stochastic process not crossing its mean in period t. Simply put, γ measures how infrequently a particular stationary process crosses its mean. Formally, γ is defined as the following:

$$\gamma = P\{[(y_t - \mu) > 0 \wedge (y_{t-1} - \mu)] \vee [(y_t - \mu) < 0 \wedge (y_{t-1} - \mu) < 0]\} \qquad (1)$$

Where y_t is the series y in period t and μ is its mean.

Given the data generating process (DGP) is unknown, a nonparametric and unbiased estimator for γ is the following[27]:

$$\hat{\gamma} = 1 - \frac{n}{T} \qquad (2)$$

Where n is the number of times y_t crosses the mean during a time interval with T+1 observations.

Unlike using SARC estimates of persistence, $\hat{\gamma}$ is, by construction, between zero and one. If $\hat{\gamma}$ is 0.5 then this indicates zero persistence. Whilst above and below 0.5 indicate positive and negative persistence, respectively. Furthermore, SARC estimates require the DGP to follow a pure autoregressive process while, after assuming stationarity, γ is independent of underlying DGP. Therefore, this serves as a useful robustness check to the conclusions reached in Section III.C (i.e., that since 2009, the persistence of food inflation has fallen relative to the persistence of NF/NF inflation).

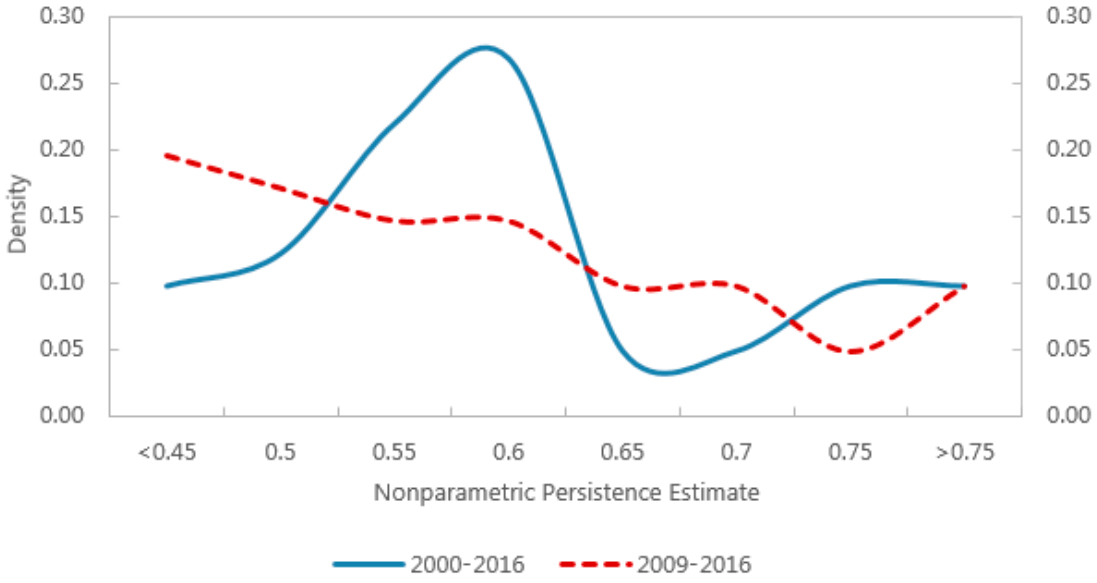
In Section III.C, we showed that the distribution of SARC estimates for food inflation had shifted leftwards while that of NF/NF had broadly flattened. Indeed, plotting the distribution for the nonparametric estimates of the persistence of food inflation, we find a similar trend for the persistence of food inflation as the distribution has skewed leftwards (Figure A.1 Panel A). Moreover, the figure shows that most of the mass of the distribution is around or to the left of 0.5 indicating that food inflation has little or no persistence in SSA. There does not seem to be an

[27] The estimator is only unbiased when the mean of the series is known. However, even if the mean is unknown, the authors show that the estimator remains consistent.

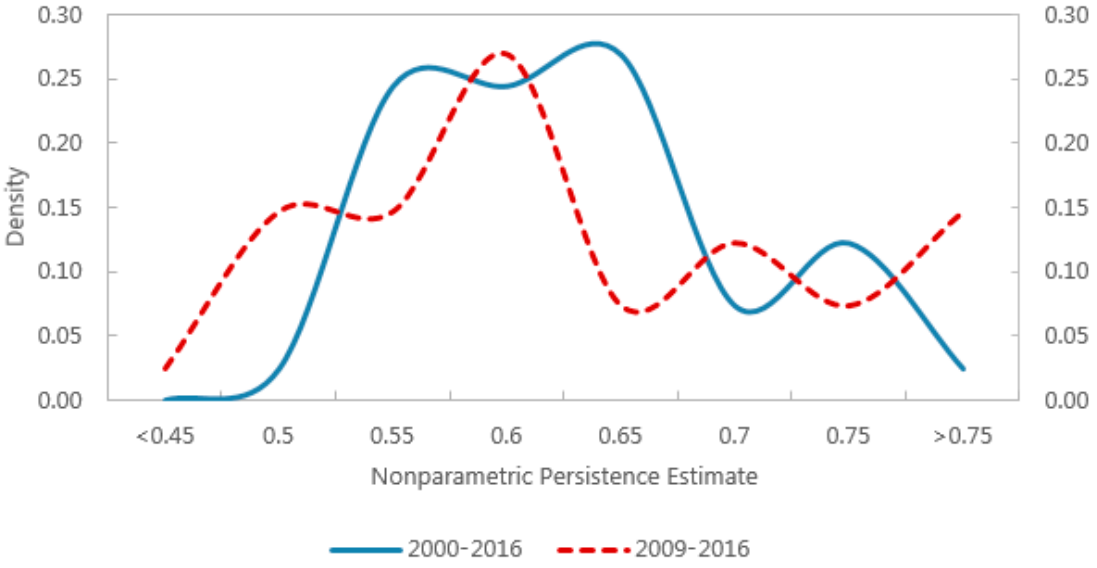
obvious change in the distribution for the NF/NF estimates. Taken together, this suggests that the persistence of food inflation relative to NF/NF inflation has fallen since 2009.

Figure A.1: Distribution of Inflation Persistence (Nonparametric Estimates) across SSA

Panel A – Food Inflation Nonparametric Estimates



Panel B – NF/NF Inflation Nonparametric Estimates



Notes: Inflation used for these calculations is QoQ, annualized.
Source: Author calculations

ANNEX II. – TABLES

Table A.1: Source and Definitions of Variables

Definition	Source	Notes	Transformation
Consumer Price Index	Country statistical sources	Available for 41 countries	Use monthly data to produce quarterly inflation rates
Fuel and Food Prices	Country statistical sources	Available for 41 countries	Use monthly data to produce quarterly inflation rates
Consumer Price Index (disaggregated)	Country statistical sources	Available for 20 countries (a subset of the 41 country sample) and compiled into 9 categories: Bakery, Coffee, Fish, Fruit, Meat, Milk, Oils, Sugar, and Vegetable prices.	Use monthly data to produce quarterly inflation rates
Food weights	Country statistical sources	Available for 20 countries (a subset of the 41 country sample) and compiled into 9 categories: Bakery, Coffee, Fish, Fruit, Meat, Milk, Oils, Sugar, and Vegetable prices. Weight of total food (not disaggregated) available for 41 countries.	One set of weights per country and therefore time invariant.
World Food Prices (USD)	Food and Agriculture Organization (FAO), IMF Primary Commodity Prices, and Haver Analytics	FAO data for Bakery, Meat, Milk, Oils, and Sugar prices. IMF data for Coffee, Fish, and Fruit prices. Haver Analytics data for US Vegetable prices.	Use monthly data to produce quarterly inflation rates
World Fuel Prices (USD)	IMF Primary Commodity Prices	Gasoline, Regular, unleaded, US Gulf, US cents per gallon	Use monthly data to produce quarterly inflation rates
Structural Variables	World Development Indicators (WDI), IMF World Economic Outlook (WEO), IMF Direction of Trade Statistics (DOTS), Jácome et al (2012), and Emergency Events Database (EM-DAT)	The following structural variables are from the WDI: • Logistics index - 1 is low (i.e. poor logistics performance), 5 is high. • Tariff rate - applied tariffs, simple mean, all products (%) • CPIA Fiscal - 1 is low (i.e. poor fiscal policy), 6 is high. • CPIA Macro - 1 is low (i.e. poor macroeconomic management) , 6 is high. • CPIA Trade - 1 is low (i.e. restrictive trade barriers), 6 is high (i.e., free trade). • Food Trade Balance - Expressed as a percentage of merchandise trade. Calculated as the difference between food exports and food imports. The remaining structural variables are from various data sources: • PPP GDP per capita is from IMF WEO data. It is expressed in units of a thousand USD. • CB loans to Governments is from Jácome et al (2012). It is an index where 1 is low (i.e. more restrictions on central bank lending to the government) and 6 is high (i.e. fewer restrictions). • Imports from China is from IMF DOTS data. It is expressed as a percentage of total imports from the world. • Total droughts is from EM-DAT. It is expressed as the total number of droughts from 2000-2015.	For all variables except total droughts, we take an average from available annual data from 2000-2015 to get one observation per country. For total droughts we use the number of droughts in each year between 2000 and 2015 and sum those together to form Total Droughts.
Exchange Rates	IMF WEO database	Available for 41 countries with respect to USD	Use monthly data to produce quarterly inflation rates

Table A.2: Definitions of Dummy Variables

Country	SSA	WAEMU	CEMAC	EAC 5	Oil Exporter	MIC	LIC	Fragile	Exchange Rate Peg	Inflation Target
Angola	x				x	x			x	
Benin	x	x					x		x	
Botswana	x					x			x	
Burkina Faso	x	x					x		x	
Burundi	x			x			x	x	x	
Cabo Verde	x					x			x	
Cameroon	x		x		x		x		x	
Central African Republic	x		x				x	x	x	
Chad	x		x				x		x	
Comoros	x						x	x	x	
Congo	x		x		x	x			x	
Côte d'Ivoire	x	x					x	x	x	
Democratic Republic of Congo	x						x	x	x	
Ethiopia	x						x		x	
Gabon	x		x		x	x			x	
Gambia	x						x	x		
Ghana	x						x			x
Guinea	x						x	x	x	
Guinea Bissau	x	x					x	x	x	
Kenya	x			x			x			x
Lesotho	x						x		x	
Liberia	x						x	x	x	
Madagascar	x						x	x		
Malawi	x						x	x		
Mali	x	x					x		x	
Mauritius	x					x				x
Mozambique	x						x			
Namibia	x					x			x	
Niger	x	x					x		x	
Nigeria	x				x	x			x	
Rwanda	x			x			x		x	
São Tomé and Príncipe	x						x	x	x	
Senegal	x	x					x		x	
Seychelles	x					x				
Sierra Leone	x						x			
South Africa	x					x				x
Swaziland	x					x			x	
Tanzania	x			x			x			
Togo	x	x					x	x	x	
Uganda	x			x			x			x
Zambia	x						x			
Total	**41**	**8**	**5**	**5**	**5**	**11**	**30**	**13**	**28**	**5**

Notes: Low income country (LIC) defined as a country with PPP GDP per capita below 5,000 US$

Table A.3: Country Food Weights Disaggregated (rescaled)

Country	Meat	Fish	Milk	Bakery	Fruit	Vegetable	Sugar	Coffee	Oil	Share of total food
Benin	7.7	17.3	7.1	29.9	2.8	22.0	2.1	0.9	10.1	92%
Botswana	17.9	1.1	12.5	37.1	3.8	11.1	7.7	3.6	5.1	80%
Central African Republic	43.2	.	15.2	8.1	1.3	32.3	.	.	.	79%
Côte d'Ivoire	21.5	20.2	7.7	27.0	1.9	11.9	.	.	9.8	76%
Ethiopia	9.5	.	4.8	42.9	.	31.0	2.4	.	9.5	82%
Gabon	25.7	15.9	8.7	24.0	.	19.1	.	.	6.5	85%
Gambia	26.9	7.5	4.8	25.7	4.3	14.8	4.7	.	11.3	91%
Ghana	9.2	23.2	4.4	25.8	6.9	21.0	2.3	2.0	5.2	95%
Guinea	13.8	19.3	8.9	31.4	.	14.2	.	.	12.5	75%
Kenya	16.4	3.8	14.3	25.6	8.8	18.5	6.2	1.4	4.9	96%
Lesotho	12.1	1.1	8.4	50.7	1.7	14.4	5.0	1.2	5.5	93%
Madagascar	19.0	4.9	6.0	41.8	3.9	13.4	3.7	2.1	5.2	98%
Namibia	24.4	5.6	8.1	33.5	2.3	8.5	10.0	2.1	5.4	88%
Rwanda	5.7	4.3	.	19.6	.	70.4	.	.	.	73%
São Tomé and Príncipe	8.2	20.3	5.6	21.2	.	.	4.7	0.9	11.3	98%
Seychelles	19.6	16.7	11.6	19.0	6.3	16.4	5.8	0.0	4.6	77%
South Africa	36.2	2.9	13.8	28.2	1.8	4.8	5.2	2.5	4.4	87%
Tanzania	12.9	14.2	2.5	27.7	9.0	17.2	8.1	2.3	6.0	94%
Uganda	13.1	6.1	7.4	18.9	15.4	23.4	9.9	0.9	4.8	89%
Zambia	16.2	17.5	4.6	28.6	3.5	14.6	6.8	0.4	7.8	96%
Mean	**18.0**	**11.2**	**8.2**	**28.3**	**4.9**	**19.9**	**5.6**	**1.7**	**7.2**	**87%**
Standard Deviation	**9.7**	**7.6**	**3.7**	**9.6**	**3.8**	**14.0**	**2.5**	**0.9**	**2.8**	**0.08**
Mean for middle income	**24.0**	**8.2**	**10.6**	**27.5**	**3.4**	**11.6**	**6.9**	**2.7**	**5.1**	**83%**
Mean for low income	**14.8**	**11.6**	**6.9**	**26.7**	**5.1**	**21.4**	**4.8**	**1.3**	**7.5**	**88%**

Notes: The nine categories of food weights have been rescaled to ensure each sum to 100. These categories do not represent 100% of the food basket in each country but the final column shows they are highly representative nonetheless.
Source: Country statistical sources

Table A.4: Average Inflation Rates (PPP GDP per capita weighted) in SSA and Sub-groups

		Average Inflation (%, QoQ, annualized, PPP GDP per capita weighted average)							
		Time period: 2000-2016				Time period: 2009-2016			
	No. of countries	Headline	Food	NF/NF	Food minus NF/NF	Headline	Food	NF/NF	Food minus NF/NF
SSA	41	6.29	7.10	5.93	1.17	5.32	5.71	5.00	0.71
MIC	11	6.11	6.90	6.03	0.87	5.11	5.41	5.03	0.38
LIC	30	6.69	7.54	5.70	1.84	5.79	6.40	4.94	1.46
WAEMU	8	2.17	3.41	1.61	1.80	1.54	2.36	1.18	1.18
CEMAC	5	2.47	3.47	1.81	1.66	1.91	2.95	1.58	1.37
EAC 5	5	7.14	8.99	5.74	3.25	7.29	9.52	5.53	4.00
Oil Exporters	5	5.48	6.51	5.06	1.45	4.96	5.83	4.61	1.22
Fragile	13	6.51	7.34	5.58	1.76	5.53	6.16	4.45	1.71

Source: Price data from country statistical sources. PPP GDP per capita data from the WEO database.

Table A.5: Average Inflation Rates by Country

Country	CPI data availability		Average Inflation (%, QoQ, annualized)							
			Time period: 2000-2016				Time period: 2009-2016			
	Start	End	Headline	Food	NF/NF	F – NF/NF	Headline	Food	NF/NF	F – NF/NF
Angola	Jan-05	May-16	12.46	14.31	11.77	2.54	12.32	13.03	12.08	0.95
Benin	Jan-00	May-16	2.80	3.69	2.35	1.34	2.09	3.29	1.41	1.88
Botswana	Jan-00	May-16	7.26	7.41	7.20	0.21	5.65	4.46	6.03	-1.57
Burkina Faso	Jan-00	Mar-16	2.52	3.65	2.08	1.56	2.61	1.73	3.44	-1.70
Burundi	Jan-01	Dec-15	8.62	9.05	8.33	0.72	7.85	6.98	8.53	-1.55
Central African Republic	Jan-00	May-16	4.25	4.88	-0.23	5.12	4.61	5.42	-0.67	6.09
Cabo Verde	Jan-00	Apr-16	1.98	1.90	2.05	-0.16	1.17	1.39	1.01	0.39
Cameroon	Jan-00	Dec-14	2.41	3.32	1.66	1.66	2.18	2.65	2.20	0.45
Chad	Jan-06	May-16	2.25	4.10	1.99	2.11	1.09	2.47	1.64	0.83
Comoros	Jan-00	May-15	2.95	3.15	2.70	0.45	1.53	2.52	-0.10	2.61
Congo	Jan-06	Jun-15	3.48	3.71	3.34	0.37	2.30	2.56	1.92	0.65
Côte d'Ivoire	Jan-05	Dec-15	2.24	4.04	1.74	2.30	1.74	2.87	1.39	1.48
Democratic Republic of Congo	Jan-05	Oct-14	15.21	15.69	14.93	0.77	8.55	7.72	10.21	-2.48
Ethiopia	Feb-05	May-16	15.67	16.99	9.22	7.77	13.01	12.61	9.22	3.39
Gabon	Jan-05	Dec-15	2.09	3.28	1.33	1.95	1.76	3.12	1.43	1.70
Gambia	Aug-04	Apr-16	4.79	5.84	2.42	3.41	5.22	6.29	2.63	3.65
Ghana	Jan-00	May-16	14.55	11.71	16.37	-4.66	11.66	7.11	13.86	-6.75
Guinea	Jan-00	May-16	13.88	17.08	11.76	5.32	12.25	14.70	8.38	6.32
Guinea Bissau	Jul-02	Apr-16	1.70	2.46	1.25	1.21	1.18	2.18	0.63	1.55
Kenya	Jan-00	May-16	7.33	9.80	5.28	4.52	7.18	10.13	4.42	5.71
Lesotho	Jan-02	Mar-16	5.86	7.66	4.65	3.02	4.79	6.44	3.56	2.88
Liberia	Dec-05	Apr-16	8.77	10.62	7.63	2.99	8.07	9.03	7.71	1.33
Madagascar	Jan-00	May-16	8.71	8.60	8.64	-0.04	6.81	6.49	6.94	-0.45
Malawi	Jan-01	May-16	14.18	14.58	14.32	0.26	17.02	16.98	19.57	-2.59
Mali	Jan-06	Apr-16	2.23	3.44	1.28	2.16	1.48	2.35	0.72	1.63
Mauritius	Jul-02	Apr-16	4.73	6.36	4.31	2.05	3.30	4.19	3.27	0.91
Mozambique	Jan-00	Apr-16	8.54	10.65	6.93	3.71	6.71	9.35	3.90	5.45
Namibia	Jan-02	Jan-16	5.84	7.24	5.71	1.53	5.33	6.02	4.66	1.36
Niger	Jan-00	Apr-16	2.10	3.74	1.12	2.62	0.29	1.03	-0.32	1.35
Nigeria	Jan-00	May-16	11.72	12.21	12.44	-0.23	10.72	11.10	10.03	1.07
Rwanda	Jan-04	Apr-16	6.86	8.34	5.35	2.99	4.27	5.82	3.34	2.48
São Tomé and Príncipe	Jan-00	Apr-16	12.64	13.43	10.89	2.54	9.35	10.59	6.14	4.45
Senegal	Jan-02	Jan-16	1.39	2.56	0.89	1.67	0.57	1.88	0.13	1.75
Seychelles	Jan-02	Jan-16	7.35	7.34	7.16	0.18	6.08	6.10	5.53	0.57
Sierra Leone	Jan-00	Apr-16	9.22	10.63	8.90	1.74	11.54	12.31	9.03	3.28
South Africa	Jan-02	Apr-16	7.42	7.28	9.38	-2.11	6.35	6.29	8.06	-1.77
Swaziland	Jan-00	Dec-15	6.47	9.25	5.68	3.57	5.70	5.73	5.50	0.23
Tanzania	Jan-02	Apr-16	7.16	9.66	5.31	4.35	8.13	10.50	5.31	5.20
Togo	Jan-00	May-16	2.41	3.40	2.12	1.28	2.03	2.52	1.83	0.68
Uganda	Jan-00	Apr-16	6.49	7.28	6.39	0.89	8.76	11.50	8.36	3.14
Zambia	Jan-03	Dec-15	10.65	9.79	8.70	1.09	8.65	8.33	8.70	-0.37

Notes: F-NF/NF refers to food inflation minus non-food non-fuel inflation
Source: Country statistical sources

Table A.6: Volatility of Inflation Rates by Country

Country	CPI data availability		Volatility (coefficient of variation)							
			Time period: 2000-2016				Time period: 2009-2016			
	Start	End	Headline	Food	NF/NF	F – NF/NF	Headline	Food	NF/NF	F – NF/NF
Angola	Jan-05	May-16	0.44	0.38	0.52	-0.13	0.54	0.45	0.62	-0.17
Benin	Jan-00	May-16	2.06	3.64	2.35	1.29	2.73	3.93	4.74	-0.81
Botswana	Jan-00	May-16	0.59	0.91	0.63	0.28	0.57	0.81	0.58	0.24
Burkina Faso	Jan-00	Mar-16	3.11	5.26	5.30	-0.04	2.91	7.60	2.98	4.62
Burundi	Jan-01	Dec-15	1.27	1.96	1.12	0.84	1.15	1.87	1.08	0.78
Central African Republic	Jan-00	May-16	1.80	2.23	-26.62	28.85	1.73	2.02	-10.03	12.06
Cabo Verde	Jan-00	Apr-16	2.44	3.51	2.09	1.42	2.99	3.92	3.33	0.58
Cameroon	Jan-00	Dec-14	0.67	1.82	2.81	-0.99	0.42	1.70	1.65	0.04
Chad	Jan-06	May-16	4.32	6.20	16.72	-10.52	5.56	8.43	16.39	-7.97
Comoros	Jan-00	May-15	4.46	5.36	7.21	-1.86	7.52	7.10	-139.31	146.40
Congo	Jan-06	Jun-15	2.29	3.58	2.66	0.92	3.18	5.03	3.55	1.48
Côte d'Ivoire	Jan-05	Dec-15	2.50	3.35	2.23	1.12	2.53	4.65	1.51	3.14
Democratic Republic of Congo	Jan-05	Oct-14	1.11	1.23	1.44	-0.21	1.26	1.71	2.08	-0.37
Ethiopia	Feb-05	May-16	1.20	1.60	0.34	1.26	0.92	1.46	0.34	1.12
Gabon	Jan-05	Dec-15	2.30	2.18	4.23	-2.05	2.44	2.24	3.53	-1.29
Gambia	Aug-04	Apr-16	0.66	0.80	1.51	-0.70	0.39	0.43	1.43	-1.00
Ghana	Jan-00	May-16	0.87	1.22	1.04	0.17	0.86	2.12	0.75	1.37
Guinea	Jan-00	May-16	0.85	0.82	1.05	-0.22	0.38	0.46	0.65	-0.19
Guinea Bissau	Jul-02	Apr-16	4.80	5.50	5.06	0.44	4.68	5.36	7.62	-2.26
Kenya	Jan-00	May-16	0.93	1.29	1.15	0.13	0.79	0.93	1.10	-0.16
Lesotho	Jan-02	Mar-16	0.53	0.79	0.59	0.20	0.46	0.60	0.61	-0.01
Liberia	Dec-05	Apr-16	1.34	1.77	1.28	0.49	1.29	1.70	1.46	0.24
Madagascar	Jan-00	May-16	1.26	1.86	1.25	0.61	0.68	1.18	0.72	0.45
Malawi	Jan-01	May-16	1.55	2.91	1.78	1.12	1.63	2.94	0.95	1.98
Mali	Jan-06	Apr-16	3.63	4.51	2.90	1.62	4.93	5.97	4.33	1.64
Mauritius	Jul-02	Apr-16	1.06	1.85	1.01	0.84	1.48	3.44	1.14	2.30
Mozambique	Jan-00	Apr-16	1.12	1.63	1.16	0.47	1.66	2.05	0.94	1.11
Namibia	Jan-02	Jan-16	0.63	0.83	0.64	0.18	0.54	0.70	0.58	0.13
Niger	Jan-00	Apr-16	4.41	4.76	4.73	0.03	26.43	14.45	-15.52	29.97
Nigeria	Jan-00	May-16	0.79	1.27	1.28	-0.01	0.39	0.40	0.50	-0.09
Rwanda	Jan-04	Apr-16	1.40	2.06	1.15	0.92	2.27	3.05	1.45	1.60
São Tomé and Príncipe	Jan-00	Apr-16	0.67	1.02	1.01	0.01	0.49	0.62	1.09	-0.47
Senegal	Jan-02	Jan-16	4.74	6.14	3.48	2.67	11.50	9.47	10.10	-0.63
Seychelles	Jan-02	Jan-16	0.85	0.86	1.02	-0.16	0.74	0.75	1.01	-0.26
Sierra Leone	Jan-00	Apr-16	0.88	1.11	0.84	0.27	0.51	0.72	0.86	-0.14
South Africa	Jan-02	Apr-16	0.93	0.91	1.04	-0.13	1.02	0.98	1.28	-0.30
Swaziland	Jan-00	Dec-15	0.73	1.08	0.92	0.16	0.53	1.13	0.66	0.46
Tanzania	Jan-02	Apr-16	0.89	1.39	0.72	0.67	0.72	1.08	0.72	0.36
Togo	Jan-00	May-16	2.83	5.85	1.98	3.87	1.87	4.70	1.33	3.37
Uganda	Jan-00	Apr-16	1.59	3.20	0.89	2.30	1.55	2.62	0.90	1.72
Zambia	Jan-03	Dec-15	0.73	1.11	0.81	0.30	0.88	1.21	0.81	0.39

Notes: F-NF/NF refers to food inflation minus non-food non-fuel inflation
Source: Country statistical sources

Table A.7: Persistence of Inflation Rates by Country

Country	Inflation Persistence - SARC Estimates			
	Time Period: 2000-2016		Time Period: 2009-2016	
	Food	NF/NF	Food	NF/NF
Angola	0.87	0.88	0.78	0.95
Benin	-0.15	0.09	-0.50	0.17
Botswana	0.59	0.40	0.75	0.92
Burkina Faso	0.14	0.00	0.23	0.08
Burundi	0.04	-0.03	-0.23	0.27
Central African Republic	-0.11	-0.37	0.04	-0.47
Cabo Verde	0.38	0.23	0.26	0.80
Cameroon	0.24	0.06	-0.02	-0.60
Chad	0.02	-0.56	-0.26	-0.31
Comoros	-0.68	-0.66	-0.93	1.08
Congo	-0.39	-0.38	-0.13	-0.54
Côte d'Ivoire	-0.01	-0.24	-0.04	0.31
Democratic Republic of Congo	0.71	0.69	0.12	0.52
Ethiopia	0.36	-0.05	0.59	-0.05
Gabon	-0.20	-0.02	-0.71	-0.02
Gambia	-0.50	0.22	-0.26	0.42
Ghana	0.70	0.14	0.29	0.84
Guinea	0.66	0.49	0.73	0.60
Guinea Bissau	0.15	0.10	-0.21	-0.53
Kenya	0.13	0.24	-0.04	0.55
Lesotho	0.61	0.55	0.65	-0.01
Liberia	0.01	-0.23	-0.49	-0.48
Madagascar	0.02	-0.06	-0.11	0.00
Malawi	0.80	0.31	0.73	0.45
Mali	0.23	0.24	0.14	0.25
Mauritius	0.25	0.31	-2.36	0.55
Mozambique	0.04	0.53	0.23	0.35
Namibia	0.60	0.53	-0.03	0.08
Niger	0.35	0.24	-0.27	-0.09
Nigeria	0.03	-0.06	0.44	0.46
Rwanda	-0.12	0.56	0.07	0.06
São Tomé and Principe	0.63	0.27	0.51	-0.28
Senegal	0.15	0.52	-0.18	0.57
Seychelles	0.57	0.61	-0.05	-0.04
Sierra Leone	0.33	0.49	0.96	0.64
South Africa	0.58	0.05	0.16	-0.56
Swaziland	0.43	0.50	0.18	-0.95
Tanzania	0.35	0.74	0.55	0.74
Togo	0.21	0.01	-0.29	0.41
Uganda	0.42	0.71	0.19	0.65
Zambia	0.57	-1.11	1.86	-1.11

Notes: Inflation used for these calculations is QoQ, annualized. SARC refers to the sum of autoregressive coefficients and provides an estimate of the level of persistence.
Source: Author calculations.

Table A.8: Pass-Through Coefficients by Type and by Country

Country	Observations	World Food Price Pass-Through	World Fuel Price Pass-Through	Exchange Rate Pass-Through
Angola	39	0.11	-0.03	0.18
Benin	59	0.64*	0.00	0.41
Botswana	59	0.11	0.02	0.17**
Burkina Faso	59	0.32	0.10	0.16
Burundi	55	0.33	0.01	0.56*
Cabo Verde	59	0.20**	0.06	0.42***
Cameroon	55	0.24*	0.01	0.31**
Central African Republic	59	-0.10	0.09	0.06
Chad	36	-0.18	0.15	-0.26
Comoros	57	0.33	-0.08	-0.13
Congo	33	-0.11	0.20	0.48
Côte d'Ivoire	39	0.92**	-0.13	0.82*
Democratic Republic of Congo	35	0.58	-0.13	0.06
Ethiopia	39	1.23*	0.17	-0.31
Gabon	39	0.14	0.11	0.33
Gambia	41	0.06	-0.06	-0.12
Ghana	59	0.08	0.03	0.12
Guinea	59	0.05	0.10	0.30***
Guinea Bissau	49	0.49	0.02	0.08
Kenya	59	0.30	0.05	0.68**
Lesotho	51	0.15	0.03	0.12
Liberia	36	-0.03	0.29*	0.79
Madagascar	59	0.95**	-0.12	0.65
Malawi	55	-0.10	0.08	0.14
Mali	35	0.03	0.16	-0.23
Mauritius	49	0.52*	-0.21	0.11
Mozambique	59	0.61***	0.05	0.50***
Namibia	51	0.19*	0.03	0.25***
Niger	59	0.47	0.01	0.30
Nigeria	59	-0.05	0.01	0.19
Rwanda	43	0.11	-0.26	-2.50
São Tomé and Príncipe	59	0.62**	-0.05	0.17
Senegal	51	0.58*	-0.03	0.18
Seychelles	51	0.04	0.02	0.00
Sierra Leone	59	0.32	0.15*	0.16
South Africa	51	0.35***	0.01	0.25***
Swaziland	59	0.35**	0.03	0.28**
Tanzania	51	0.37	-0.02	0.42*
Togo	59	0.32	-0.02	0.21
Uganda	59	1.15***	-0.22*	0.47*
Zambia	47	0.37	0.13	0.39**

*** p<0.01, ** p<0.05, * p<0.1
Source: Author calculations

Table A.9: Average Inflation for Disaggregated CPI by Country

Country	Number of observations	Average Inflation (%, QoQ, Annualized)												
		Total food basket	Fresh					Non-Fresh						Fresh minus Non-fresh
			Meat	Fish	Fruit	Vegetables	Total	Milk	Bakery	Sugar	Coffee	Oil	Total	
Benin	24	3.66	3.24	6.62	2.98	6.20	5.00	2.94	3.14	3.99	1.62	0.90	2.54	2.46
Botswana	31	6.24	6.71	8.07	5.63	7.01	6.71	6.08	5.41	8.48	8.89	5.70	6.04	0.67
Central African Republic	35	8.30	12.46	.	10.85	1.44	9.03	4.75	7.24	.	.	.	5.29	3.74
Côte d'Ivoire	26	2.66	3.71	4.41	6.02	4.27	3.30	3.20	1.37	.	.	4.35	1.98	1.32
Ethiopia	17	9.23	13.80	.	11.80	10.45	11.18	14.09	7.49	5.99	.	7.20	7.90	3.28
Gabon	32	3.94	3.22	7.37	.	4.08	4.41	1.57	3.16	.	.	6.53	3.28	1.13
Gambia	45	6.06	6.58	4.08	5.66	6.05	6.00	3.56	5.71	8.39	.	7.53	6.16	-0.16
Ghana	15	5.83	8.17	5.84	3.40	4.04	5.28	7.27	6.66	7.92	8.64	5.14	6.68	-1.40
Guinea	49	19.70	17.04	25.05	.	21.82	22.27	14.59	16.99	.	.	18.75	16.90	5.37
Kenya	27	10.16	8.69	11.03	12.10	17.51	13.09	9.12	6.08	9.38	4.56	7.61	7.15	5.95
Lesotho	27	6.16	6.50	4.30	7.53	9.33	7.86	4.95	5.40	7.01	4.67	5.81	5.47	2.38
Madagascar	59	8.69	8.39	8.43	9.08	10.32	8.93	7.88	8.97	10.41	8.25	10.11	8.73	0.20
Namibia	55	7.29	8.18	6.67	8.55	9.25	8.11	7.58	6.84	6.72	6.04	6.55	6.80	1.30
Rwanda	47	9.40	7.70	8.26	.	10.23	9.84	.	8.63	.	.	.	8.63	1.21
São Tomé and Príncipe	20	8.16	9.96	18.36	.	.	11.52	0.93	3.32	-4.46	3.95	0.94	1.67	9.85
Seychelles	47	8.44	8.88	9.48	6.16	7.42	8.30	7.95	9.96	8.98	.	8.91	8.88	-0.57
South Africa	55	6.94	6.94	6.52	5.73	6.66	6.78	7.28	7.04	7.69	6.50	7.43	7.13	-0.35
Tanzania	19	11.75	9.71	17.70	15.91	16.97	15.07	8.90	8.55	8.29	5.04	5.52	7.81	7.27
Uganda	21	10.59	11.93	12.96	19.16	10.68	12.58	7.70	9.00	11.52	7.70	7.91	8.21	4.37
Zambia	23	8.39	11.45	7.95	9.95	3.96	8.23	8.39	7.43	11.98	7.27	10.74	8.68	-0.44

Source: Country statistical sources.

Table A.10: Volatility for Disaggregated Inflation by Country

Country	Number of observations	Volatility (coefficient of variation)												
		Total food basket	Fresh					Non-Fresh						Fresh minus Non-fresh
			Meat	Fish	Fruit	Vegetables	Total	Milk	Bakery	Sugar	Coffee	Oil	Total	
Benin	24	3.29	1.82	3.26	12.32	6.81	4.08	2.18	5.85	2.48	8.00	24.02	4.92	-0.83
Botswana	31	1.24	1.12	0.77	1.39	1.68	0.97	2.03	2.32	0.83	0.77	3.44	1.65	-0.68
Central African Republic	35	1.72	2.16	.	5.50	10.83	1.92	2.15	2.98	.	.	.	1.83	0.09
Côte d'Ivoire	26	5.79	3.15	5.68	6.40	13.65	6.21	2.48	9.29	.	.	9.58	6.59	-0.38
Ethiopia	17	1.50	1.20	.	1.86	1.86	1.49	0.71	2.76	1.33	.	2.14	2.02	-0.53
Gabon	32	2.14	2.51	3.55	.	5.06	2.78	6.48	3.04	.	.	3.63	2.43	0.36
Gambia	45	0.84	1.09	0.84	2.03	1.48	0.80	1.11	1.26	3.07	.	2.18	1.13	-0.34
Ghana	15	2.35	1.88	2.63	2.87	4.60	2.80	1.60	2.07	1.66	1.63	2.32	1.91	0.89
Guinea	49	0.79	1.05	0.75	.	1.00	0.54	1.04	1.63	.	.	1.78	1.44	-0.91
Kenya	27	0.98	0.74	0.74	0.68	1.78	1.11	1.55	2.44	5.17	1.53	2.15	1.79	-0.68
Lesotho	27	0.61	0.67	0.86	0.49	0.51	0.29	0.58	1.25	0.79	0.58	1.53	0.97	-0.68
Madagascar	59	2.15	1.36	1.87	3.62	1.86	1.14	1.25	3.61	4.45	1.46	2.93	3.03	-1.89
Namibia	55	0.88	1.18	2.17	2.42	1.64	1.05	1.57	1.61	1.14	1.52	1.60	1.15	-0.10
Rwanda	47	2.37	1.76	2.70	.	2.89	2.70	.	2.63	.	.	.	2.63	0.07
São Tomé and Príncipe	20	0.67	1.61	1.04	.	.	0.67	7.20	3.70	-4.79	4.65	14.78	4.58	-3.91
Seychelles	47	2.28	2.55	2.29	4.38	3.53	2.28	4.29	2.61	2.37	.	2.99	2.71	-0.43
South Africa	55	0.97	1.34	1.02	3.49	2.18	1.23	1.05	1.57	0.88	1.27	2.20	1.19	0.04
Tanzania	19	1.25	1.24	0.62	0.95	1.63	0.80	0.67	3.27	2.95	1.10	1.79	2.63	-1.83
Uganda	21	1.52	1.22	1.51	2.04	3.88	1.56	1.77	2.01	6.67	1.61	1.76	2.87	-1.31
Zambia	23	1.31	0.64	1.42	1.44	4.00	0.94	1.27	2.68	1.23	1.95	2.43	1.97	-1.03

Source: Country statistical sources.

Table A.11: Structural Variables by Country

Country	Structural Variables									
	Central Bank loans to Government	Logistics Index	Food Trade Balance	Tariffs	CPIA Fiscal	CPIA Macro	CPIA Trade	PPP GDP per capita	Imports from China	Total droughts
Angola	4.2	2.1	.	8.2	2.9	3.0	3.8	4.7	11.4	3
Benin	3.3	2.3	-6.7	13.6	3.6	4.2	4.1	1.7	17.9	0
Botswana	.	2.4	-4.5	7.7	.	.	.	11.9	.	1
Burkina Faso	3.3	2.1	-2.9	12.5	4.2	4.5	4.0	1.3	4.5	3
Burundi	.	2.2	0.4	13.1	3.5	3.5	3.8	0.7	6.2	5
Cabo Verde	4.5	.	-24.7	14.9	4.1	4.3	4.2	5.1	3.2	1
Cameroon	4.7	2.1	0.1	18.7	3.6	4.0	3.5	2.5	10.2	2
Central African Republic	4.7	2.5	-13.7	18.5	3.1	3.3	3.2	0.8	2.0	0
Chad	4.7	2.0	.	17.5	2.7	3.0	3.0	1.9	10.8	3
Comoros	.	2.1	-20.7	8.7	2.3	2.9	3.1	1.4	6.3	0
Congo	4.7	1.6	-2.7	19.0	3.1	3.5	3.5	5.2	10.9	0
Côte d'Ivoire	3.3	2.3	20.2	13.3	2.8	3.4	3.9	2.6	6.1	0
Democratic Republic of Congo	6.0	2.0	.	12.7	3.5	3.5	3.6	0.5	8.4	0
Ethiopia	4.7	2.0	4.9	18.6	3.7	3.2	3.0	1.0	13.9	6
Gabon	4.7	2.1	-4.0	19.0	.	.	.	15.7	6.1	0
Gambia	4.5	2.1	-22.5	17.5	3.1	3.5	3.9	1.4	25.3	2
Ghana	4.5	2.4	10.5	13.2	3.5	3.5	4.0	2.9	15.5	0
Guinea	2.5	2.2	-7.9	13.7	3.2	3.0	3.9	1.1	10.6	0
Guinea Bissau	3.3	2.2	20.3	13.5	2.6	2.6	4.0	1.3	4.7	2
Kenya	2.8	2.2	7.9	13.5	4.1	4.4	4.0	2.4	9.2	5
Lesotho	4.5	2.2	-12.2	8.5	3.4	3.9	3.6	2.0	.	3
Liberia	4.5	2.3	.	10.1	3.5	3.5	3.2	0.7	11.5	0
Madagascar	3.8	2.3	3.6	10.6	3.1	3.7	4.0	1.3	15.3	5
Malawi	4.2	2.7	20.2	11.4	3.2	3.1	3.6	0.9	6.4	4
Mali	3.3	2.0	-0.2	12.9	3.9	4.3	4.0	1.8	.	5
Mauritius	3.5	2.5	-1.0	5.1	.	.	.	13.6	11.7	0
Mozambique	3.7	2.1	-1.7	11.2	4.2	4.3	4.2	0.8	6.3	7
Namibia	3.2	2.3	3.5	6.6	.	.	.	8.1	.	3
Niger	3.3	2.1	-7.1	13.5	3.6	4.0	4.0	0.8	9.6	4
Nigeria	3.2	2.4	-4.8	15.2	4.2	4.1	3.3	4.3	13.3	0
Rwanda	3.7	1.8	-2.7	12.9	3.9	4.0	4.0	1.2	4.9	1
São Tomé and Príncipe	.	2.3	-21.1	.	3.0	3.0	4.0	2.5	2.4	0
Senegal	3.3	2.3	-6.4	13.5	4.0	4.1	4.3	2.0	5.7	3
Seychelles	.	.	16.4	15.5	.	.	.	18.7	1.7	0
Sierra Leone	2.8	2.0	-12.3	12.9	3.3	4.0	3.5	1.2	9.4	0
South Africa	1.8	3.5	1.3	7.7	.	.	.	10.8	11.0	1
Swaziland	.	.	1.8	8.7	.	.	.	6.8	.	2
Tanzania	4.7	2.2	8.5	13.2	4.1	4.6	4.0	2.0	14.3	4
Togo	3.3	2.2	-2.8	13.7	2.6	3.3	4.0	1.2	12.3	0
Uganda	4.0	2.3	7.8	10.6	4.2	4.3	4.2	1.5	7.3	4
Zambia	3.5	2.1	0.8	11.7	3.2	3.8	4.0	2.7	5.0	1

Source: See Table A.1

Table A.12: Granger-Causality Tests

Country	Food inflation granger-causes NF/NF inflation	NF/NF inflation granger-causes food inflation
Angola		x
Benin		
Botswana	x	x
Burkina Faso		
Burundi		
Cabo Verde		
Cameroon	x	
Central African Republic	x	x
Chad		
Comoros		
Congo		
Côte d'Ivoire		
Democratic Republic of Congo	x	
Ethiopia		
Gabon	x	
Gambia		x
Ghana		x
Guinea	x	x
Guinea Bissau		
Kenya	x	
Lesotho		
Liberia		x
Madagascar		
Malawi	x	x
Mali	x	
Mauritius		
Mozambique		
Namibia		
Niger		
Nigeria		
Rwanda		
São Tomé and Príncipe	x	x
Senegal	x	x
Seychelles		
Sierra Leone	x	
South Africa	x	
Swaziland	x	
Tanzania	x	x
Togo		
Uganda		
Zambia	x	x
Total	**16**	**12**

Source: Country statistical sources.