Ethiopian Economics Association (EEA)

Inflation Dynamics and Macroeconomic Stability in Ethiopia: Decomposition Approach

Atnafu Gebremeskel

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EXECUTIVE SUMMARY

This study was driven by the fact that inflation has become one of the binding constraints for policy makers both in their short- and long-term efforts to advance economic progress. There is a growing need to examine the commodity-wise contributions and drivers of inflation, and to decompose it into its permanent and transitory components. So, the objectives of this study are first, to investigate the evolution and dynamics of inflation by decomposing the headline inflation (raw inflation) into its core (permanent) and transitory (non-permanent) components from highly disaggregated commodities' prices. Secondly, it aims to investigate the association between core inflation (the predictor of headline inflation) and macroeconomic stability.

The statistics of the previous two decades showed significant economic growth accompanied by creeping inflation to the mid-2000s, but from 2005, the growth process was accompanied by trotting inflation. Despite the efforts of fiscal and monetary policies to contain inflation to single digits during the Growth and Transformation Plans (GTP I from 1995/96-2010/11 and GTP II from 2010/11 2014/15**),** inflation persisted to the extent that real interest rates fell within negative territory. The official inflation records were 2.5% up to 2004 and 15.1% thereafter. While GTP II envisaged 11.1% economic growth, the performance achieved was 10.9%. According to the Central Statistical Agency (CSA), in October 2019 (2016=100) the regional distribution of Consumer Price Index (CPI) inflation shows that Dire-Dawa city reached the highest level, 37.1%. followed by Harari and Addis Ababa with 32.3% and 28.6% respectively. Despite overall economic growth, inflationary pressure affected the great majority of the population with estimated average welfare cost of Birr 22.354 billion forming inflation growth dilemma implying severe implications for the welfare of wage earners on the minimum wage, and pensioners on fixed incomes which are not subject to wage or income indexation in the context of Ethiopia.

One of the key sources of inflationary pressure in Ethiopia is deeply rooted in the government financing of deficits. Data sets from the MoFEC indicate that the average annual financing requirement for the period 1974-2017 was 8492.971 million Birr. The figures for the period 1974-1990 and for 1991-2017 were 720.279 and 13386.89 million respectively. In terms of the sources of finance, the annual average for gross borrowing, external sources and domestic borrowing for 1974-2017, were 5448.625, 4663.038, 2140.716 million Birr

respectively. For 1974-1990 the annual averages were 343.3905, 297.4992 and 396.0675, million Birr respectively; and for 1991-2017 the figures were 8663.032, 7411.711, and 3239.199.

The World Development Indicator (WDI) for the period over which the data is available, 1990-2013, shows the annual average domestic demand for investment and net savings were respectively 8 billion Birr and 4.37 billion Birr. This meant saving investment disequilibria of 3.63 billion Birr. The annual average of net borrowing during the same period was 13.7 billion Birr. Between 1974 and 2017, the domestic imbalance widened to the extent that the average resource gap (budget deficit), including grants, stood at 8492.971 million Birr; excluding grants it rose to 14493.69 million Birr. For 2017, the figures stood at 66643.18 and 84557.13 million Birr respectively. The yearly average total expenditure for the whole period reached 124.65% of total revenue, while it was 123.17% in 2017.

During the GTP II, the nominal exchange rate depreciated by 5.7% per cent reaching 20.1 Birr/USD. The yearly average Balance of Payment (BoP) deficit for 2013-2019 was US 5639.838 million, with minimum and maximum value of USD 2137.828 and USD 7905.485 million respectively, signalling a slight improvement over 2016. With reference to macroeconomic instability in Ethiopia, the government Debt-to-GDP ratio averaged 35. 34% from 1991 to 2019 reaching an all-time high of 60% in 2018 and a record low of 24.7 % in 1997, indicating acute macroeconomic instability. Subsequently, economic growth was constrained by trotting inflation coupled to heavy debt burdens, and this provided the center of debate for the government's policy trilemma.

Examining the government's official documents, critically evaluating previous studies on inflation in Ethiopia, and making use of the recently developed method of inflation decomposition techniques, this research has effectively extracted the commodity-wise contribution to total inflation in Ethiopia. To the best of this author's knowledge, no previous study has analyzed permanent and non-permanent components of inflation from a wide range of commodity level price changes, using the inflation decomposition approach and validating this with econometric evaluation techniques for Ethiopia.

The monthly commodity's prices dataset, with associated commodity consumption weights from January 1997 to April 2020, were obtained from the Central Statistical Agency (CSA). The datasets obtained from the National Bank of Ethiopia (NBE), the Ministry of Finance and Economic Cooperation (MoFEC),

and the National Planning Commission (NPC), and the information from the World Governance Indicators for Ethiopia, were employed to examine the characteristics and evolution of inflation in Ethiopia.

The most recent (October, 2019) CSA commodity weights were available for individual commodity at regional level; and aggregate weights were constructed for baskets of commodities. Food and non-alcoholic beverages, and non-food items, constituted about 54% and 46% respectively. Bread and cereals were given the highest weight of 17.1% followed by vegetables at 12.3%. For non-food items, housing, water, electricity, gas and other fuels constituted the largest weight (16.8%), followed by clothing and footwear (5.7%). Associated commodities' consumption weights were selected and linked to each commodity to compute aggregate inflation for that particular period, and for the whole study period for each of 279 commodities over 280 months from January 1997 to April 2020. The study identified the top 25 inflationary commodities whose values were averaged over five-year periods from 1997 to April 2020.

During the first of these, 1997 to 2001, imported iron pipes, 6 meters long and 12 inch in diameter, contributed the highest five-year average inflation of 168%; imported items registered the highest average inflation pressure. Between 2002 and 2006, the inflationary regime was dominated by food items to the extent that all top 25 commodities were food items, and the five years average inflation was 3.7%. From January 2007 to December 2011, the inflationary process was dominated by a mix of food and imported items with, for example, motor oil and gloves registering five-year average inflation rates of 2.5 and 1% respectively. Clothing and accessories joined the top 25 commodities. Between 2012 and 2016, construction items (e.g. stone for house construction) and energy (Benzene) climbed up the top 25 inflation ladder, and stone for construction exerted the highest five-year average inflation momentum of 774%. Benzene and motor oil registered five-year average inflation rates of 6 and 5% respectively. Finally, between 2017 and 2020, the inflationary process was dominated by pressure arising mainly from food items, predominately vegetables. Onions and garlic were at the top of the 25 commodities' list with inflation pressure of 17 and 13% respectively, followed by cereals. Construction materials also contributed to inflationary pressure during this period.

On aggregate, commodity price changes on the CSA dataset covering January 1997 to April 2020 were characterized by different commodities as they exerted upward pressure on inflation. Our decomposition results from 280

commodities' prices over 279 months suggest that the headline inflation, inflation arising from monetary growth, and the non-monetary component of inflation averaged 38.5, 10.5, and 28% respectively. Throughout the study period, inflation due to monetary growth stood at mean and maximum values of 27.2 and 80% of the total inflation respectively, suggesting money growth rate as one major candidate as a driver of inflation.

After examining the time series properties and detecting the existence of the structural break, our econometric evaluation validated the underlying monetary component of inflation ($\pi_t{}^c$) as driver of headline inflation (π_t) in Ethiopia. This suggested the current decomposition approach had effectively minimized the noise in headline inflation arising from shocks, whether supply shocks, and market failure, government failure or both. We subsequently concluded the minimization of the effects of demand side factors arising from the monetary component of inflation to be a necessary and sufficient condition for price stability, one major aspect of macroeconomic stability.

To summarize the policy implication: There is a need for managing domestic and external disequilibria. Key domestic disequilibria include fiscal deficits and imbalances between domestic saving and aggregate investment demand. Managing the external disequilibria would mean management of external debt as one of the binding constraints for achieving macroeconomic stability.

To reverse the deteriorating welfare cost of inflation, supporting productivity by removing the binding constraints of the real sector should be espoused as a necessary and sufficient condition. This suggests constraints that obstruct productivity and destabilize production must be eliminated from the agricultural and manufacturing sectors, and productive businesses that generate employment and value adding potential should be incentivized. Constraints should be removed for exiting small businesses and entry conditions slackened to facilitate entrepreneurs to start businesses with minimum requirements while they proceed to formal licensing. This would enable the economy to fight inflation from the supply side, enhancing those employed and attracting the unemployed. For senior citizens and pensioners not participating in the labor market, their fixed income could be indexed for inflation, providing there is an adequate pension fund.

The fact that inflation dynamics has been characterized by shifting commodity prices indicates that there is repressed inflation in the economy, which

could be due to hoarding arising from market failures. The commodities whose inflationary pressure can potentially and permanently perpetuate inflation, should be identified, and their production and marketing systems be made efficient.

As there is strong evidence that the monetary component of inflation is due to money growth, prudent monetary policy includes productive use of the available financial resources, tight monetary policy, and fiscal discipline, enabling the achievement of acceptable level of development financing. A tight monetary policy is indispensable for fighting the monetary component of inflation, and this requires insulating the Central Bank from political interference. It helps the Central Bank to regulate domestic borrowing by the government particularly during election times, which often subsequently leads to inflation driven by political business cycle. The independence of the central bank is a necessary and sufficient condition to establish a well-functioning financial system, capable of effectively finding high quality projects that can produce at a lower cost, and hence provide for lower inflation and increased competitiveness, improving the welfare of individuals making up the economy.

In reference to political economy, the institutional quality and quality of governance and zero tolerance for corruption are suggested here as necessary and sufficient conditions for fighting inflation to achieve enhanced welfare and make headway in economic growth with stable internal and external disequilibria.

Keywords and Phrases: *Inflation Dynamics; Inflation Decomposition; Headline Inflation; Core Inflation; Transitory Inflation; Econometric Modeling; Governance quality; Macroeconomic* ***Stability.***
JEL Classification: E, E5, E31, E39, E52

1. INTRODUCTORY **BACKGROUND**

1.1 Background Motivation and Purpose of the Study

For the last two decades, Ethiopia has registered some of the fastest economic growth in Africa but this has been accompanied by double digit inflation for most of the time. This growth inflation dilemma has led to a heated discourse in academic and political circles. Seeking drivers for this dilemma in Ethiopia and explaining the inflationary growth process has occupied a central position in the Ethiopian political economy of economic growth.

The Ethiopian growth process was not inflationary before 2005. The NBE (2019) data reveals that average annual inflation rate for the years before 2004 was 2.5% but the yearly average after 2004 reached 15.1%. Assefa (2015), using political economic arguments, pointed out that traditionally, Ethiopia was not a country that experienced double digit inflation until 2004. Inflation rates trended upward after 2004 and this could be attributed to post-election 2005 development financing. The government was unable to secure adequate foreign assistance because of prevailing political instability prevailed and it resorted to inflationary finance, financing by money creation.

Inflation is said to exist when there is a sustained rise in the general price level; macroeconomic stability exits when key economic relationships, internal or external, are in balance. Internal balances, for example, include the balance between domestic demand and output, fiscal revenues and expenditure, and savings and investment; external balances mainly refer to Balance of Payments (BoP) equilibrium. Ames et al (2001), however, noted that these relationships need not necessarily be in exact balance. Fiscal and current account deficits or surpluses are perfectly compatible with economic stability provided that they can be financed in a sustainable manner.

There is no unique threshold for every macroeconomic variable between stability and instability. Rather, there is a continuum of various combinations of the levels of key macroeconomic variables, including growth, inflation, fiscal deficit, current account deficit, or international reserves, that could indicate macroeconomic instability. It may be relatively easy to identify a country in a state of macroeconomic instability, for example where there are large current account deficits financed by short-term borrowing, high and rising levels of public debt, double-digit inflation rates, and stagnant or declining GDP; or in a state of stability, with current account and fiscal balances consistent with low and

declining debt levels, low single digit inflation, and rising per capita GDP). There is, however, a substantial "gray area" in between where countries enjoy a degree of stability, but where macroeconomic performance could clearly be improved (Ames et al, 2001).

It is against this background that the EEA initiated this research which is aimed at examining the drivers of inflation dynamics and its effects on macroeconomic stability. The current research is justified on the grounds that it has focused on a decomposition approach to the dynamics of inflation in Ethiopia. As far as the author knows, none of the surveyed literature has a demonstrated decomposition approach *per se* in Ethiopia and this study breaks the limitations of contemporary research on inflation in Ethiopia through the application of decomposition by factoring out the monetary and non-monetary components of headline inflation. It uses current state of the art of associated econometric validation techniques by disaggregating a wide range of commodities' prices changes in the country. This helps the understanding of the evolution of inflation in Ethiopia and allows us to propose a macroeconomic policy to ensure the economy could achieve non-inflationary and stable economic growth.

The objectives of this study are two-pronged. First, it investigated the evolution and dynamics of inflation by decomposing the headline inflation (raw inflation). Second, it investigates the association between core inflation (predictor of headline inflation) and Macroeconomic stability. It aims generally to design and measure inflation dynamics and macroeconomic stability and to qualify policy options in Ethiopia. The specific objectives included:

i. measure the dynamics of inflation and its drivers, both short- and long-term;
ii. examine inflation and its effect on macroeconomic stability;
iii. examine the relationship between inflation dynamics and changes in the policy environment and economic structure; and
iv. indicate feasible policy options that the country may pursue to ensure macroeconomic stability.

1.2 Research Questions

The study also addressed the following major research questions:

a) What are the sources of inflation and macroeconomic imbalance, and what are their changes in the dynamic constituents of sectors?

b) What are the potential short-to-long-term effects of macroeconomic imbalance on economic growth?
c) What are the links between inflation and macroeconomic imbalance?
d) How are inflation dynamics and changes in the policy environment related?
e) What policy options and what specific price stability strategies could be pursued in Ethiopia?

2. THE STATE OF INFLATION DYANMICS AND MACROECNOMIC STABILTY: EVIDENCE, CONCEPTS AND MEASURES

This chapter presents a review of the government's documents on inflation and macroeconomic stability, concepts and measures. This is followed by empirical evidence on inflation and macroeconomic stability, discussion of the evolution of inflation and the extent of internal and external disequilibria, as well as exploration of available previous studies. The final section of this chapter concludes with an evaluation of the previous empirical studies on inflation on Ethiopia.

2.1 The State of Inflation and Macroeconomic Stability: Review of Documents

The objective of the government's macroeconomic policy, as defined by the Ministry of Finance and Economic Development's Ethiopia: Building on Progress (MoFED; 2006, P.61) in general, and of monetary policy in particular, was to attain relative stability of prices to help protect the poor from the ills of inflation and encourage savings and long-term investment. The document emphasized the average general inflation rate during the Sustainable Development and Poverty Reduction Program (SDRP), 2002-2005, was low and stable. Inflation, which stood at about 6.8% in 2004/5, was projected to average 8% per annum over the next five years during the Plan for Accelerated and Sustained Development (PASDP), 2005-2010.

The document further stipulated that that the government's monetary policy would be geared towards containing price and exchange rate stability, with the major objective of containing inflation within a single digit. The monetary policy assumed a stable but slowly declining velocity. Broad money was therefore

assumed to grow at a slightly higher rate than the nominal GDP, with expectation the policy would assume maintenance of an adequate level of foreign reserves.

Similarly, in the Growth and Transformation Plan (MoFED (2010a, P.33), it is stated that Ethiopia's monetary policy will continue to focus on maintaining price and exchange rate stability so as to create macroeconomic stability that is conducive for rapid and sustained growth. It is further stressed that inflation should be held at single digit during the GTP period (2010/11-2014/15). Measures should also be undertaken so the growth of money supply would not be in excess of nominal GDP growth. A stable foreign exchange rate is envisaged for the GTP period, to encourage export growth and import substitution. This in turn was expected to facilitate stable economic growth and significantly minimize foreign exchange constraints by strengthening hard currency reserves.

In GTP II (2015/16, pp 14-15**)** the performance of monetary policy during GTP I (2010/11-2014/15) is evaluated. This shows in regard to maintaining the balance between existing money supply and inflation, the money supply increased by an average of 29% per annum, while nominal GDP grew by 27.2% on average over the five years. This five-year performance showed money supply and nominal GDP expanded at a closely similar growth rate, consistent with the target. The government set the minimum interest rate for deposits at 5% over the period of the plan. However, the government admitted inflation was a challenge during the first two years of GTP I, and the document claimed the government had taken tight monetary and fiscal policy measures to counter adverse effects and maintain inflation to a single digit, though the real interest rate dropped into negative territory. According to GTP II, the nominal exchange rate depreciated by 5.7% and reached 20.1 Birr/USD by the end of 2014/15. Measures taken in the foreign exchange market helped to stabilize the external sector. As a result, the real effective exchange rate of Birr remained above zero and this helped in relative terms to expand the export sector.

During the GTP II period, the monetary policy was similarly supposed to continue to focus on maintaining price and exchange rate stability to create a conducive macroeconomic environment for rapid and sustained economic growth. GTP II stipulated that measures would be taken to keep the growth of base money consistent with maintaining annual inflation stable and within single figures. In addition, it said a stable foreign exchange rate that encouraged export growth, while promoting efficient import substitution, would be pursued. The implementation of these monetary policy instruments was expected to facilitate

economic growth and address foreign exchange constraints by building up reserves (GTP II, P.110).

The GTP II envisaged Ethiopia would achieve middle income status by 2025. In this document, it was expected that Ethiopia would register 11.1% growth in 2017. The supposition was that this would be driven by proportionate contributions from all the sectors of the economy. However, the achieved growth for this year was only 10.9%. On the macroeconomic stability front during GTP II, price stability remained a prime concern. In general, the inflation rate was expected to be confined to single figures, though this failed to materialize.

According to the NPC (2020), prices continued to climb, especially for cereals including *teff*, barley, sorghum and maize and some vegetables used daily, including onions, tomatoes and garlic. Global sources, for example the International Monetary Fund (IMF), indicated that Ethiopia was among the biggest inflationary economies of the world –the global average inflation rates during 2017 and 2018 were 4.47% and 3.23% respectively. The highest inflationary economies in 2017 and 2018 with 31.69, 29.5 and 16.05% respectively, were Angola, Egypt and Burundi. For Ethiopia, CSA and NPC documentation showed the general twelve months moving average CPI inflation rate standing at 13.6% in September 2019, with the food and non-food inflation rates at 15.6 and 11.2% respectively. The year-on-year general CPI inflation rate soared to 18.6% in September 2019, from 15.3% in July, mainly attributed to the lingering effect of security problems and an upsurge in ethnic violence across the country. A 2019 NPC report taking 2016 as the base year, notes the regional distribution of CPI inflation: Dire Dawa (37.1), Harari (32.3), Addis Ababa (28.6) Benishangul-Gumuz (28.5), Afar (28.0), Somali (25.3), SNNP (24.6), Oromia (24.6), Tigray (22.9), Gambella (20.3) and Amhara (18.5). The average for Ethiopia was 23.2.

2.2 Macroeconomic Disequilibria and Macroeconomic Stability

2.2.1 Domestic Disequilibria

Domestic disequilibrium (imbalance) covers the gap in resources which are the result of such items as budget deficits and saving-investment gaps. The revenue-expenditure section of the National Income Account from the MoFEC reveals that for the period 1974-2017, the annual resource gap (budget deficit), including and excluding grants, averaged 8492.971 and 14493.69 million Birr

respectively. For the year 2017, the figures were 66643.18 and 84557.13 million Birr respectively. The annual total expenditure for the whole period averaged 124 % of total revenue, with 123% for 2017. For the same period (1974-2017), the budget deficit including and excluding grants were positively associated with general inflation, non-food inflation and food inflation, with correlation coefficients of 4.09, 1.56 and 12.64% respectively; the coefficients for the budget deficit excluding grants were 11.11, 7.21 and 24.59% for general, non-food and food inflation respectively.

One of the key sources of inflationary pressure is how the government finances a deficit. Theoretically, a government can finance a deficit in three alternative ways: It can borrow from the public, that is issue bonds to the public; it can print money, by borrowing from the central bank; or it can run down its foreign exchange reserves. In Ethiopia, these alternatives of financing deficit have varied from regime to regime.

The dataset from the MoFEC indicates that the average annual financing requirement for the period 1974-2017 was 8492.971 million Birr. The same figures for the periods, 1974-1990 and 1991 – 2017, were 720.279 and 13386.89 million Birr respectively.

On the sources of finance for the whole 1974-2017 period, the annual average for gross borrowing, external sources and domestic borrowing was 5448.625, 4663.038, 2140.716 million Birr respectively. For the period 1974-1990 the figures averaged annually 343.3905, 297.4992 and 396.0675, million Birr respectively; and the corresponding values for 1991-2017 were 8663.032, 7411.711, and 3239.199 for gross borrowing, external sources and domestic borrowing respectively.

The World Development Indicator (WDI) for the period for which data is available, 1990 -2013, showed the annual average domestic demand for investment and net saving were respectively 8 billion and 4.37 billion Birr. This signaled a saving investment disequilibria of 3.63 billion Birr. The annual average of net borrowing during the same period was 13.7 billion Birr.

The data from the National Bank of Ethiopia showed that for the period 1974-2017, the annual averages of inflation and growth of broad money stood at 9.84 and 16.45% respectively. For 1974-1990, the averages were 8.32 and 12.54% respectively; and for 1991-2017, the average inflation and average growth rate of broad money were respectively 10.76 and 18.60%.

These figures clearly demonstrate both the existence of domestic imbalances and their association with inflationary pressures in Ethiopia.

2.2.2 External Disequilibria

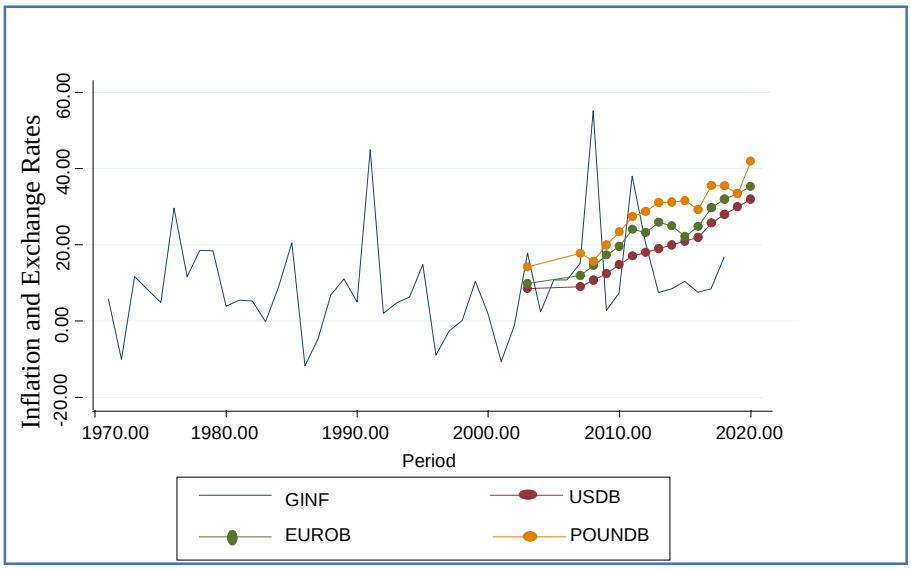
According to International Development Association's Joint Bank-Fund Debt Sustainability Analysis (IDA/IMF (2018)), Ethiopia continues to be at high risk of external debt distress, and consequently is at high risk of overall debt distress. The external current account deficit (including official transfers) was estimated at 6.4% of GDP in 2017/18, but a gradual improvement of export performance, a moderate pick-up in capital goods imports, and steady inflows of remittances (even if slowly declining as a ratio to GDP) can lead to a gradual reduction of the deficit over the longer term. Economic transformation, with more dynamic and diversified exports and a phase-down in public imports of capital goods, can be expected to ameliorate external imbalances.

On the issue of debt burdens, documents from the National Planning Commission reveal that, at the end of June 2019, total outstanding loans stood at USD 27.05 billion, 4.9% higher than the USD 25.80 billion in June 2018. The total outstanding loans to central government rose by 8.2% while non-government guaranteed loans decreased by 3.6%. Out of the total USD 2.77 billion disbursed in 2018/19, some 54.3 % were central government loans, and the remaining balance 13.6% and 31.9% was for government guaranteed and non-government guaranteed loans respectively. A total of USD 2.77 billion was paid for debt servicing, including the servicing of central government, as well government and non-government guaranteed loans (NPC, 2019).

One of the more important questions for external stability is the relative variability of foreign exchange rate viabilities and their association with the variability of macroeconomic fundamentals such as inflation changes. The variability of inflation and exchange rates, with figures drawn from the MoFEC and NBE, are shown in Figure 1.

Fluctuations in general inflation (GINF) are more pronounced than exchange rate fluctuations of Birr per unit of Dollar (USDB), Birr per unit of pound (POUND) or Birr per unit of Euro (EUROB). While only post-2002 data was available, the curves clearly suggest decision makers in Ethiopia will be more sensitive to inflation variability than exchange rate variability as they face the former more often than the latter.

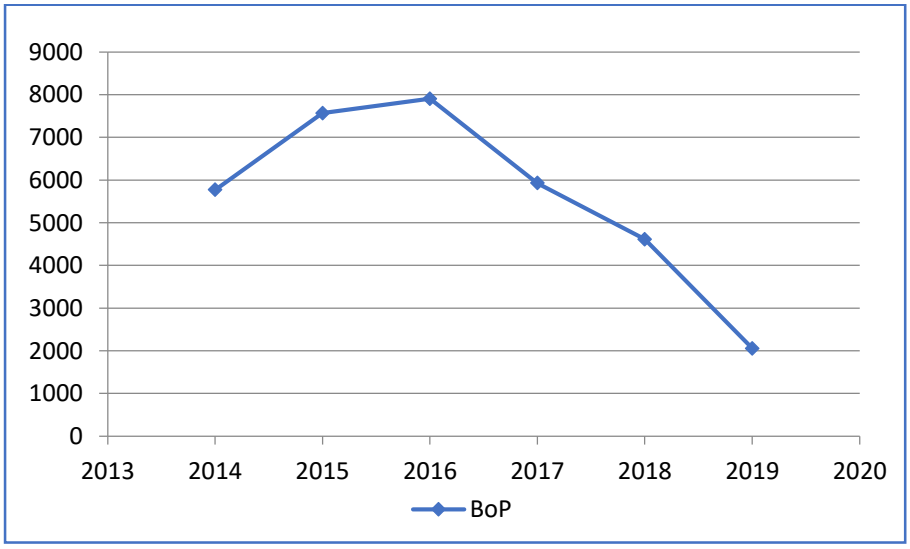
Figure 1: Movements of Inflation and Exchange Rates over Time



Source: Author's computation

Another component of external stability is the balance of payment equilibrium.

Figure 2: Trend of Balance of Payments (BoP)



Source: Author's computation

The yearly average BoP for 2013 to 2019 has been US 5639.838 million with minimum and maximum values of US 2137.828 and US 7905.485 million respectively.

Figure 3: Inflation and Economic Growth Rate

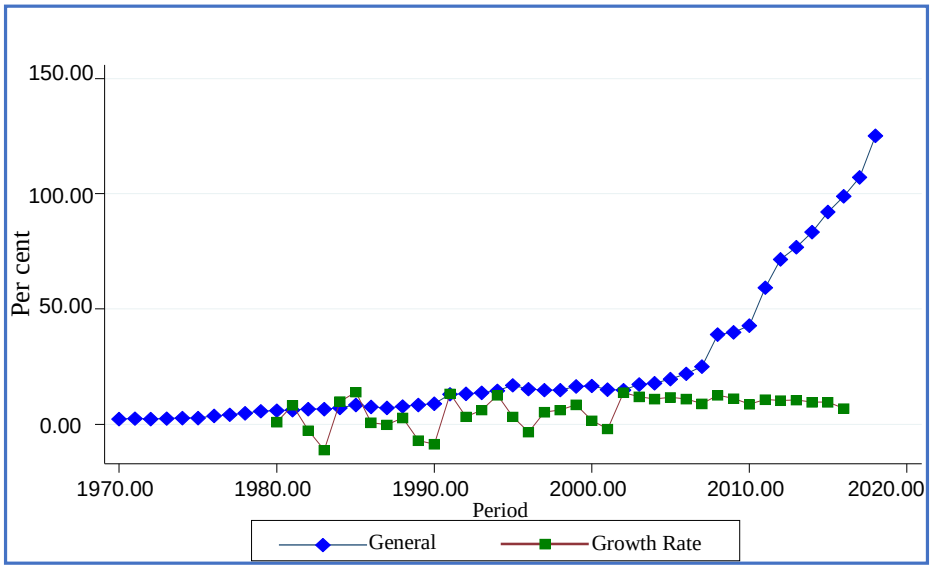
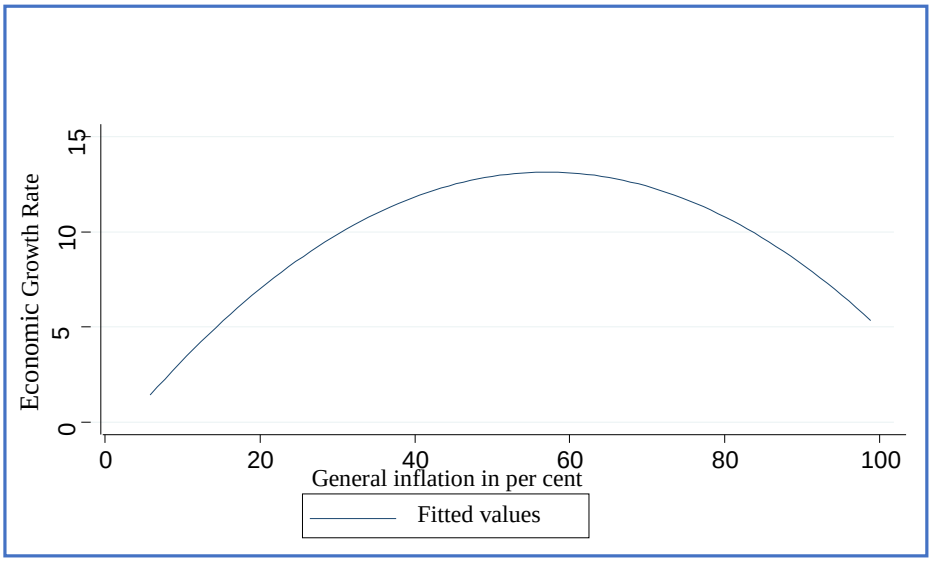


Figure 4: Inflation and Economic Growth



Source: Author's computation

The inverted U- curve in Figure 4 raises another question. Official reports have claimed double digit economic growth with moderate inflation, but the data indicates, for example, that with 10% economic growth, inflation can be expected to be over 25%. This suggests the need for some revision of the figures.

There are no good arguments for high inflation, and a government that is producing high inflation is a government that has lost control. So, in high inflation economies, a government will be more likely to introduce price controls, and change tax and trade regimes, increasing uncertainty about the future, and affecting investment and growth. Fisher (1930) supports this view, arguing that inflation is an indicator of the overall ability of the government to manage the economy. He further points out that the nominal interest rate should (approximately) equal the sum of the ex-ante real interest rate and the anticipated inflation rate.

Some of the effects of inflation he notes can be listed here:

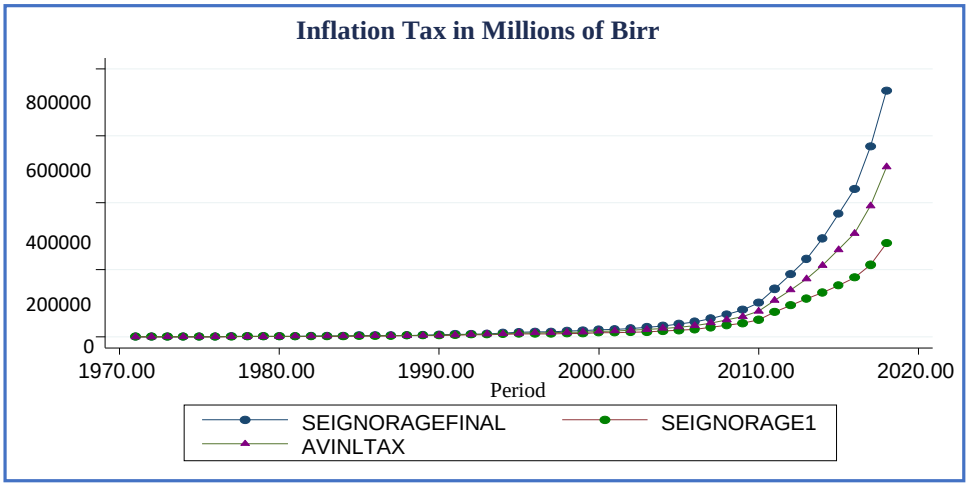
I. Inflation can affect growth negatively because it can be considered to be a tax on investment and therefore increase the profitability required to undertake investment, reducing the real interest rate relevant for saving. Fisher sees the real interest rate as an inflation adjusted nominal interest rate**;**
II. High inflation may lead to excessive resources being devoted to transaction and cash management instead of production of goods and innovation. In other words, overall inflation provides an incentive for firms and households to devote more resources to activities that are not engines of sustained growth;
III. Inflation causes distortion that affects the search intensity of individual and monopoly power of firms;
IV. Inflation increases uncertainty, which adversely affects the public's ability to make the best decision. Uncertainty about macroeconomic policy increases with inflation;
V. High anticipated inflation is associated with high variability of unexpected inflation; that is, the uncertainty about inflation rises with the level of inflation. Subsequently, forecast of future macroeconomic conditions becomes more problematic in a high inflationary environment. Furthermore, relative price variability also increases with inflation, and as a result informational content of prices declines with inflation since current prices are poor indicators of future prices;
VI. Inflation reduces labor supply. Individuals have to choose between consumption and leisure, and to purchase consumer goods, they face cash-in-advance constraints. Therefore, the effective price of consumer goods will

include the rate of inflation, like a tax, since the individual will have to hold money in order to buy them. An increase in inflation rates increases the price of consumption with respect to a leisure-inducing shift from consumption to leisure, thereby reducing the labor supply;

VII. Inflation also reduces the ability of financial markets to perform efficient financial intermediation as it inhibits long-term contracts. In the world of imperfect information, the informational problems may be exacerbated with high inflation rates affecting the efficiency with which credit is allocated and the total volume of intermediation;

VIII. Inflation also distorts government budgets.

Figure 5: The Welfare Cost of Inflation, supports some of these arguments



Source: Author's Computation

Figure 5 displays Seignorage (inflation tax). It is calculated from MoFEC and NBE data sources. The curves represent maximum (SEIGNORAGEFINAL), minimum (SEIGNORAGE1) and average seignorages (AVINLTAX) (measured as the product of inflation and broad money $(M_t\ \pi_t)$ divided by the sum of one plus inflation $(1 + \pi_t)$ at each particular year t). Consequently, the average welfare cost of inflation measured as the inflation tax is: 30665.54 (the mean of the maximum), 14042.65 (the mean of the minimum) and 22354.09 (the mean of the average) million Birr respectively. The economic rationale for seeing this as a welfare cost to individual households making up the whole population is that this is revenue to the monetary authorities in their endeavors to finance budget

deficit through money creation, and not revenue to the households, so an inflation tax as a measure of welfare cost.

2.3 Taxonomy of Empirical Studies on Inflation in Ethiopia

This section documents empirical studies on inflation in Ethiopia of which there are a considerable number, including both policy oriented working papers and published articles and unpublished manuscripts. They are documented here according their relevance, the issues they raise and their methodological approach as well as their relative influence on the evolution of the literature on inflation in Ethiopia and their policy content. A brief summary of the literature considered is shown in Table1. The taxonomy is structured and documented along the three lines.

The most frequently appearing studies are those widely focused on: underlying causes of inflation, inflation and economic growth and other related issues such as those that link budget deficit and inflation, and those trying to relate Ethiopian inflation to other economies. Details are indicated in Table 1.

The literature in documented in three different but interrelated categories:

Category1: Studies that focus on the underlying causes of inflation:

Studies in this category include Alemayehu and Kibrom (2008), Barnichon et al (2008), Loening et al (2008), Loening et al (2009)**,** Muluneh (2009), Abebe et al (2012), Durevall et al (2013), Solomon (2013), Temesgen (2013), Habtamu (2015), Ademe (2015), Fitsum et al (2016), Fantu et al (2017)**,** Jonse (2018) and Tekeber et al (2019).

Alemayehu and Kibrom (2008) examine the driving forces of inflation through a VAR model for the period 1994/95 to 2007/08, using quarterly data to explain the underlying causes of inflation and the factors behind inflationary pressure in Ethiopia; they argue that monetary cost push and supply factors drive inflation in Ethiopia. More specifically, they found that the most important factors behind food price rises in the long-run are inroad money supply and inflation expectation. They also claim that food and non-food inflation vary significantly.

Loening et al (2008) approached their analysis using monthly data on monetary aggregates (M2) and nominal exchange rates. Using CSA data, they identified 11 commodity sets and the remaining sets as miscellaneous goods, extracting food which accounted for 60 % of the CPI contributing to 26.8% of

inflation between April 2006 and April 2007. Using an error correction model of parsimonious type on monthly data, 2000-2006, they claim inflation expectations, together with increased monetary aggregate, particularly M2, are significant drivers of inflation in Ethiopia.

Loening et al (2009) examined the inflation dynamics for cereal prices. They used 119 monthly data series from January 1999 to November 2008 and fitted Error Correction Models for each of four price series - cereals, food, non-food and CPI. They concluded that Ethiopian inflation was rooted in agricultural products. They established that M2 drives food inflation in the short-run. However, unlike Loening et al (2008), they claimed that M2 was not a major driver of inflation in the long-run.

Muluneh (2009) advanced the measurement of core inflation into permanent and transitory components. He used annual data on inflation rates from the National Bank of Ethiopia (NBE) for 25 commodities from July 1998 to July 2009. Using trimmed mean regression, he concluded that the issue of measuring inflation was key to central banks. He argues short term price fluctuations may misrepresent actual inflationary trends, adding that some temporary events that cannot be addressed through monetary policy may cause problems in the consumer price index.

Abebe et al (2012) used monthly datasets from CSA, NBE, IMF and the WB from January 2001 to September 2012. They identified four food categories: cereals, pulses, fruits and bread. They employed meso level variables such as smuggling (which they claim is a unique variable that affects food prices) and the non-food domestic consumer price index. From their VECM model, they found that rises in M2, aggregate demand, and international food and oil prices, all fuel domestic food prices in the long-run. They claimed that expectations, world oil prices and domestic food prices also contributed to inflation in the long-run.

Durevall et al (2013) studied inflation dynamics through food prices. They employed monthly data from 1999 to 2009 through ECM and found that the Ethiopian inflationary situation to be dominated by agriculture and food.

Fitsum et al (2016) used annual data from 1970 to 2011 from MoFED and NBE. They used a VECM model and found inflationary trends to be driven by M2.

Fantu et al (2017) employed a unique panel of monthly price and wage data from 111 urban markets to construct welfare-relevant measures of real

wages. Their evidence suggested highly adverse short-run welfare impacts of higher food prices on the urban poor.

Jonse (2018) took annual data from NBE, CSA and MoFED from 1975 to 2015 and applied ARDL to examine the dynamics and determinants of inflation. The author found that inflation was driven by money supply.

Tekeber et al (2019) applied ARDL on annual data from 1985 to 2016. The empirical results revealed evidence that the money supply, world oil price, budget deficits and real effective exchange rates had a real impact on inflation, whereas real gross domestic product insignificantly affect price levels.

Category 2: Studies that link inflation to economic growth:

These include: Asayehgn (2009), Abis (2013), Abeba (2014), Ashagrie (2015), Fitsum et al (2016), Getachew (2018) and Tizita (2019)**.**

Asayehgn (2009) looked at the relationship between macroeconomic variables and inflation though a time series analysis and noted imports, deprecation of domestic currency, domestic lending rates, and broad money supply, jointly determined inflation.

Abis (2013) investigated the relationship between inflation and economic growth to consider the threshold level of inflation using the quarterly data from 1992 Q2 to 2010 Q4. The paper, using ECM and VECM, found a long run association between inflation and economic growth.

Abeba (2014) followed a comparative approach for Uganda and Ethiopia and using VECM and Causality from 1990 to 2012 found associations between inflation and economic growth.

Ashagrie (2015) used time series data from 1971 to 2013 for a Threshold Auto Regressive (TAR) model and found no evidence of threshold effect between inflation and economic growth. The author claims the absence of evidence for non-linearity may be due to the absence of informational fiction which infers efficiency of financial system.

Tizita (2019) used the Granger causality test to examine the effect of inflation on economic growth.

Category 3: Other related studies: In this category are Yemane (2008), Mulualem (2014), Meseret (2014) and Abate et al (2015).

Yemane (2008) used a bounds test approach to co-integration due to Pesaran et al. (2001) and a modified version of the Granger causality test due to

Toda and Yamamoto (1995) for the period 1964 to 2003. The empirical evidence showed that besides money growth, higher budget deficits had significance influence on Ethiopian inflationary pressures.

Mulualem (2014) used an error correction model and co-integration techniques to examine the long-run relationship among variables during the period 1975 to 2014. The empirical evidence suggested that domestic inflation was affected by budget deficits, real GDP, exchange rates (ETB/USD) and world food prices.

Meseret (2014) employed time series data over the period 1970/1971-2010/2011 by applying an ARDL model for inflation. Gross fixed capital formation significantly reduced inflation, but money supply, per capita income and government consumption expenditure had a positive and significant effect both in the long- and short-term.

Abate et al (2015) used a VAR Granger Causality test over the period 1975 to 2012 and found unidirectional Causality from money supply to CPI.

Table 1: Summary of the Inflation Studies on Ethiopia

No	Author/s(year). /Article/Journal/Commissioned document/Manuscript	Methodology	Major findings
1	Durevall, D., Loening, J. and Ayalew Birru, Y., (2013). "Inflation dynamics and food prices in Ethiopia". *Journal of Development Economics*, 104, pp.89-106.	Single-equation ECMs using monthly data	Movements in international food and goods prices, measured in domestic currency, determined the long-run evolution of domestic prices.
2	Loening, L., Durevall, D. and Birru A. (2009). (2009). "Inflation Dynamics and Food Prices in an Agricultural Economy: The Case of Ethiopia", *Policy Research Working Paper 4969, The World Bank Africa Region Agricultural and Rural Development Unit.*	Error correction model.	Over three to four years, the main factors that determine domestic food and non-food prices are the exchange rate and international food and goods prices. In the short-run, agricultural supply shocks and inflation inertia strongly affect domestic inflation, causing large deviations from long-run price trends. Money supply growth does affect food price inflation in the short-run, although the money stock itself does not seem to drive inflation
3	Mulualem, E. (2014). "Budget Deficit Impact of Inflation in Ethiopia". *Birritu NBE Quarterly Magazine No.121.*	Co-integration technique to examine the long run relationship between variables	Evidence for the existence of a long-run relationship between domestic inflation, budget deficits, real GDP, exchange rates (ETB/USD) and world food prices.
4	Muluneh, A (2009): "Estimating Underlying Inflation for Ethiopia", *Birritu NBE quarterly magazine No. 107,* http://www.nbe.gov.et/pdf/birritu/Birritu107.pdf	Regression analysis based on trimmed means	In general, the existing official core inflation measurement used by the National Bank of Ethiopia is found to be more efficient than the trimmed means obtained here.
5	Bachewe, F. and Headey, D., (2016). "Urban Wage Behaviour and Food Price Inflation in Ethiopia". *The Journal of Development Studies, 53(8), pp.1207-1222.*	A unique panel of monthly price and wage data from 111 urban markets to first construct welfare-relevant measures of real wages, before employing various panel estimators to formally test wage-food price integration	Moderate rates of long-run adjustment to increases in food prices, but adjustment very slow. This implies highly adverse short-run welfare impact of higher food prices on the urban poor.
6	Habtamu, G. (2015). "A Macro Econometric Approach Explaining the Causes and Dynamics of Price Inflation in Ethiopia". *Journal of Economics and Sustainable Development.6(15), PP 58-75*	The VECM and a multi factor single equation model	The effect of supply side, monetary and external factors are highly significant to explain price inflation through their long run co-integrated relationships.

No	Author/s(year). /Article/Journal/Commissioned document/Manuscript	Methodology	Major findings
7	Jonse, B. (2018). "Dynamics and Determinants of Inflation in Ethiopia", *in A. Heshmati and H. Yoon (eds.), Economic Growth and Development in Ethiopia, Perspectives on Development in the Middle East and North Africa (MENA) Region,* https://doi.org/10.1007/978-981-10-8126-2_4	ARDL	Inflation is driven by money supply as known from the monetarist school.
8	Tadesse, G., and Guttormsen, A. (2010). "The behavior of commodity prices in Ethiopia". *Agricultural Economics*, 42(1), 87-97. doi: 10.1111/j.1574-0862.2010. 00481.x	A Modified classical rational expectation model to account for seasonal correlation of shocks. Model predictions are reduced to computable periodic threshold auto-regression	The presence of periodic price thresholds that could be formed as a result of speculative storage.
9	Durevall, D. and Sjö, Bo, (2012). "The Dynamics of Inflation in Ethiopia and Kenya", *Working Paper Series N° 151 African Development Bank, Tunis, Tunisia.*	Single-equation error correction models for the Consumer Price Index in each country	Inflation rates in both Ethiopia and Kenya are driven by similar factors: world food prices and exchange rates have a long run impact, while money growth and agricultural supply shocks have short- to medium-run effects. There is also evidence of substantial inflation inertia in both countries
10	Yemane Wolde-Rufael (2008). "Budget Deficits, Money and Inflation: The Case of Ethiopia". *The Journal of Developing Areas*, 42(1), pp. 183-199.	Using the bounds test approach to co-integration due to Pesaran et al. (2001) and a modified version of the Granger causality test due to Toda and Yamamoto (1995); the dynamic ordinary least squares (DOLS) due to Stock and Watson (1993) and the fully modified ordinary least squares (FMOLS) due to Philips and Hanson (1990)	The empirical evidence shows that there was a long run co-integrating relationship among the series with a unidirectional Granger causality running from money supply to inflation and from budget deficits to inflation. By contrast, fiscal policy does not seem to have any impact on the growth of money supply.

No	Author/s(year). /Article/Journal/Commissioned document/Manuscript	Methodology	Major findings
11	Asayehgn, D. (2009). "Economic Growth for Inflation: The Ethiopian Dilemma",https://pdfs.semanticscholar.org/d291/6a9131abc2929b221571436a88beb809bc53.pdf?_ga=2.56524395.1532688480.1588702214-2090345817.1567689219	Multiple regression analysis	The main determinants of inflation in Ethiopia are imports, depreciation of the birr, and a decline in the domestic lending interest rates or an increase in broad money supply.
14	Abebe, A., Arega, S., Jemal, M., and Mebratuc, L. (2012) "Dynamics of Food Price Inflation in Eastern Ethiopia: A Meso-Macro Modelling", *Ethiopian Journal of Economics, Vol XXI No 2 or 21(1).*	Meso level price dynamics and focus on certain items are scant through Vector Error Correction Model (VECM)	In the long run, money supply, real income and international food and oil price hikes increase domestic food inflation while rises in exchange rate (depreciation or devaluation) was found to decrease inflation. Inflation expectation, smuggling, rises in world oil price and exchange rates are also documented to impact food price inflation of the study area in the short-run.
15	Ademe, A. (2015). "Interaction of Ethiopian and World Inflation: A Time Series Analysis; VECM Approach'. *Intellectual Property Rights: Open Access 3(147). doi:10.4172/2375-4516.1000147*	Vector Error Correction Model was employed to model long run co-integration	In the long-run co-integration model, world oil prices, household level and the country's government expenditure and money supply growth, and world level inflation, affect the domestic inflation positively and significantly.
16	Ashagrie, D. (2015). "Inflation- Growth Nexus in Ethiopia: Evidence from Threshold Auto Regressive Model1". *Ethiopian Journal of Economics* Vol. XXIV No 1,	Hansen's Threshold Autoregressive (TAR) model.	Does not support the existence of threshold effect between inflation and economic growth
17	Abis, G. (2013). *The Relationship Between Inflation and Economic Growth in Ethiopia*, Unpublished MCom Thesis. University of South Africa	Engle-Granger and Johansen co-integration tests	There is a positive long-run relationship between inflation and economic growth. The error correction models show that in cases of short-run disequilibrium, the inflation model adjusts itself to its long-run path correcting roughly 40% of the imbalance in each quarter
18	Gebeyehu Yismaw, T. (2019). "Effect of Inflation on Economic Growth of Ethiopia". *Journal of Investment and Management, 8(2), 48. doi: 10.11648/j.jim.20190802.13*	Granger causality test	Existence of strong and significant correlation between variables pairwise. The test reveals a uni-directional causation between real GDP and export (EX), between real GDP and inflation, and real GDP and investment. The causation runs from real GDP to inflation, real GDP to export and real GDP to investment respectively

No	Author/s(year). /Article/Journal/Commissioned document/Manuscript	Methodology	Major findings
19	Getachew, W. (2018). "The Relationship between Inflation and Economic Growth in Ethiopia". *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)* Volume I, No 3., PP. 264-271	Desk review	Inflation rate has a serious negative effect on the growth of one country's economy especially in Ethiopia, if inflation has a double digit of an annual growth.
20	Teamrat, K. (2017). "Determinants of Inflation in Ethiopia: A Time-Series Analysis". *Journal of Economics and Sustainable Development* www.iiste.org SSN 2222-1700 (Paper) ISSN 2222-2855 (Online)Vol.8, No.19, 2017	co-integrating technique	The co-integrating regression considers only the long-run property of the model, and does not deal with the short-run dynamics explicitly.
21	Loening, J. Gounder, R. and Takada, H. (2008). "Inflationary Expectations in Ethiopia: Some Preliminary Results". *Applied Econometrics and International Development,8(2).*	Parsimonious error correction model fitted with monthly observations. And simulation	Increased money supply and the nominal exchange rate significantly affect inflation in the short run. Agricultural output shocks, proxied by a cereal-weighted agricultural production index, are also important. By providing an accommodative financial environment, monetary policy in Ethiopia triggers price inertia, which has large and persistent effects; monetary policy alone may be unfeasible to control inflation effectively
23	Alemayehu, G., and T. Kibrom. (2011). "The galloping inflation in Ethiopia: A cautionary tale for aspiring 'developmental states' in Africa'. *IAES Working Paper* No. WP-A01-2011.	Vector auto-regressive (VAR) formulation	The determinants of inflation differ for food and non-food sectors and in the short- and long-run. The most important forces behind food inflation in the long-run are sharp rises in food demand triggered by rises in money supply/credit expansion, inflation expectations and international food price hikes. The long-run determinants of non-food inflation, however, are money supply, interest rate and inflation expectations. In the short-run model, wages, international prices, exchange rates and constraints in food supply is found to be prime sources of inflation. We also found evidence of cost marking-up as another possible cause of inflation in the short-run.
24	Tekeber, N., Tekilu. T., and Tesfaye, M. (2019). "Supply and Demand Side Determinants of Inflation in Ethiopia Auto-Regressive Distributed	ARDL	A long-run relationship between explanatory variables and the consumer price index in Ethiopia. The empirical results implied evidence of a long-run positive impact of money supply, world oil prices, budget deficits and a real effective exchange rate on

No	Author/s(year). /Article/Journal/Commissioned document/Manuscript	Methodology	Major findings
	Lag Model (ARDL)", *International Journal of Commerce and Finance, Vol. 5, Issue 2, 2019, 8-21*		inflation though real gross domestic product had an insignificant effect on price level
24	Solomon, M. (2013). "Determinants of Price Dynamics in Ethiopia", *Ethiopian Journal of Economics Vol. XXII No 2*.	Simulation analysis to uncover the sources of inflationary pressure	Monetary and fiscal fundamentals are important determinants of price dynamics in the short run. In the long run, output remains the most important variable
25	Temesgen T. (2013). "Determinant and Impacts of Dynamic Inflation in Ethiopia". Unpublished MA Thesis. *Norwegian University of Life Sciences. Department of Development and Natural Resource Economics*	A Granger Causality Model approach	Existence of a bi-directional causality between broad money supply growth and inflation and unidirectional causality between currency devaluation and inflation as well as oil price and inflation. For the complete sample period, the causality running from inflation to broad money supply growth was stronger than the reverse.
26	Fitsum, S., Yilkal, W. and Teshome, A. (2016). "The Relationship between Inflation, Money Supply and Economic Growth in Ethiopia: Co integration and Causality Analysis". *International Journal of Scientific and Research Publications, 6(1).*	The Johansen co-integration test indicates the presence of one co integrating vector and the VECM	Existence of long run bi-directional causality between inflation and money supply and unidirectional causality from economic growth to inflation. In the short-run one way causality was found from money supply and economic growth to inflation. The key findings were that inflation is a monetary phenomenon in Ethiopia and it is negatively and significantly affected by economic growth
27	Abate, E. and Nandeeswara, R (2015). "A Co-Integration Analysis of Money Supply and Price in Ethiopia", *International* Journal of Recent Scientific Research Vol. 6, Issue, 5, pp.3972-3979.	A co-integrated Vector Auto Regressive (VAR)	The existence of a long-run relationship among the variables entered in both inflation and growth models. To explore the short-run direction of causality between money supply and the Consumer Price Index (CPI), a Granger Causality test has been applied and in order to investigate the existence of a long-run relationship, co-integration analysis has been employed
28	Meseret, F. (2014). *Effect of Trade Openness on Inflation in Ethiopia (An Auto Regressive Distributive Lag Approach).* Unpublished MSc thesis, Addis Ababa University.	Time series data over the period 1970/1971-2010/2011 by applying ARDL	Gross fixed capital formation significantly reduces inflation, but money supply, per capita income and government consumption expenditure have a positive and significant effect both in the long-run and short-run
29	Abeba, T. (2014) I*nflation and Growth Relationships: A Comparative Study of Ethiopia*	Vector Error Correction Model (VECM) from 1990-2012	Existence of a positive significant bi-directional feedback relationship between inflation and economic growth both in the short- and long-term. But for Uganda there exists only a

No	Author/s(year). /Article/Journal/Commissioned document/Manuscript	Methodology	Major findings
	and Uganda, Unpublished Thesis Submitted to the Center for African And Oriental Studies.		unidirectional negative relationship between inflation and growth that runs from GDP growth to inflation. Since there is a strong long-run effect of economic growth on inflation both in Ethiopia and Uganda, there is a need for a stabilization program to mitigate the inflationary situations in both countries. Therefore, in Ethiopia, focus should be given to policies that will achieve price stability. This demands further research to identify factors affecting the level of inflation and also the impact of inflation on other economic variables including development.

2.4 Evaluation of the Documents and Empirical Studies on Inflation Dynamics and Macroeconomic Stability

This section evaluates the empirical evidence related to inflation in Ethiopia and reviewed above. This evaluation will help to identify key gaps for this study emphasizing specific issues. Our first category focused on studies focused on the underlying factors of inflation in Ethiopia. With the exception of Muluneh (2009), who approached the measurement of core inflation in permanent and transitory components using trimmed mean regression, the studies used very similar approaches such as facing aggregate time series data to ECM, VEC and VAR, and also Granger Causality, though this is a method with high statistical dominance and less to do with economics in the strict sense. The use of time series econometrics is not inappropriate by itself, but most of the studies have not undergone a test for structural break, the standard approach in the current state-of-art in time series economics. The main concern here is the need to discriminate between genuine unit roots and the tendency of autoregressive coefficients to drift towards unity due to a failure to model a regime shift. This regime shift is likely to exhibit a break in series, rendering results based on the DF test dubious. Structural breaks, irrespective of their nature, have a permanently lasting effect on nonstationary processes, while their effect on stationary process dies out as time passes, though they lead to a permanently higher mean of stationary process (Charmeza and Deadman, 1997, pp,115-19)). The implication is that policies drawn from such results may be misleading.

Another facet of the studies under this category is excessive overreliance on statistics and less concentration on economics. For example, using the Quantity Theory of Money (QTM) to model equations where money supply is argued as a source of inflation, is not appropriate because QTM is an identity in itself not a reduced form equation. Fitsum et al (2016), for example, used the modeling and estimation of inflation from QTM.

The second category linked inflation to economic growth. With the exception of Ashagre (2015), who used TAR and found the absence of threshold hold effect, others found different but unstructured results, suggesting the absence of unified framework under inflation growth regression. Our final category is of work not based on economic theory with the exception of Yemane (2008) and Mulualem (2014) who linked budget deficit to inflation.

To summarize, none of these studies have attempted to decompose the general inflation into permanent and non-permanent components using a model-

based approach. This study aims to add to existing knowledge first by disaggregating inflation down to commodity level and then decomposing it into permanent and non-permanent components; and by using emerging literature which links inflation to political economy variables as proxied by quality governance. It is hoped this research will inform policy makers in their efforts to establish stable macroeconomic conditions.

3. METHODOLOGY OF THE STUDY

3.1 Theoretical Issues in Inflation Decomposition

Literature on inflation and methods of linking inflation to key macroeconomic fundamentals occupies one of the central positions in macroeconomics and in monetary economics in particular. By creating uncertainties, inflation affects economic agents' decision-making behavior and subsequently affects economic performance at macro level and individuals' lives at micro level. Owing to the complexities and dynamics in the behavioral (economic and psychological) and institutional factors embodied in the drivers of inflation which are becoming more complex and sophisticated, renewed interests are emerging in the study of inflation dynamics.

Bauer et al (2004) noted that an aggregate inflation rate is limited in the information it provides, especially with regard to sources of its movements. Reis and Watson (2010) argued that explaining the aggregate changes in goods' prices is one of the goals of macroeconomics, if there is a single consumption good as often assumed in models, describing price changes of consumption goods would be a trivial matter. However, in reality, there are many goods and prices, and there is an important distinction between price changes that are equiproportional across all goods (absolute price changes) and changes in cost of goods relative to others (relative-price changes) (Rise and Watson, 2010, p 128).

This research will therefore differ from previous empirical works on inflation in Ethiopia by studying inflation dynamics. Its focus is decomposition of the traditional measure of the headline inflation to its permanent (core) and non-permanent (transitory) components. The theoretical and empirical literature differs on measuring and estimating inflation dynamics by decomposition. The starting point is the definition of core inflation. This represents the long-run trend in price level which affect overall inflation numbers and has no medium- to long-run impact on real output, a notion which is consistent with the vertical long-run Phillips Curve interpretation of movement in inflation and output (Quah and

Vahey,1995). This helps monetary authorities to discriminate between different drivers of inflation such as monetary aggregates and or cost push.

The traditional measure of trend inflation is attained by subtracting food and energy components which exhibit high volatility from the CPI. This is known as core inflation (see Ribba, 2003) and an excellent treatment of the measurement of core inflation is to be found in Rather et al. (2016). This emphasizes that previous studies, including Bauer et al., (2004)**,** have elements of arbitrariness in excluding food and energy components as volatile and instead proposed a model based on estimation of core inflation. Rather et al reviewed the existing methods of constructing core inflation identifying these as the exclusion, limited influence and model-based methods.

The exclusion method is based on the practice of eliminating some prices; Bauer et al (2004), for example, exclude the food and energy components of inflation to arrive at core inflation. The limited influence method, proposed by Bryan and Cecocchetti (1993)**,** decomposes inflation by the approach of some percentage of prices on both tails of the distribution of price changes that are either symmetrically or asymmetrically eliminated to arrive at a measure of core inflation. Trimmings are based on the optimal percentage to consider for trimming. Kearns (1998) and Meyer (1999) define the optimal size of trimming that ensures a measured core inflation lying closer to the reference trend component of inflation. However, the core inflation obtained is again conditional upon the selection of the reference trend inflation.

The model-based approach avoids the limitations of the previous two models. Its theoretical development is due to Ball and Mankiw (1995)'s development of a new theory of supply shock arguing that fundamentally, supply shocks are changes in certain relative prices. An example cited was the 1970s' supply shock from increases in the relative prices of food and energy. They pointed out that the theory of the transmission mechanism making such relative price changes inflationary wasn't clear. The authors contended that in a classical approach, real factors determine relative prices, and the money supply determines the price level, while for a given money stock, adjustments in relative prices would be accomplished through increases in some nominal prices and decreases in others (Ball and Mankiw, 1995, p.161). Friedman, who saw the first OPEC shock and applied this logic, claimed, however, that this event should not be inflationary (Friedman (1975)).

Rather et al expanded the theoretical development of Ball and Mankiw to decompose the headline inflation through its trend components, in which the

major improvement being a measure of core inflation, defined as the weighted average of the distribution of commodity price changes, has a minimum skewness. The resulting underlying core inflation was found to be a powerful leading indicator of headline inflation. While other conventional measures do not exhibit such fundamental properties of core inflation, the major characteristic of this procedure is that the trimming percentage varies over time based on the sign and size of the skewedness. Decomposition of inflation is the contribution of many economists (Bauer et al., 2004; Ball and Mankiw, 1995; Kearns, 1998; Meyer, 1999; Mohanty et al., 2000; Ribba, 2003; Rather et al., 2016).

We will now proceed to formulate the theoretical approaches and outline our estimation strategy. Decomposition starts from a very simple equation.
Headline inflation is the usual inflation figure reported through the CPI by the CSA at a particular time - t; it can be decomposed into permanent and non-permanent components:

$$(Eq.1) \quad \pi_t = \pi_t{}^c + \pi_t{}^{np}$$

In (Eq.1), π_t, $\pi_t{}^c$ and $\pi_t{}^{np}$ represent headline inflation, the permanent component of headline inflation or the underlying core inflation and the non-permanent component of the headline inflation at time t respectively. The formulation by Ribba (2003) expands the decomposition equation as follows:

$$(Eq.2) \quad \pi_t = (\ln(p_t) - \ln(p_{t-12})) \times 100$$

In$(Eq.2)$, π_t is year-on-year inflation rate assumed $I(1)$ variable. Then, it is possible to decompose inflation in permanent $I(1)$ and non-permanent (transitory), $I(0)$ components.
Permanent (core) component is given by:

$$(Eq.3) \quad \pi_t{}^c = (\ln(p_t{}^c) - ln(p_{t-12}^c)) \times 100$$

Ribba (2003) argued that any measures of core inflation should satisfy the following two conditions:
(1) π_t and $\pi_t{}^c$ are integrated with co-integrating vector $(1,-1)'$:
(2) There exits an error correction representation given by:

$$(Eq.4) \quad \Delta \pi_t{}^c = b_{11}(L)\,\Delta\pi_{t-1}^c + b_{12}(L)\,\Delta\pi_{t-1} + \alpha_{11}(\pi_{t-1}^c - \pi_{t-1}) + \varepsilon_{\pi_t{}^c}$$

$$(Eq.5)\ \ \Delta\pi_t = \ b_{21}(L)\,\Delta\pi_{t-1}^{c} \ + \ b_{22}(L)\,\Delta\,\pi_{t-1} + \ \alpha_{21}(\pi_{t-1}^{c} - \pi_{t-1}) + \varepsilon_{\pi_t}$$

Where, $\alpha_{11} = 0, \Delta = 1 - L$ and L is the lag operator, $\varepsilon_t = \left(\varepsilon_{\pi_t{}^c}, \varepsilon_{\pi_t}\right)'$ is the (2×1) vector of reduced form disturbances such that $E(\varepsilon_t) = 0)$ and $E(\varepsilon_{1t}\,\varepsilon_{2t'}) = \Omega_t$. This implies π_t adjusts to long run equilibrium whereas $\pi_t{}^c$ does not, as the coefficient of the error correction term in the core inflation equation (α_{11}) is restricted to be zero, i.e., there is one way causality at frequency zero.

To operationalize $(Eq.4)$ and $(Eq.5)$, we obtain their respective reduced forms as follows. Noting that $(1-L)\,1-L)\,X_t = \Delta\,X_t - \Delta\,X_{t-1} = X_t - 2X_{t-1} + X_{t-2}$. Thus,

The first term on the right-hand side of $(Eq.4)$ becomes:

$$b_{11}(L)\,\Delta\pi_{t-1}^{c} = \ b_{11}(L)(1-L)\,\pi_{t-1}^{c} = \ b_{11}(L(\pi_{t-1}^{c} - L\pi_{t-1}^{c})) = \ b_{11}(\pi_{t-2}^{c} - \pi_{t-3}^{c})$$

Similarly, the second term on the right side of $(Eq.4)$ becomes:

$$b_{12}(L)\,\Delta\,\pi_{t-1} = b_{12}(L)\,(1-L)\ \pi_{t-1} = b_{12}(L(\,\pi_{t-1} - L\,\pi_{t-1}) = \ b_{12}(\,\pi_{t-2} - \ \pi_{t-3})$$

Thus, $(Eq.4)$ can be written in simplified form as $(Eq.4a)$ where;

$$(Eq.4a)\ \ \Delta\ \pi_t{}^c = \ b_{11}(\pi_{t-2}^{c} - \pi_{t-3}^{c}) + \ b_{12}(\,\pi_{t-2} - \ \pi_{t-3}) + \alpha_{11}(\pi_{t-1}^{c} - \pi_{t-1}) + \varepsilon_{\pi_t{}^c}$$

Following the same procedure, $(Eq.5)$ can be written in simplified estimable form as $(Eq.5a)$ where;

$$(Eq.5a)\ \ \Delta\,\pi_t = \ b_{21}(\pi_{t-2}^{c} - \pi_{t-3}^{c}) + \ b_{22}(\,\pi_{t-2} - \ \pi_{t-3}) + \ \alpha_{21}(\pi_{t-1}^{c} - \pi_{t-1}) + \varepsilon_{\pi_t}$$

Thus $(Eq.4a)$ and $(Eq.5a)$ can be estimated using OLS after investing the time series properties of the variables in the data set and subsequent data transmutation. So, shocks in core inflation can influence the long run forecast of headline inflation and not *vice-versa*. Ribba (2003) and Rather et al (2016) emphasize that it is not necessary to impose further restriction on causality relationship as condition (2)

ensures that only the innovation term in (Eq.4) $+ \varepsilon_{\pi_t{}^c}$ can influence the long-run forecast of inflation. In other words, if condition (2) holds, then:

$$\text{(Eq. 6)} \qquad \lim_{h\to\infty}\left(\frac{\partial E_t(\pi_{t+h})}{\partial \varepsilon_{\pi_t{}^c}}\right) \neq 0$$

$$\text{(Eq. 7)} \qquad \lim_{h\to\infty}\left(\frac{\partial E_t(\pi_{t+h})}{\partial \varepsilon_{\pi_t}}\right) = 0$$

Hence, the conditional expectation $E_t\,\pi_{t+h}$ for long forecast horizon with respect to the past history depends only on $\pi_t{}^c$

When $(Eq.4)$ and $(Eq.5)$ are inverted to obtain the reduced form representation:

$$\text{(Eq. 8)} \quad \begin{pmatrix}\Delta\,\pi_t{}^c\\ \Delta\,\pi_t\end{pmatrix} = \begin{pmatrix}C_{11}(L) & C_{12}(L)\\ C_{21}(L) & C_{22}(L)\end{pmatrix}\begin{pmatrix}\varepsilon_{\pi_t{}^c}\\ \varepsilon_{\pi_t}\end{pmatrix}$$

Under Ribba (2003), the total multiplier of $\Delta\,\pi_t{}^c$ with respect to $\Delta\,\pi_t$ *i*s given by $C_{12}(1)$and the assumption of unidirectional causality at zero frequency (inflation does not Granger –cause core inflation in the log-run) implies $C_{12}(1) = 0$ and it was emphasized that if $C_{12}(1) = 0$, then the long-run forecast does not depend on inflation and more importantly, $\pi_t \; and \; \pi_t{}^c$ are integrated with co-integrating vector $(1,-1)'$ implying that $C_{22}(1)$=0. Hence it follows that only the core inflation, $\pi_t{}^c$ can influence headline inflation, π_t

3.2 The Link between Inflation Dynamics and Macroeconomic Stability

To examine how macroeconomic stability evolved together with inflation in Ethiopia, this research uses the following framework proposed by the World Bank (2005; PP 102-3) which developed a useful method for measuring macroeconomic stability in the public sector solvency condition which requires the present values (PV) of primary surpluses $(T-G)$ and seignorage revenue (dM) to be at least as large as the government's outstanding stock of debt (B), $B(0)$ representing the present value of gross debt. Thus:

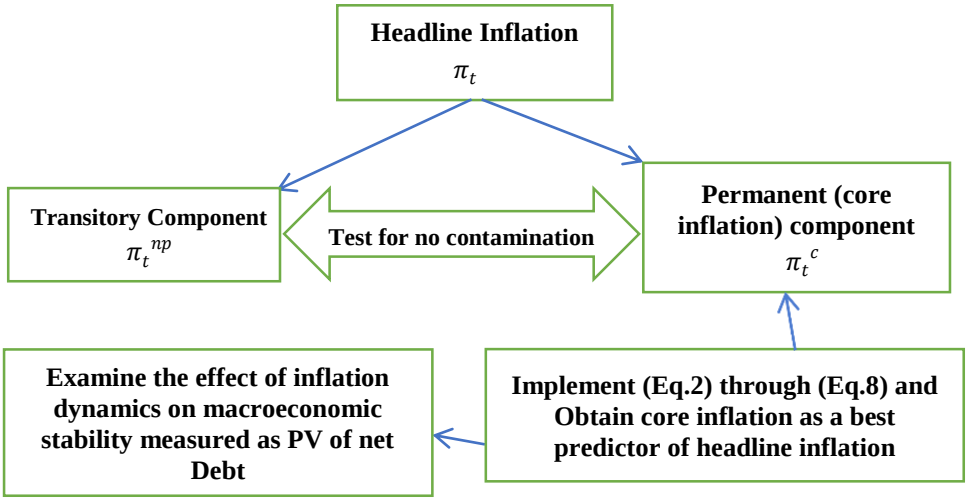
$$\text{(Eq. 9)} \quad PV(T-G+dM) \geq B(0)$$

Macroeconomic stability requires a monetary fiscal policy stance consistent with maintaining public sector solvency at low levels of inflation, while leaving some scope for mitigating the impact of real and financial shocks on macroeconomic performance. The former requirement imposes constraints on the size of the primary deficits $(G - T)$ and its money financing dM, while the latter refers to the profiles of monetary and fiscal policy over the business cycle. These requirements apply not only to the present but also to the future, as implied by the present value term in the expression.

3.3 Conceptual Framework and Estimation Implementation Procedure

This study will operationalize the inflation decomposition through the model-based approached described in section 2.1 so that the headline inflation is decomposed into core (permanent) and non-permanent (transitory) components endogenously. The model-based approach allows core inflation to be estimated endogenously as opposed to the exclusion and limited influence methods. The model-based approach does not impose prior exclusion of food and energy prices (exclusion method) or arbitrary choice of trimming point (limited influence method); rather core inflation is estimated endogenously. Thus, it implements Rather et al which allows performing endogenous estimation of the core inflation.

Figure 6: Conceptual Framework for Inflation Decomposition, Dynamics and Macroeconomic Stability



Source: Author's formulation

Steps for implementation: Rooted in Rather et al, the following steps will be followed:

Step 1. Measure the change in price of the i^{th} commodity (π_{it}) for time period $t\ and\ i = 1,2,3 \ldots N, where\ N$ is the total number of commodities in the sample and w_i represents the weight of the i^{th} commodity. Then Headline inflation during the time t is given by:

$$(Eq.10) \quad \pi_t = \sum_{i=1}^{N} w_i \pi_{it} / \sum_{hi=1}^{N} w_i$$

Step 2. Each commodity inflation (π_{it}) with their associated weights (w_i) is arranged in ascending or descending order for each time period;

Step 3: The search process for the range of commodity price changes $\{i^*, j^*\}$ minimizing the absolute value of skewedness $\left(\left|S_{i,j}\right|\right)$ within the range|i, j|. The procedure is executed with the help of the following formula:

$$(Eq.11)\ S_{i,j} = \left(\sum_{h=i}^{j} w_h\ (\pi_h - \pi')^3\right) \times \left(\sum_{h=i}^{j} w_h\ (\pi_h - \pi')^2\right)^{-3/2} \times \left(\sum_{h=i}^{j} w_h\right)^{1/2}$$

For each $j = \{N, N-1, N-2, \ldots, Z\}, i = \{1,2,3, \ldots, j - Z + 1\}$ where Z is the minimum number of data required for the calculation of skewedness and N is the number of commodities in the sample.

Step 4. The sample mean, π' for each period is computed using $(Eq.11)$

$$(Eq.12):\ \pi' = \sum_{h=i}^{j} w_h \pi_h \Big/ \sum_{h=i}^{j} w_h$$

Step 5: The core inflation ${\pi_t}^c$ is computed using $(Eq.12)$

$$(Eq.13)\ {\pi_t}^c = \sum_{h=i^*}^{j^*} w_h \pi_h \Big/ \sum_{h=i^*}^{j^*} w_h$$

4. DATA PRESENTATION, DESCRIPTION AND ANALYSIS

Section 4.1 presents the type and source of data used for this study. It is followed by a discussion of the evolution of inflation in Ethiopia, details and discussion of inflation disaggregation-decomposition, the decomposition of total inflation into

permanent (inflation driven by excess money growth) and non-permanent inflation (inflation driven by supply shock) and econometric evaluation of the decomposition result.

4.1 Data Presentation and Description

The data presentation, description and subsequent operationalization of the methodology for inflation disaggregation and decomposition was outlined above (Section 3.3). Commodity prices were obtained from the CSA's price survey and the dataset covers a wide range of commodities which has been expanding over time. The CSA had a sample of 119 markets which are themselves drawn from across and within the administrative regions. The regional price dataset cover from September 1997 to April 2020. The total number of commodities for which monthly price data was registered vary from 389 in September 1997 to 693 in April 2020. The data for the monetary aggregates and inflation were obtained from National Bank of Ethiopia (NBE), while data related to fiscal information was obtained from the MoFEC and the NPC. There were cases where a commodity or group of commodities was excluded from the survey over a period and/or a new commodity or group of commodities was included. To work on a longer time period enables investigation of the evolution of inflation over time; indeed, a longer time series observation is a more necessary and sufficient condition for studying a limiting distortion of estimated parameters in time series analysis and subsequent efficient analysis than observations of a relatively small number of observations for a large number of commodities. On these grounds, this study is based on a sample period from January 1997-April 2020 using the prices of 278 commodities, 41% of the commodity prices used in the construction of the CPI. The choice of the study period and the subsequent selection of 278 commodities were based on the grounds of availability of continuous observation for the study period.

4.2 Evolution and Inflation Dynamics and Inflation Disaggregation and Decomposition

Studying the evolution of aggregate prices and their changes over time requires understudying the weights of commodities in the national consumption and their contribution to aggregate inflation. Table 2 indicates these weights.

Table 2: Weights or basket (groups) of commodity items

Commodity Class			
Food and Non-Alcoholic Beverages Commodity Items	**Weight**	**Non-Food Commodity Items**	**Weight**
Bread and Cereals	0.171	Alcoholic Beverages and Tobacco	0.049
Meat (ND)	0.042	Clothing and Footwear	0.057
Milk, Cheese and Eggs (ND)	0.031	Housing, Water, Electricity, Gas and Other Fuels	0.168
Oils and Fats (ND)	0.043	Furnishings, Household Equipment and Routine Maintenance of the House	0.047
Fruit (ND)	0.002	Health	0.015
Milk, Cheese and Eggs (ND)	0.031	Transport	0.025
Vegetables	0.123	Communications	0.02
Sugar, Jam, Honey, Chocolate.	0.014	Recreation and Culture	0.004
Food products n.e.c. (ND)	0.056	Education	0.002
Non-Alcoholic Beverages	0.051	Restaurants and Hotels	0.053
		Miscellaneous Goods and Services	0.025
Total Weight	**0.54**		**0.46**

Source: CSA, latest new-weight

CSA constructs weights for individual commodities at regional level. However, aggregate weights are constructed for baskets of commodities. Table 2 shows that food and non-alcoholic beverages, and non-food items, constitute about 54% and 46 % respectively. Bread and cereals are given the highest weight of 17.1% followed by vegetables with the weight of 12.3%. For non-food items, housing, water, electricity, gas and other fuels constitutes the largest weight of 16.8% followed by clothing and footwear with weight of 5.7%.

4.3 Disaggregation of Inflation by Commodities and Construction of Aggregate Inflation

This study is based on these weights. Year to year inflation is computed for each commodity using $(Eq.2)$ (See above, Section 2.1). Using $(Eq.10)$ appropriate weight is selected and linked to each commodity for computing aggregate inflation for that particular period.

This procedure was repeated for each of the 278 commodities and 280 months from January 1997 to April 2020, providing 77840 values of inflation. Annex (1) is attached to provide five-year average values of inflation for the total of 278 commodities. Tables 3(b) - 3(c) show the top 25 inflationary commodities, with values averaged over five-year sets. Table 3(a)-3(c) indicate the shifting commodity drivers over time.

In Table 3(a) panel (A): January 1997-December 2001 (FFY), the imported Iron Pipe 6 mt 12 inches contributed the highest five-year average inflation of 168%; the minimum of the top 25 inflationary commodities is traditional hairdressing with a five-year average inflation of 3%. The median value is 10%. About 25 of the 278 commodities registered a five-year average inflation of 18%, driven by construction materials. This period was dominated by non-food items. Only four commodities were food items, Pepper Green, Bula Kg, Coffee Leaves Kg and Lentil split, most of which were at the bottom of the list. Imported items showed the highest inflationary pressure.

In Table 3(b), Panel (B): January 2002-December 2006 (SFY), the inflationary regime was dominated by food items. All the top 25 inflationary commodities were food items. As discussed above, Ethiopia's growth process began to be associated with inflation after 2004 and this five-year average inflation was 3.7%, with a median value of 3.47%.

In Table 3(b), Panel (A): January 2007-December 2011 (THFY), the dominating elements were a mix of food and imported items; for example, motor

oil and gloves registered five-year average inflation rates of 2, 5 and 1% respectively Clothing and accessories joined the top 23 commodities.

In Table 3(b), Panel (B): January 2012-December 2016 (FOFY), construction items (stone for house construction) and energy (Benzene) climbed to the top 25 inflation ladder. For example, stone for construction showed the highest five-year average inflation of 774% during this period. Benzene and motor oil registered five-year average inflation rates of 6 and 5% respectively.

In Table 3(c) Panel (A): January 2017 - April 2020 (FIFFY), the five-year inflationary process was dominated by inflationary pressures arising mainly from food items, largely vegetables. For example, onions and garlic were at the top of the list of the 25 commodities with inflation pressure of 17 and 13%, followed by cereals. Construction materials also contributed to inflationary pressure during this period.

From this, it is clear different inflationary regimes are influenced by the altering ebb and flow of commodities. The top 25 inflationary commodities changed over time. One explanation of this is that as the economy progressed, demands for new commodities arise as new income groups emerge while traditional commodities (*e.g* cereals) remain as the mainstay of groups left behind when others climb up the income ladder from low-income status.

Table 3(a): The top 25 inflationary commodities, five-year average

Item	Panel (A): January 1997-December 2001 (FFY)		Panel(B): January 2002- December 2006 (SFY)	
	Commodity	**Inflation**	**Commodity**	**Inflation**
1	Iron Pipe 6mt 12-inch Wide imported	**1.68**	Pepper Whole Kg	**0.06**
2	Day School Fee Private Grade 9	**0.38**	Fenugreek Kg	**0.05**
3	Floor Board 4m Length No	**0.35**	Coffee Beans Kg	**0.05**
3	Motor Oil Mobil Lt	**0.25**	Coffee Whole Kg	**0.05**
5	Wall Paints Super Fluid Plastic	**0.19**	Horse Beans Kg	**0.04**
6	Kemisna Netela No	**0.18**	Soya Beans Kg	**0.04**
7	Jeans Trouser	**0.17**	Peas Mixed Kg	**0.04**
8	Pepper Green Kg	**0.12**	Peas Black Kg	**0.04**
9	Jerrycan 20 Litres No	**0.12**	Teff Black Red Kg	**0.04**
10	Sweater Men Imported No	**0.12**	Wheat Mixed Kg	**0.04**
11	Animal Transport fare Trip	**0.12**	Horse Beans Split Roasted Kg	**0.04**
12	Night School Fee GovernmentGr9	**0.11**	Barley for Beer Kg	**0.03**
13	Cloves Imported Kg	**0.10**	Peas White Kg	**0.03**
14	Electric Mitad Aluminium No	**0.10**	Teff Mixed Kg	**0.03**
15	Bus Fare within Town Trip	**0.09**	Chick Peas Kg	**0.03**
16	Jeans Trouser No	**0.07**	Wheat Black Kg	**0.03**
17	Coarse Aggregate Gravel Meter Cu	**0.07**	Chick Peas Milled Kg	**0.03**
18	Bucket 20 Litres No	**0.05**	Barley Black K g	**0.03**
19	Shirt Long Sleeved Imported Boys N	**0.05**	Haricot Beans Kg	**0.03**
20	Nylon dress No	**0.04**	Short for Boys No	**0.03**
21	Bula Kg	**0.04**	Teff White Kg	**0.03**
22	Hand Bag Imported Synthetic No	**0.04**	Horse Beans Milled Kg	**0.03**
23	Coffee Leaves Kg	**0.04**	Wheat White Kg	**0.03**
24	Lentil split Kg	**0.04**	Maize Kg	**0.03**
25	Hair Dressing Traditional No	**0.03**	Sorghum White Kg	**0.03**
	Mean inflation from the top 25 commodities	**0.18**	**Mean inflation from the top 25 commodities**	**0.04**

Table 3(b): The top 25 inflationary commodities, five-year average, continued

Item	Panel(A): January 2007- December 2011 (THFY)		Panel(B): January 2012- December 2016 (FOFY)	
	Commodity	**Inflation**	**Commodity**	**Inflation**
1	Ginger Wet Local Kg	0.11	Stone for House Construction	7.74
2	Ginger Dry Local Kg	0.09	Dung Cake Kg	0.15
3	Barley White Kg milled	0.07	Ethiopian Kale Kg	0.14
3	Black Pepper Local Kg	0.07	Sesame Seed Kg	0.07
5	Motor Oil Mobil Lt	0.07	Ginger Wet Local Kg	0.06
6	Dabo Traditional Sheleto 350 gm	0.07	Benzene Lt	0.06
7	Turmeric Flour Local Kg	0.07	Wall Paints Super Fluid Plastic	0.06
8	Maize Kg	0.07	Motor Oil Mobil Lt	0.05
9	Cloves Imported Kg	0.07	Sorghum Kg	0.05
10	Lima Beans Kg	0.06	Fenugreek Kg	0.04
11	Coffee Whole Kg	0.06	Ginger Dry Local Kg	0.04
12	Coffee Beans Kg	0.06	Lima Beans Kg	0.04
13	Barley Mixed Kg milled	0.06	Chillies Whole Kg	0.04
14	Maize Kg milled	0.06	Niger Seed Kg	0.03
15	White Cumin Bishops Weed Local Kg	0.06	Barley Black Kg	0.03
16	Dabo Traditional Ambasha 350gm	0.06	Lentils Split Kg	0.03
17	Sorghum Red Kg	0.06	Lentils Kg	0.03
18	Bus Fare per km Tarif	0.06	Sun flower Kg	0.03
19	Lentils Kg	0.06	Chick Peas Kg	0.03
20	Garlics Kg	0.06	Black Cumin Local Kg	0.02
21	Durrah Kg	0.06	Chick Peas Split Roasted K g	0.02
22	Soya Beans Kg	0.06	Chick Peas Milled Kg	0.02
23	Lentils Split Kg	0.06	Peas Mixed Kg	0.02
24	Sorghum White Kg	0.06	Basil Dry Kg	0.02
25	Wheat Mixed Kg milled	0.06	Mixed Pulses Milled Kg	0.02
	Mean inflation from the top 25 commodities	0.07	Mean from the top 25 commodities	0.37

Table 3(c): The top 25 inflationary commodities five years average, continued

Item	Panel(A): January 2017- April 2020 (FIFFY)	
	Commodity	**Inflation**
1	Onions Kg	0.17
2	Barley Mixed Kg milled	0.13
3	Garlics Kg	0.12
3	Dabo Traditional Sheleto 350 gm	0.09
5	Window Glass 50cmx50cmx3mmN	0.08
6	Chick Peas Milled Kg	0.07
7	Pumpkin Kg	0.07
8	Cotton Kg	0.07
9	Fenugreek Kg	0.07
10	Lettuce Kg	0.06
11	Sorghum Kg	0.06
12	Barley White Kg milled	0.06
13	Gutter N32 Meter	0.05
14	Fire Wood Meter Cube	0.05
15	Vetch Kg	0.05
16	Durrah Kg	0.05
17	Wheat White Kg milled	0.05
18	Peas Black Kg	0.05
19	Leaks Kg	0.05
20	Coffee Leaves Kg	0.05
21	Sorghum White Kg	0.05
22	Sorghum Yellow Kg	0.05
23	Tomatoes Kg	0.05
24	Horse Beans Split Roasted Kg	0.05
25	Horse Beans Kg	0.04
	Mean inflation from the top 25 commodities	0.07

Figure 6: Inflation in descending order against top 25 commodities

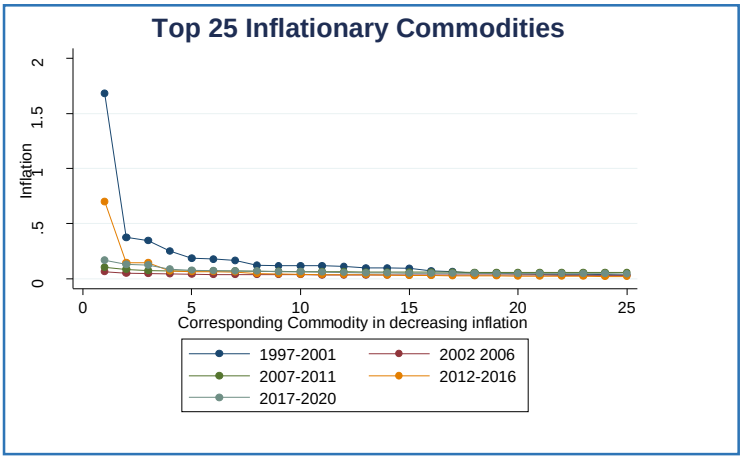


Figure 7: Mean Values

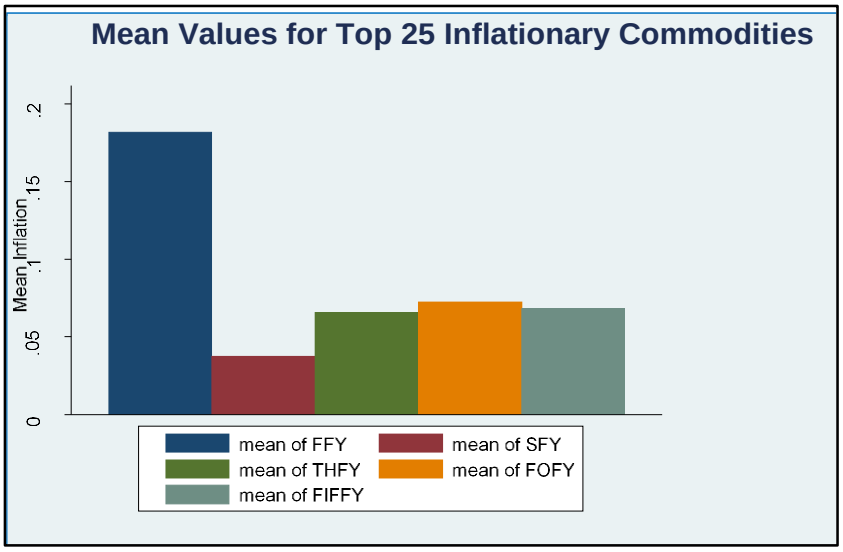


Figure 6 and Figure 7 show differences in the initial momentum of inflation arising from altering ebbs of the top 25 commodities in subsequent years. The inflation of the top ranked inflationary commodities during 1997-2001 was far greater than subsequently ranked commodities within the same group. The initial inflationary pressure for the years 1997-2001 and 20012-2016 were significantly higher for the top ranked commodity, in both cases construction materials. In the first case, it was an imported iron pipe and in the second case

domestic construction stone. The peculiar characteristic of these two items, particularly the iron pipe, is that they are usually imported by public institutions for a unique purpose. The purchase processes are usually direct orders to suppliers without competitive bidding. There is also the possibility that these items were transferred to businesses which hoarded the items until demand for the items soared, creating a market of relaxed sellers, tight byers and higher prices. The buyers could ultimately use markup pricing, creating price propagation throughout the overall economy and perpetuating inflation.

It is inviting to look in to Table 3(c) Panel (A): January 2017- April 2020 (FIFFY) the recent phenomenon high price for example onions and other vegetables climbing to the top of the inflation ladder. While there are serious constraints in producing and distributing these vegetables, it is far from clear why they should be inflationary, let alone ranking among top inflationary items. The answer lies in the structuralism model of inflation which argues causes of inflation must be sought in certain structural characteristics of developing countries' economies. This makes them particularly inflation-prone and means that the elimination of inflation, except at the social cost of widespread recession, requires policies to be directed toward removing various structural bottlenecks which initiate and perpetuate inflation. One of the most frequently mentioned of these is the relative inelasticity of the food supply. It is argued there is a tendency for the food supply to lag behind demands generated by the expansion of income in the non-agricultural sector, a result either of economic development or population pressure, and a cause of food price rises. If the share of the food component is high (in Ethiopia it is about 54%) any disruption in the food supply chain causes inflation. This could be the result of market failure, government failure or both. Market failure may come from the dominance of middle men, information asymmetry or poor marketing structures. Government failure is typically visible in political instability and violence that disrupt free mobility of people and commodities and prevent one price holding throughout out the country.

This suggests inflation could also be initiated and catalyzed by non-economic factors such as quality of economic management. We attempted to extract the track record of governance quality from the World Bank which produces the "Worldwide Governance Indicators (WGI)", a project to construct aggregate indicators of six broad dimensions of governance, Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness;

Regulatory Quality; the Rule of Law; and Control of Corruption. Here, we consider the four WDI indicators from the 2019 edition. The estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) performance.

I. **Government Effectiveness:** This reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, and the quality of policies.

II. **Regulatory Quality:** This shows perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

III. **Rule of Law:** This reflects perceptions of the extent to which agents have confidence in, and abide by, the rules of society, and in particular the quality of contract enforcement, and property.

IV. **Control of Corruption:** This provides perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

The following table (Table 4) shows top inflationary pressure and the World Governance indicator variables (WGI) variables are related. Simple correlation coffins are computed to learn if there is any association between the top inflationary momentum and the WGIs

Table 4: Correlation matrix from stata command: pwcorr FFY SFY THFY FOFY FIFFY concor goveff regqual rol, star(.01) bonferroni

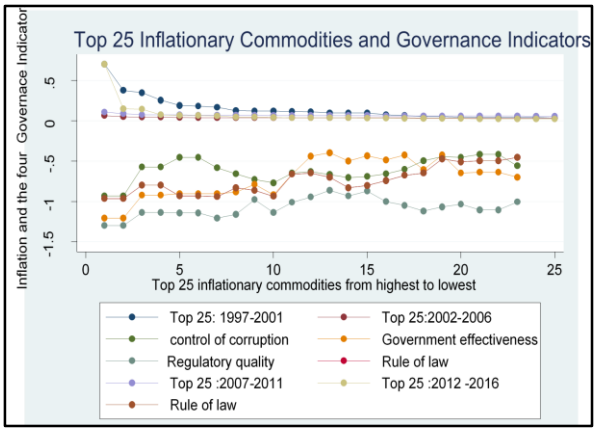
Pwcor	FFY	SFY	THFY	FOFY	FIFFY	concor	goveff	regqual	rol
FFY	1								
SFY	0.990*	1.00							
THFY	0.982*	0.980*	1.00						
FOFY	0.909*	0.885*	0.891*	1.00					
FIFFY	0.983*	0.978*	0.961*	0.849*	1.00				
Concor	-0.604	-0.599	-0.650	-0.546	-0.585	1.00			
Goveff	-0.756*	-0.776*	-0.784*	-0.580	-0.807	0.394	1.00		
Regqual	-0.632	-0.663	-0.660	-0.529	-0.690*	0.167	0.852*	1.00	
Rol	-0.611	-0.608	-0.678	-0.407	-0.605	0.604	0.638	0.416	1.00

Source: Computed from the CSA top 25 inflationary commodities and the WGIs database, 2019 edition

Table 4 is a correlation matrix between the top 25 inflationary commodities for the indicated commodities from Table 3(a)-3(c): Panel (A): January 1997- December 2001 (FFY); Panel (B): January 2002- December 2006 (SFY); Panel (A): January 2007- December 2011 (THFY); Panel (B): January 2012- December 2016 (FOFY); Panel (A): January 2017- April 2020 (FIFFY).

Table 4 shows there exists a positive association between inflation momentum across all the times and for all the selected four governance indicators. The following Figures 8 through 28 are constructed as follows. In all cases, the inflation values of the top 25 commodities range from the highest inflation value (inflation values on the vertical axis and number 1 on the horizontal axis) to the lowest inflationary commodity (inflation values on the vertical axis and number 25 on the horizontal axis) during the specific five-year periods. The figures exhibit consistent associations. In Figure 8, we superimpose the inflation values of the top 25 inflationary commodities on all the selected four governance indicators. We can see when the inflation momentum is high, all the four governance indicators are high, and large negative values for the governance indicators are associated by construction to low governance performances and *vice versa*. It should be noted that with low inflationary commodities, these are less likely to be associated with governance performance.

Figure 8: Top 25 Inflationary Commodities and Governance Indicators



Source: Constructed from the CSA and the WB data

Figures 9 through Figure 28 are constructed by taking each five-year period's inflationary momentum of the top 25 inflationary commodities and superimposing these on each governance indicator, one at a time. Figures 9–13 cover Inflationary Commodities and Control of Corruption; Figures 14-18

Inflationary Commodities and Government Effectiveness; Figures 19-23 Inflationary Commodities and Regulatory Quality; and Figures 24-28 Inflationary Commodities and the Rule of Law. All figures are constructed using CSA and WGI data set.

There is a clear indication in all cases that there is a positive association between each inflationary momentum and each governance indicator. Equally, the existence of correlation and association does not necessarily mean causation. It is not clear whether inflation momentum is causing (deriving) governance performance or *vice versa*. There could be a common factor behind and driving both inflation and governance performance. Since it was not feasible to carry out a controlled experiment to establish causation, we resorted to empirically identifying the common factor by inflation decomposition technique (see Section 4.4 below).

Top 25 Inflationary Commodities and Control of Corruption

Figure 9: 1997 – 2001

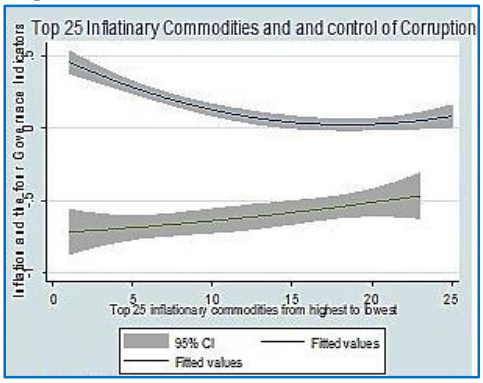


Figure 10: 2002

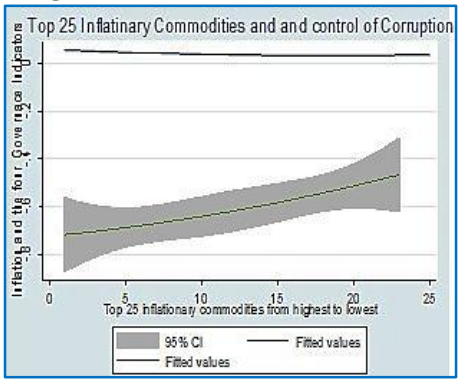


Figure 11: 2007 – 2011

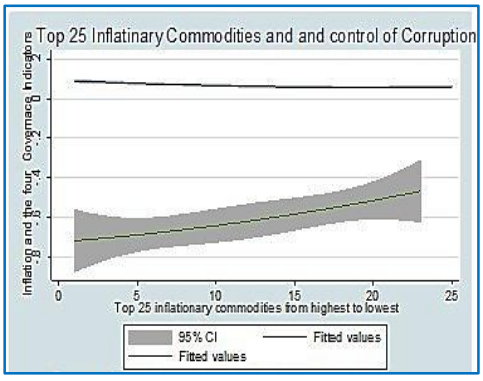


Figure 12: 2012 - 2016

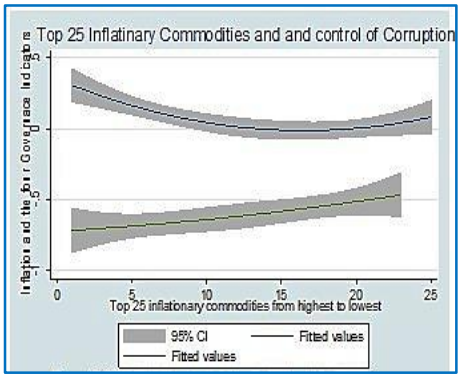
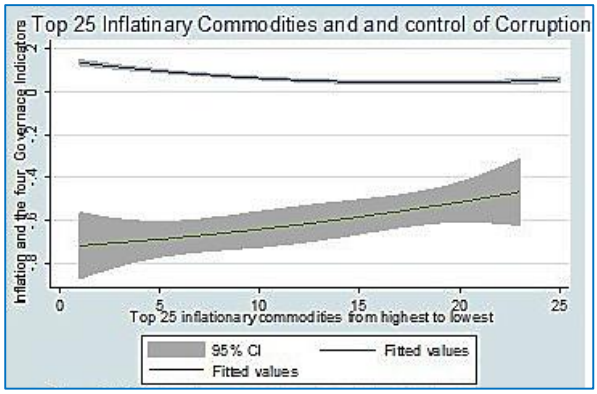


Figure 13: 2017 - 2020



Top 25 Inflationary Commodities and Government Effectiveness:

Figure 14: 1997 - 2001

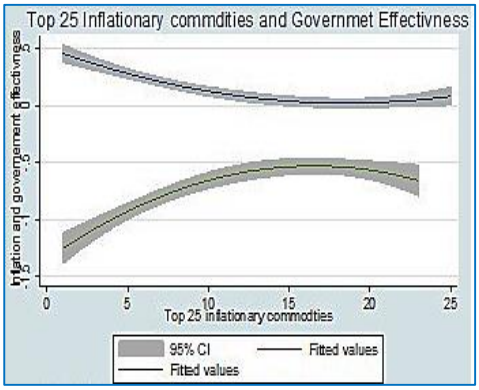


Figure 15: 2002 – 2006

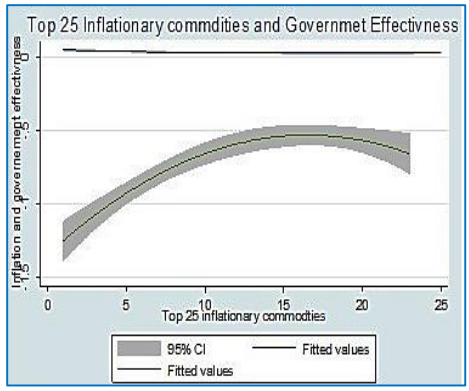


Figure 16: 2007 - 2011

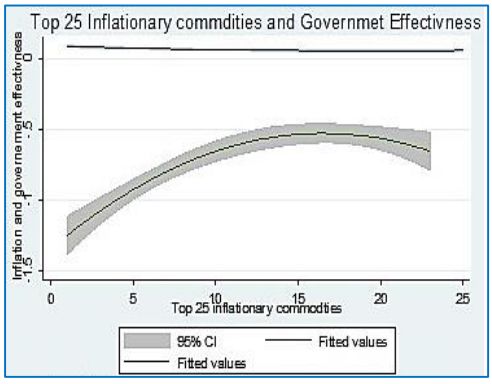


Figure 17: 2012 – 2016

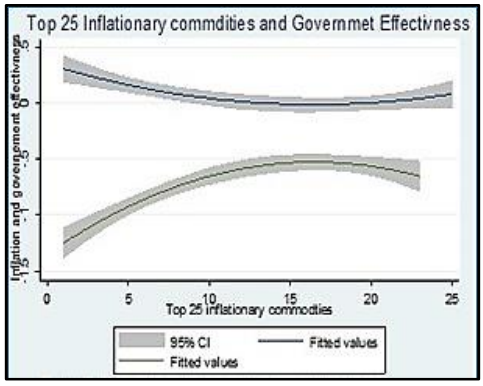
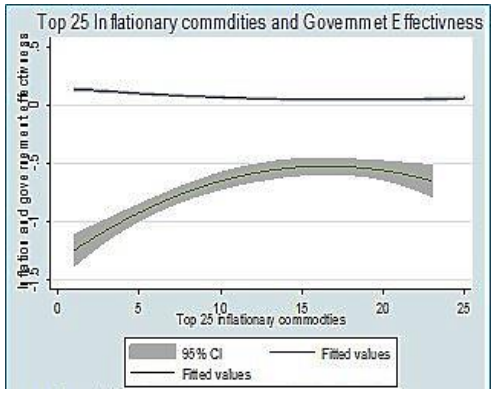


Figure 18: 2017 – 2020



Top 25 Inflationary Commodities and Regulatory Quality:

Figure 19: 1997-2001

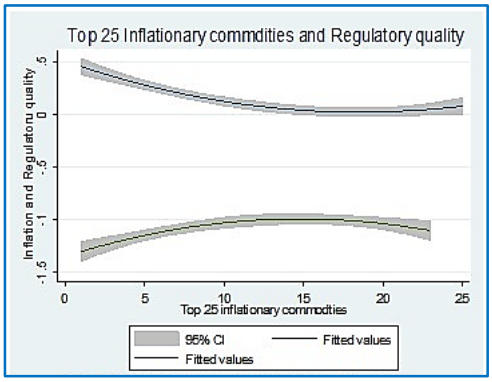


Figure 20: 2002-2006

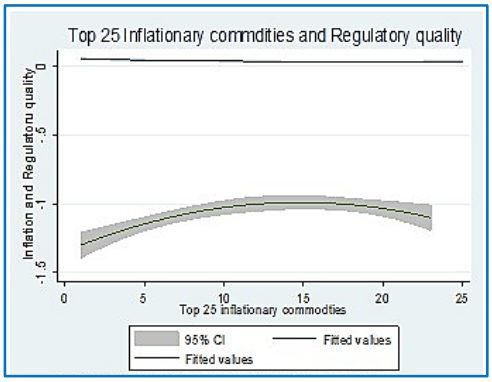


Figure 21: 2007-2011

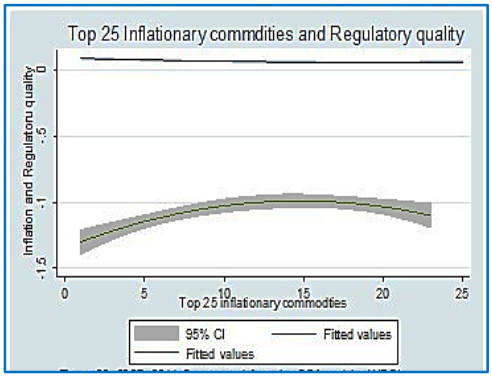


Figure 22: 2012-2016

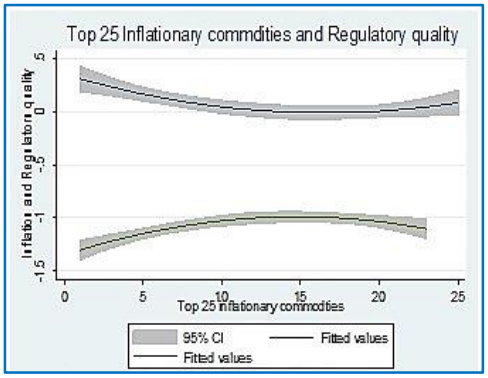
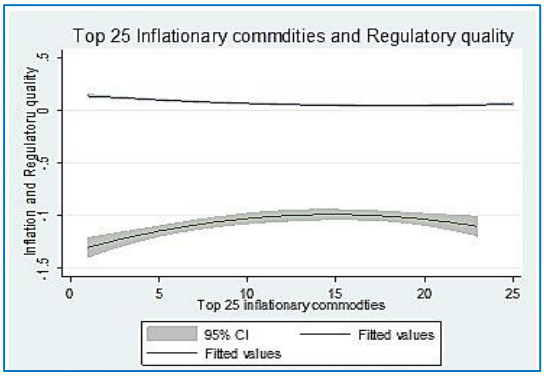


Figure 23: 2017-2020



Top 25 Inflationary Commodities and the Rule of Law:

Figure 24: 1997-2001

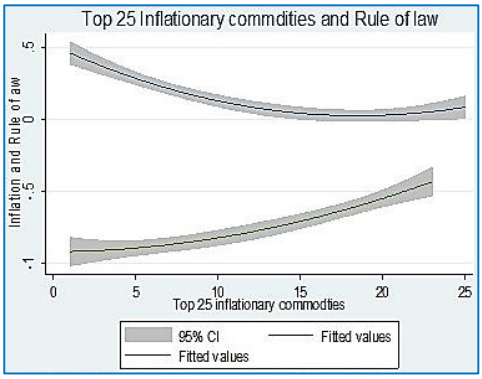


Figure 25: 2002-2006

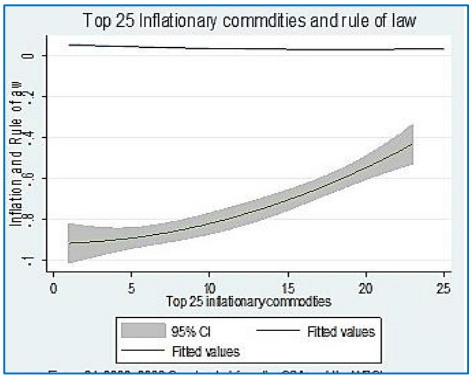


Figure 26: 2007-2011

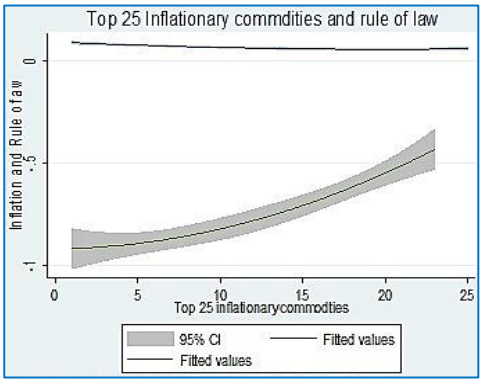


Figure 27: 2012-2016

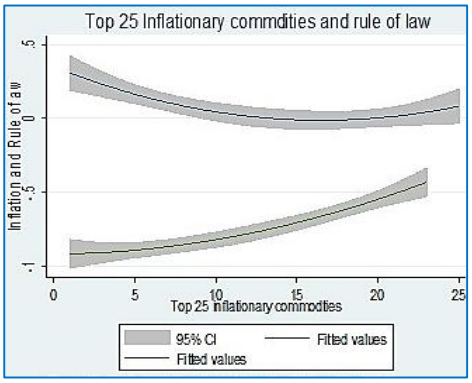
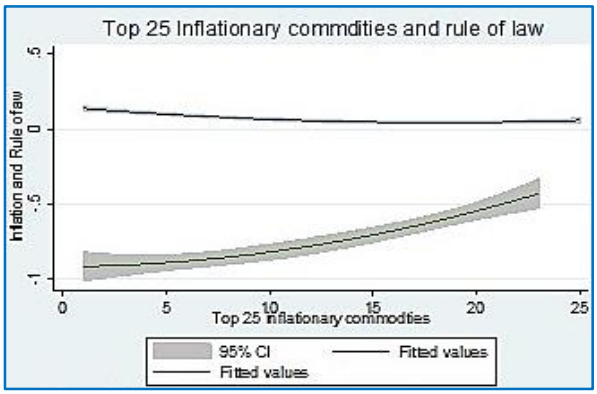


Figure 28: 2017-2020



The transmission mechanism through which corruption, for example, may affect inflation may be through seignorage and borrowing on inflation. Elkamel (2019) used panels of 72 for the period 1995-2005 and found that corruption, jointly with public finance, meant seignorage and borrowing increased the level of inflation. Also, where misuse of public finances was prevalent, so was corruption. Blackburn and Powell developed a model in which the embezzlement of tax revenues by public officials leads the government to rely more on seignorage to finance its expenditure. This raises inflation, depressing investment and growth via a cash-in-advance constraint: *"The effect of bureaucratic corruption on economic growth from a public finance perspective. Corruption is modeled as the embezzlement of public funds which leads to a loss of resources available to the government for financing its expenditures. As a consequence, the government is forced to rely on other sources of revenue, notably seignorage. This raises inflation which acts as a tax on both consumption and investment by virtue of a cash-in-advance constraint. The result is a fall in capital accumulation and growth. The predictions of the analysis are consistent with several empirical observations that is, a negative correlation between growth and inflation/seignorage"* (Blackburn and Powell (2011)).

4.4 Inflation Decomposition: Empirical Investigation of Permanent and Transient Components of Inflation

As outlined in section 2.3, equation $(Eq.10)$ through $(Eq.13)$, together with step 1 through step 5 of methodology, are carefully performed to obtain core component of the headline inflation. The total number of 280 skewnesses were

computed from the 280 commodities taking three commodities at a time (from theoretical statistics, a minimum of three observations are required to compute skewnesses) for each month and the minimum skewness was searched and core component of the inflation computed using($Eq.13$). These procedures were repeated for 279 months from January 1997 to April 2010. The outcome table is shown in Annex (2A) for headline inflation and Annex (2B) for the core, permanent component of inflation. Interpretation of the core component of inflation is offered below.

The whole purpose of inflation decomposition is to effectively identify the permanent and non-permanent (transient) components of total inflation by statistical apportioning methodology. A core inflation obtained through such inflation decomposition technique is interpreted as an existence of a common factor driving a common factor that applies to all commodities under investigation.

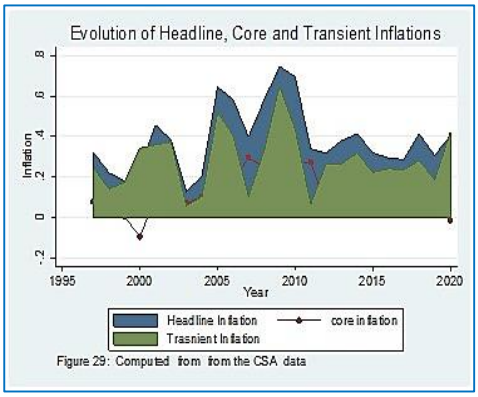
The purposed core inflation measure is the common persistent feature in the inflation and excess nominal money growth, and bears the interpretation monetary inflation (For this direct interpretation see Claudio, 2007 and literatures cited there). There are recently growing literatures and associated empirical evidences on this interpretation and subsequent adoption of the methodology by many central banks throughout the world.

Table 5 and Figures 29 to 31 show the variabilities (Table 5) and relative significances of the three categories of inflation and their shares in Figures 29,30 and 31. Table 5 shows that between January 1997 and April 2020, the core inflation (equivalent to monetary inflation) accounted for about 27.2%. Rising prices for all commodities is deeply rooted in sustained growth of the money supply, unless money growth is kept stable or nearly constant, when some prices rise and other prices on average fall significantly. The same money is spent on different commodities (see Annex (2A) and Annex (2B)).

Table 5: Summary statistics of headline, core and transient inflation,

Variable	Mean	Std. Dev.	Min	Max	CV(Std/Mean)
Headline Inflation	0.385	0.162	0.125	0.745	0.420
Core inflation	0.105	0.093	-0.095	0.745	0.885
Transient Inflation	0.280	0.144	-0.095	0.745	0.510
Share of Core Inflation	0.272	0.248	-0.389	0.804	0.911
Share of Transient inflation	0.727	0.248	0.195	1.389	0.340

Figure 29 and 30: Evolution of Headline, Core and Transient Inflations



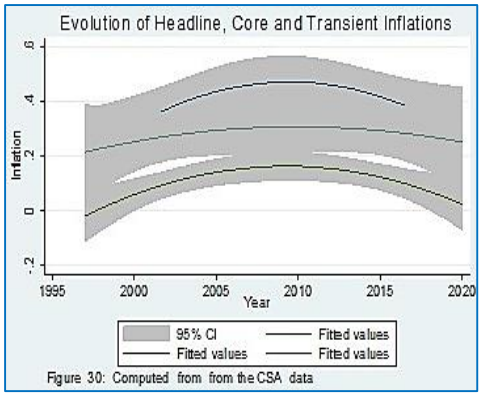
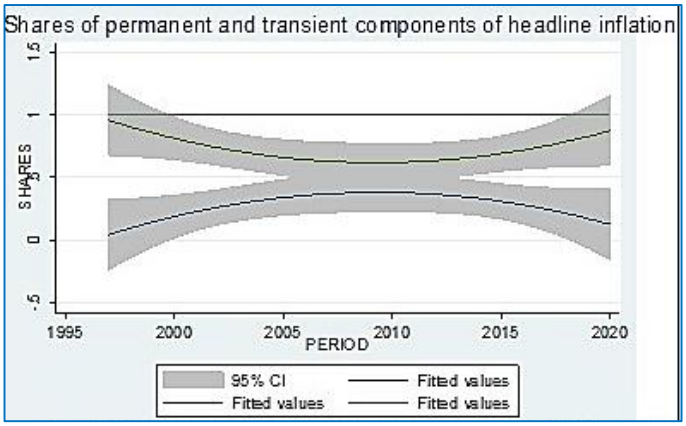


Figure 31: Shares: The lower most is the core component, the horizontal line is full share



The computations in Figure 29 and Figure 30 are obtained by superimposing headline, core and transient inflations, with core inflation figures taken from the CSA dataset in the same pattern as headline inflation. The transient inflation is a linear combination (simple arithmetic difference) of the headline and core inflation. This demonstrates that core inflation (a common factor, a monetary phenomenon) to be a long-run predictor of total inflation, while transient inflation is due to non-monetary factors, mainly supply shocks and other behavioral and institutional factors including market or government failures or even both together.

4.5 Econometric Evaluation of the Headline and Core Inflations Obtained from the Decomposition Approach

This section tests and appraises the performance of core inflation as a predictor of headline inflation. The starting point of this test is a check on whether the necessary conditions identified in the methodology have been met. First, that the headline inflation (π_t), and core (permanent) components (${\pi_t}^c$) are $I(1)$ processes and the non-permanent (transitory) component (${\pi_t}^{np}$) is $I(0)$ process; and secondly that $\pi_t \; and \; {\pi_t}^c$ are integrated with co-integrating vector $(1, -1)'$. More precisely, the sufficient condition has to be supported by the existence of error correction mechanism where the loading factor (α_{11}) in $(Eq. 4a)$ should turn out to be zero. To obtain headline and core inflations from a model that satisfies econometric regularity conditions, the starting point remains to advance to time series diagnostics, testing for the existence of unit roots and existence of structural break. The usual test results are presented in sequence.

Table 6(A): Results from Augmented Dickey-Fuller unit root test

Variable	Test statistic	Interpolated Dickey-Fuller critical values at		
		1%	5%	10%
π_t	-2.687	-3.750	-3.000	-2.630
$\Delta\,\pi_t$	-4.430	-3.750	-3.000	-2.630
${\pi_t}^c$	-2.631	-3.750	-3.000	-2.630
$\Delta\ {\pi_t}^c$	-6.048	-2.660	-1.950	-1.600
${\pi_t}^{np}$	-4.160	-3.750	-3.000	-2.630

Table 6(B): Results from Phillips-Peron-Unit root test

Variable	Test statistic	Interpolated Dickey-Fuller (critical values at)		
		1%	5%	10%
π_t	-2.617	-3.750	-3.000	-2.630
$\Delta\,\pi_t$	-4.551	-3.750	-3.000	-2.630
${\pi_t}^c$	-2.525	-3.750	-3.000	-2.630
$\Delta\ {\pi_t}^c$	-6.673	-2.660	-1.950	-1.600
${\pi_t}^{np}$	-4.102	-3.750	-3.000	-2.630

As the results in Table 6(A) and Table 6(B) show, we fail to reject the null of unit root at level at 1 % while we fail to accept the null of unit root in first

differences for both $\pi_t \ and \ \pi_t{}^c$ at 1%. Moreover, we fail to accept the null of unit for $\pi_t{}^{np}$ suggesting components ($\pi_t{}^c$) are $I(1)$ processes and non-permanent (transitory) component ($\pi_t{}^{np}$) is $I(0)$ process**.**

The second set of diagnostics essential for establishing a regularity condition in time series analysis before embarking on actual estimation of the parameters' estimation and interpretation, and subsequently demonstrating their policy relevance, is to perform a test for parameter stability. A method was developed by Zivot and Andrews (1992), treating the breakpoint endogenously. Andrews (1993) also developed an asymptotic distribution of test statistics when the test point is known and unknown to lie in a restricted interval and documented tests of both pure (in which the entire parameter vector is subject to change under the alternative) and partial (in which the only component of the parameter vector is subject to change) structural change. He noted that the asymptotic distribution of test statistics was non-standard because the change point parameter only appeared under the alternative hypothesis and not under the null. He also stated that tests of one-time structural change, can be shown to have some weak asymptotic local power optimality for large sample size and small significance level Andrews (1993))

For the full sample of 1997-2020, this methodology detected the break point at 2009. However, it resulted in *swald* static of 0.5448 with P-value of 0.8549; we fail to reject the null hypothesis of No *structural break*. To check the advent of the inflationary phenomena in year 2004 in Ethiopia, we imposed the year 2004 exogenously and found the chi-square statistic of 1.711 with associated p-value of 0.4249. We fail to reject the null hypothesis of *No structural break, though for reasons of space the results are not* reported, but can be accessed Andrews (1993) suggests we could accept the alternative for existence of partial structural change at the date of 2009, and to operationalize this, we followed the dummy variable approach where D takes value 0 from 1997 -2008 and value 1 from 2009 to 2020. This suggested we could safely proceed to the establishing of the second condition: i.e. $\pi_t \ and \ \pi_t{}^c$ are integrated with co-integrating vector$(1, -1)'$. Since we have only two variables, other than the dummy variable, the maximum rank and hence cointegrating equation is 1, the test result suggested a maximum of one lag. The results can be seen in Table 7.

Table 7: Co-integrating Vector between π_t and π_t^c

Identification: beta is exactly identified: Johansen normalization restriction imposed						
	beta	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**(95%Conf. Interval)**
ce1	π_t	1				
	π_t^c	-1.252	0.260	-4.80	0.000	(-1.763, -0.741)
	D	0-.030	0.047	-0.65	0.515	(-0.122, 0.061)
	Constant	-0. 232				

From Table 7, the Johansen likelihood method suggests one co-integrating vector $(1, -1.252)'$ and turn out to be statistically significant even at 1% and very close to $(1, -1)'$ as suggested by theory. Moreover, the joint restriction that the headline inflation is co-integrated with core inflation is accepted with X^2 (chi-squared) statistics of 24.71 significant at 1%. Rather et al (2016) took the US data for the sample period of April 1993 – August 2010, using prices of 418 commodities with this methodology and reported co-integrating vector$(1, -0.98)'$. This suggests core inflation as a predictor of headline inflation.

The headline and core Inflations are transformed to conform $(Eq.4a)$ and $(Eq.5a)$ to obtain the error correction mechanisms. The results are reported in Table 8 and Table 9, respectively.

Table 8: Error Correction Model Estimated from $(Eq.4a)$

$\Delta\ \pi_t^c$	**Coef.**	**Std. Er**	**t**	**P>|t|**	**(95% Conf. Interval)**
b_{11}	-0.674	0.186	-3.62	0.002	(-1.070, -0.279)
b_{12}	0.254	0.126	2.00	0.062	(-0.014, 0.522)
α_{11}	-0.024	0.148	-0.17	0.869	(-0.339, 0.289)
D	-0.087	0.036	-2.41	0.028	(-0.164, -0.010)
_cons	0.044	0.046	0.95	0.354	(-0.054, 0.144)

Table 9: Error Correction Model Estimated from $(Eq.5a)$

	Coef.	**Std. Er**	**t**	**P>|t|**	**(95% Conf. Interval)**
b_{21}	0.103	0.288	0.36	0.724	(-0.508, 0.716)
b_{22}	-0.575	0.210	-2.73	0.015	(-1.022, -0.129)
α_{21}	0.319	0.281	1.13	0.274	(-0.278, 0.916)
D	-0.067	0.0595	-1.13	0.277	(-0.193, 0.059)
_cons	0.140	0.078	1.78	0.095	(-0.027, 0.307)

The main result from Table 8 is that the loading factor or the coefficient of the error correction term (α_{11}) in $(Eq.4a)$ turned out to be insignificant, suggesting that $\pi_t{}^c$ does not adjust to the long run equilibrium. This suggests that since $\pi_t{}^c$ is the monetary component of the headline inflation, money growth is instantly and completely inflationary without any long run adjustment of disequilibrium. However, b_{11} is negative and significant while b_{12} is positive and significant, suggesting that the monetary authority's attempt to contain inflation by reversing the money growth in the first case while the inflation expectation still exerts momentum, thereby aggravates inflation in the second case. The monetary authority's attempt to hostage inflation converts unsuccessful.

In Table 9, the loading factor α_{21} is statistically not different from zero (however positive remains under investigation) suggesting nonexistence of the error correction mechanism and non-causality from headline to core inflation. However, the fact that b_{22} is negative and significant, suggests a strong expectation formation mechanism from the general public on the part of future inflation and the degree of lag structure in the conduct of monetary policy.

To summarize, using a methodology which minimizes the skewness of the distribution of the actual inflation, we have exposed the underlying trend or the monetary component ($\pi_t{}^c$) of the headline inflation (π_t). Thus, this evidence, obtained under a decomposition approach, has effectively minimizes the noise in the headline inflation arising from shocks of any nature, whether supply shocks, market and/or government failures, and thereby helps in tracing the monetary component of inflation.

5. BRIEF SUMMARY OF KEY FINDINGS AND POLICY IMPLICATIONS

5.1 Brief Summary

This study updates and documents existing studies on inflation in Ethiopia through a systematic review of available empirical literature, their associated methodologies, methods of estimation and interpretations. It disaggregates and documents the contributions of 279 commodities to inflation using the CSA monthly price data from January 1997 to April 2020, and currently evolving techniques of decomposing the headline inflation to permanent,

interpreted as a monetary phenomenon, and non-permanent components (transient) due to supply shocks arising from economic and institutional factors.

5.2 Key Findings

Evidence from MOFEC, MoFED and NBE sources show that since the beginning of the 2000s Ethiopian economic growth has been accompanied by inflationary pressure. The quadratic fitting shows the economic growth regime was accompanied by inflation greater than 20%. Debt burden, particularly external debt and budget deficits, have perpetuated inflation. The external balance has been on the rise until very recently, showing some moderate improvement for few years. The welfare cost of inflation has exhibited a sharp increase since 2010, reaching 22.354 billion Birr during 1970 to 2020 on average. Regional distribution of CPI inflation shows Dire Dawa city reaching 37.1% followed by Harari and Addis Ababa with 32.3 and 28.6%, respectively. Inflation has negatively affected the economic life of the great majority of the population. This has had severe implications for the welfare of wage earners prone to inflation and particularly those on minimum wages and pensioners with fixed incomes not subject to wage or income indexation.

The data set from the MoFEC indicates that the average annual financing requirement for the period 1974-2017 stood at 8492.971 million Birr. The same figures for the period 1974-1990 and 1991 - 2017 were 720.279 and 13386.89, respectively.

On sources of finance, for 1974-2017, the annual average for gross borrowing, external sources and domestic borrowing stood at 5448.625, 4663.038, 2140.716 million Birr respectively. For the period 1974-1990, the annual averages for gross borrowing, external sources and domestic borrowing were 343.3905, 297.4992 and 396.0675, million Birr, respectively. The corresponding values for the period 1991-2017 stood at 8663.032, 7411.711, and 3239.199.

The World Development Indicator (WDI) for the period for which data is available, from 1990 to 2013, shows that the annual average domestic demand for investment, and net savings were 8 billion and 4.37 billion Birr respectively. This shows a saving investment disequilibria of 3.63 billion Birr. The annual average net borrowing during the same period was 13.7 billion Birr.

From the disaggregated commodity level inflation and the ranking of commodities according to their position in inflation ranking, we have shown that each inflationary regime has been driven by different sources. The drivers responsible for the prices changes of the main inflationary items were: construction materials (during 1997- 2001), food items vegetables and cereals (2002-2006), vegetables (2007-2011) construction materials and energy (2012-2016) and vegetable and cereals (2017-2020.

The use of decomposition technique demonstrated that throughout the study period monetary factors were significant, ranging from a minimum of -9.5% (shrinking money supply) to 74.5%, with mean value of 10.5% per cent, but with high variability of 88.55% (See Table 5). Evidence of inflation due to money growth was revealed by the simultaneous rise of nearly all commodities (See: Annex Table 2 (A) and Annex Table 2 (B). This suggests strong evidence of inflation driven by monetary expansion. The NBE data also supports this indicating broad money growth rate of 18.60% on average for the period 1991-2017 while reaching a maximum value of 39.2% in 2011.

The non-monetary components, such as aggregate supply shock, imports and export instability and the variability of major trading partners' currency fluctuations against the dollar, might have also contributed to the non-monetary components of decomposed inflation. They range from -9.5% to a maximum of 74.5%, with a mean value of 28% but with less variability relative to the monetary component (See Table 5)

Institutional factors including government effectiveness, control of corruption, regulatory quality, and the rule of law, affect inflation by browsing from printing (seignorage). After examining the time series properties and detecting and taking note of the existence of the structural break, econometric evaluation methodology validated the underlying monetary component of inflation ($\pi_t{}^c$) as the driver of headline inflation (π_t) in Ethiopia. This suggests the current decomposition approach has effectively minimized the noise in the headline inflation arising from the shocks of any nature, supply shocks, market and/or government failure, and thereby helped in tracing the monetary component of inflation.

5.3 Key Policy Implications

In order to attain stable economic growth with stable internal and external equilibrium, authorities should watch the factors explained and underlined in this study.

1. There is a need for managing domestic and external disequilibria. Key domestic disequilibria include fiscal deficits and the imbalance between domestic saving and investment aggregate investment demand. Managing the external disequilibria would mean management of external debt as one of the binding constraints for achieving macroeconomic stability.
2. To respond to the deteriorating welfare cost of inflation, supporting the productivity of the real sector, should be espoused as a necessary condition. Constraints that obstruct productivity and destabilize production should be eliminated from the real sector, the agricultural and manufacturing sectors. Productive businesses generating employment and value adding potential should be incentivized. Constraints should be removed for exiting small businesses and entry conditions slackened to the point of allowing and facilitating entrepreneurs to start businesses with minimum requirements while they proceed to formal licensing. This would enable the economy to fight inflation from the supply side, enhancing the employed and attracting the unemployed. For senior citizens and pensioners who do not participate in the labor market, their fixed income could be indexed for inflation provided an adequate pension fund was available.
3. The commodities whose inflationary pressure can potentially or permanently perpetuate inflation should be identified regularly and the results used for inflation forecasts. This would help the monetary authority (the NBE) to effectively identify the causes of price changes. The author believes the existing CSA capacity should be enhanced and utilized. Efficiency in coordination between the monetary authority and the CSA is crucial.
4. Scare financial resources should be utilized diligently and productively to reduce (if not eliminate) imbalances of all kinds.
5. As there is strong evidence that the monetary component of inflation is due to money growth, a prudent monetary policy is critical. This may call

for a new institutional arrangement of the monetary authority, to the extent of allowing the operational independence of the central NBE. This means freedom by the NBE to choose monetary policy instruments and targets. More importantly, independence of the Central Bank could mitigate the problem of time inconsistency, giving it the benefit of keeping monetary policy insulted from political pressure, preventing the government from irresponsible revenue raising, and keeping rent-seeking economic actors at a distance, thereby encouraging competition and enhancing economic progress.

6. Creating structural changes, including a production exchange and consumption chains to encourage marketing efficiency and free mobility of people and commodities are among needed developments. This is particularly true for those commodities that can be easily produced, distributed and consumed by all sections of society yet dominate the sources of inflation. (See Table 3(c) Panel A).

7. The success of any economic policy depends highly upon the quality of governance, and its effectiveness, its zero tolerance for corruption, the enforcement of the rule of law and the strengthening of regularity arrangements as a necessary and sufficient condition to fight inflation. Enabling a smooth free flow of information, avoiding any monopoly of information, dis-incentivizing hoarding behavior in commodity markets, and the elimination of organized parallel markets in the financial system, would also help in handling repressed inflation. This, in turn, would enable society to anticipate price increases correctly and minimize the effects on the distribution of income, achieving stable economic progress.

REFERENCES

Abate, E. and Nandeeswara, R. (2015). "A Co-Integration Analysis of Money Supply and Price in Ethiopia", *International Journal of Recent Scientific Research,* 6(5) 3972-3979.

Abeba, T. (2014). "Inflation and Growth Relationships: A Comparative Study of Ethiopia and Uganda", Unpublished Thesis, submitted to the Center for African and Oriental Studies.

Abebe, A., Arega, S., Jemal, M. and Mebratuc, L. (2012). Dynamics of Food Price Inflation in Eastern Ethiopia: A Meso-Macro Modeling, *Ethiopian Journal of Economics*, Vol XXI No 2 or 21(1).

Abis, G. (2013). "The Relationship Between Inflation and Economic Growth in Ethiopia", Unpublished MCom Thesis, University of South Africa

Ademe, A. S. (2015). "Interaction of Ethiopian and World Inflation: A Time Series Analysis; VECM Approach". *Intellectual Property Rights: Open Access 3(147). doi:10.4172/2375-4516.1000147*

Alemayehu, G., and Kibrom, T. (2011). "The galloping inflation in Ethiopia: A cautionary tale for aspiring developmental states' in Africa". *IAES Working Paper* No. WP-A01-2011.

Ames, Ward, B., Shanta, D., and Alejandro I. (2001). "Macroeconomic Policy and Poverty Reduction". *PRSP Sourcebook Chapter 6, rty_Reduction*

Andrew. B., Nicholas H. and William B. Peterman. (2004). "Decomposing inflation", Economic Review, Federal Reserve Bank of Atlanta, vol. 89(Q 1), pages 39-51.

Asayehgn, D. (2009). "Economic Growth for Inflation: The Ethiopian Dilemma", https://pdfs.semanticscholar.org/d291/6a9131abc2929b221571436a88beb809bc53.pdf?_ga=2.56524395.1532688480.1588702214-2090345817.1567689219

Ashagrie, D. (2015). "Inflation-Growth Nexus in Ethiopia: Evidence from Threshold Auto Regressive Model1". *Ethiopian Journal of Economics* Vol. XXIV No 1,

Assefa, A. (2015). "The Political Economy of food price in Ethiopia"*; In Pinstrup-Andersen, Per (Ed.): Food Price Policy in an Era of Market Instability: A Political Economy Analysis, UNU-WIDER Studies in Development Economics, ISBN 978-0-19-871857-4, Oxford University Press, Oxford, http://dx.doi.org/10.1093/acprof:oso/9780198718574.001.0001*

Bachewe, F. and Headey, D. (2016). "Urban Wage Behaviour and Food Price Inflation in Ethiopia". *The Journal of Development Studies, 53(8), pp.1207-1222.*

Ball, L., and Mankiw, N. (1995). "Relative-Price Changes as Aggregate Supply Shocks". *The Quarterly Journal of Economics,* 110(1), 161-193. doi: 10.2307/2118514

Blackburn, K., and Powell, J. (2011). "Corruption, inflation and growth". *Economics Letters, 113*(3), 225-227. doi: 10.1016/j.econlet.2011.06.015

Cahrmeza, W. W., and Deadman D. F. (1997). *New Directions in Econometric Practice: General to Specific Modeling, Co-integration and Vector Auto-regression,* 2nd Edition, Edward Elgar Publishing, Cheltenham

Claudio Morana. (2007). "A structural common factor approach to core inflation estimation and forecasting", *Applied Economics Letters*, 14(3), 163-169.

Durevall, D. and Birru A. (2009). "Inflation Dynamics and Food Prices in an Agricultural Economy: The Case of Ethiopia". *Policy Research Working Paper 4969, The World Bank Africa Region Agricultural and Rural Development Unit*

Durevall, D., Loening, J. and Ayalew Birru, Y. (2013). "Inflation dynamics and food prices in Ethiopia". *Journal of Development Economics*, 104, pp.89-106.

Durevall, D. and Sjö, Bo. (2012). "The Dynamics of Inflation in Ethiopia and Kenya", *Working Paper Series No. 151 African Development Bank, Tunis, Tunisia.*

Elkamel, H. (2019). "The effect of Corruption, Seignorage and Borrowing on Inflation," *PSU Research Review*, Vol. 3 No. 1, pp. 1-15.

Fitsum, S., Yilkal, W. and Teshome, A. (2016). "The Relationship between Inflation, Money Supply and Economic Growth in Ethiopia: Co-integration and Causality Analysis", *International Journal of Scientific and Research Publications, 6(1).*

Fisher, I. (1930). *The Theory of Interest*. New York

Friedman, M. (1975), "Perspectives on Inflation", *Newsweek*, June 24, 1975, 73.

Gebeyehu Y. T. (2019). "Effect of Inflation on Economic Growth of Ethiopia". *Journal of Investment and Management*, 8(2), 48. doi: 10.11648/j.jim.20190802.13

Getachew, W. (2018). "The Relationship between Inflation and Economic Growth in Ethiopia". *International Research and Critics Institute-Journal (BIRCI-Journal) Volume I, No 3., PP. 264-271*

Habtamu, G. (2015). "A Macro-Econometric Approach explaining the Causes and Dynamics of Price Inflation in Ethiopia". *Journal of Economics and Sustainable Development*. 6(15), PP 58-75

IDA/IMF. (2018). "The Federal Democratic Republic of Ethiopia, Joint Bank-Fund Debt Sustainability Analysis Update 2018", *International Development Association International Monetary Fund* http://documents.worldbank.org/curated/en/690431545161133088/pdf/wbg-ethiopia-debt-sustainability-analysis-2018-update-final-dec0718-12142018636805946102250783.pdf

Jonse, B. (2018). "Dynamics and Determinants of Inflation in Ethiopia", *in A. Heshmati and H. Yoon (eds.), Economic Growth and Development in Ethiopia, Perspectives on Development in the Middle East and North Africa (MENA) Region, https://doi.org/10.1007/978-981-10-*

Loening, J. Gounder, R. and Takada, H. (2008). "Inflationary Expectations in Ethiopia: Some Preliminary Results", *Applied Econometrics and International Development, 8(2).*

Meseret, F. (2014). *Effect of Trade Openness on Inflation in Ethiopia (An Auto Regressive Distributive Lag Approach)*. Unpublished MA Thesis, Addis Ababa University.

Michael F. Bryan and Stephen G. Cecchetti. (1993). "Measuring Core Inflation:" Federal Reserve Bank of Cleveland, Working Paper no. 93-04.

MoFED. (2006). *"Ethiopia: Building on Progress, A plan for Accelerated and Sustained Development to End Poverty (PASDEP), 2005/06-2009/10)",* Federal Democratic Republic of Ethiopia, Addis Ababa Volume I: Min text, Addis Ababa.

_____. (2010a). *Growth and Transformation Plan (2010/-2014/15),* Federal Democratic Republic of Ethiopia, Addis Ababa Volume I, Addis Ababa.

_____. (2010b). *Growth and Transformation Plan (2010/-2014/15),* Federal Democratic Republic of Ethiopia, Addis Ababa Volume II: Policy Mix Addis Ababa.

_____. (2013). *Development and Poverty in Ethiopia (1995/96-2010/11),* Federal Democratic Republic of Ethiopia, Addis Ababa

Mulualem, E. (2014). "Budget Deficit Impact of Inflation in Ethiopia". *Birritu NBE Quarterly Magazine No.121.*

Muluneh, A. (2009). "Estimating Underlying Inflation for Ethiopia", *Birritu NBE quarterly magazine No. 107, http://www.nbe.gov.et/pdf/birritu/Birritu107.pdf*

NPC. (2016). *Growth and Transformation Plan II (GTP II) (2015/16-2019/20) Volume I: Main Text* Federal Democratic Republic of Ethiopia, National Planning Commission May, 2016 Addis Ababa,

Quah, D., and Vahey, S. (1995). "Measuring Core Inflation". *The Economic Journal*, *105*(432), 1130. doi: 10.2307/2235408

Rather, S., Durai, S., and Ramachandran, M. (2016). "On the Methodology of Measuring Core Inflation". *Economic Notes,* 45(2), 271-282. doi: 10.1111/ecno.12052

Reis, R., and Watson, M. (2010). "Relative Goods' Prices, Pure Inflation, and the Phillips Correlation". *American Economic Journal: Macroeconomics*, *2*(3), 128-157. doi: 10.1257/mac.2.3.128

Ribba, A. (2003). "Permanent-transitory decompositions and traditional measures of core inflation". *Economics Letters, 81(1), 109-116. doi: 10.1016/s0165-1765(03)00159-9.*

Solomon, M. (2013). "Determinants of Price Dynamics in Ethiopia", *Ethiopian Journal of Economics Vol. XXII No 2.*

Tadesse, G., and Guttormsen, A. (2010). "The behavior of commodity prices in Ethiopia". *Agricultural Economics, 42(1), 87-97. doi: 10.1111/j.1574-0862.2010. 00481.x*

Teamrat, K. (2017). "Determinants of Inflation in Ethiopia: A Time-Series Analysis". *Journal of Economics and Sustainable Development* www.iiste.org *ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online), 8(19)*

Tekeber, N., Tekilu. T. and Tesfaye, M. (2019). "Supply and Demand Side Determinants of Inflation in Ethiopia Auto-Regressive Distributed Lag Model (ARDL)", *International Journal of Commerce and Finance*, Vol. 5, Issue 2, 2019, 8-21

Temesgen T. (2013). "*Determinant and Impacts of Dynamic Inflation in Ethiopia"*. Unpublished MA Thesis. Department of Development and Natural Resource Economics, Norwegian University of Life Sciences.

Yemane Wolde-Rufael. (2008). "Budget Deficits, Money and Inflation: The Case of Ethiopia". *The Journal of Developing Areas*, 42(1), pp. 183-199.

World Bank Group. (2005). *Economic Growth in the 1990s*. Washington, D. C.

Zivot, E., and Andrews, D. (1992). "Further Evidence on the Great Crash, the Oil-Price Shock, and the Unit-Root Hypothesis". *Journal of Business & Economic Statistics, 10*(3), 251. doi: 10.2307/1391541.

ANNEXES

Table 1: Commodity Prices and associated Inflations Averaged over five years from January 1997 to April 2020

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Teff White Kg	2.06	0.04	2.75	0.19	8.12	0.29	15.78	0.10	25.25	0.22
Teff Mixed Kg	1.86	0.02	2.48	0.20	7.09	0.29	13.92	0.10	22.94	0.22
Teff Black Red Kg	1.72	0.01	2.21	0.21	6.17	0.30	12.27	0.10	20.61	0.25
Wheat White Kg	1.73	0.00	2.07	0.19	5.77	0.27	10.09	0.06	15.63	0.24
Wheat Mixed Kg	1.62	-0.01	1.88	0.21	5.26	0.26	9.03	0.08	13.70	0.24
Wheat Black Kg	1.66	-0.01	1.96	0.20	5.59	0.28	10.24	0.06	15.71	0.23
Barley White Kg	1.64	0.02	2.04	0.18	5.71	0.28	10.02	0.08	15.71	0.16
Barley Mixed Kg	1.47	0.03	1.82	0.18	4.84	0.31	8.61	0.07	13.43	0.16
Barley Black Kg	1.49	0.01	1.85	0.19	5.16	0.30	9.33	0.19	16.24	0.12
Barley for Beer Kg	1.67	0.04	2.00	0.20	6.03	0.25	10.42	0.09	16.41	0.16
Maize Kg	1.08	0.03	1.34	0.19	3.56	0.39	5.86	0.08	9.01	0.24
Durra Kg	1.26	0.03	1.61	0.18	4.43	0.34	7.90	0.08	12.57	0.30
Sorghum Yellow Kg	1.46	0.05	1.95	0.18	5.41	0.30	9.46	0.06	14.17	0.28
Sorghum White Kg	1.29	0.01	1.67	0.18	4.72	0.33	8.31	0.06	12.41	0.28
Sorghum Red Kg	2.48	-0.18	1.48	0.17	3.98	0.35	6.72	0.07	10.56	0.25
African Millet Kg	1.46	-0.04	1.79	0.17	4.93	0.31	9.14	0.09	14.21	0.19
Teff White Kg milled	3.00	0.01	3.36	0.15	9.61	0.29	17.97	0.10	27.05	0.20
Teff Mixed Kg milled	2.73	0.02	3.03	0.16	8.73	0.29	16.32	0.10	25.01	0.25

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Teff Black Red Kg milled	2.40	0.01	2.68	0.17	7.76	0.30	14.53	0.10	23.36	0.24
Wheat White Kg milled	2.33	0.00	2.54	0.14	7.18	0.27	11.35	0.05	17.85	0.30
Wheat Mixed Kg milled	2.16	-0.02	2.15	0.18	6.90	0.33	11.68	0.07	17.27	0.23
Barley White Kg milled	2.40	0.14	3.60	0.16	12.28	0.43	26.12	0.08	37.33	0.33
Barley Mixed Kg milled	2.45	0.06	3.35	0.18	10.28	0.36	22.86	0.08	32.03	0.76
Maize Kg milled	1.74	-0.01	1.81	0.14	4.88	0.36	8.08	0.07	11.79	0.19
Oats Kg	3.77	0.37	5.09	0.08	13.54	0.30	28.61	0.12	45.97	0.28
Sorghum Kg	1.75	0.08	2.30	0.13	5.74	0.32	13.32	0.26	14.99	0.36
Furno Duket Locally Processed Kg	3.88	-0.04	3.61	0.10	8.60	0.24	13.74	0.04	20.68	0.22
Horse Beans Kg	1.90	-0.01	2.31	0.24	6.64	0.31	13.66	0.11	22.85	0.26
Peas White Kg	2.25	0.00	2.92	0.20	7.66	0.30	16.75	0.11	27.58	0.22
Peas Black Kg	2.08	0.00	2.47	0.22	7.13	0.32	14.64	0.11	24.17	0.30
Peas Mixed Kg	2.10	-0.01	2.48	0.22	7.04	0.30	14.21	0.13	25.71	0.25
Soya Beans Kg	1.98	0.02	3.69	0.22	8.77	0.34	17.99	0.04	24.57	0.17
Chick Peas Kg	2.14	0.02	2.62	0.20	7.08	0.27	14.51	0.15	24.99	0.13
Lentils Kg	3.15	0.00	4.04	0.15	11.33	0.34	26.11	0.16	42.88	0.22
Haricot Beans Kg	1.49	0.03	2.00	0.19	5.34	0.26	10.14	0.11	17.70	0.20
Lima Beans Kg	1.53	-0.01	1.90	0.17	6.03	0.38	15.12	0.22	31.86	0.17
Vetch Kg	1.48	0.05	1.87	0.24	4.90	0.36	10.12	0.15	17.93	0.43
Fenugreek Kg	4.96	-0.04	5.30	0.30	15.29	0.24	29.71	0.24	43.63	0.38
Horse Beans Milled Kg	4.43	-0.04	4.39	0.19	12.52	0.29	27.66	0.11	45.10	0.24

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Peas Milled Kg	5.01	-0.02	5.26	0.17	14.91	0.29	34.29	0.10	54.16	0.21
Chick Peas Milled Kg	4.92	-0.01	5.52	0.20	15.36	0.29	36.61	0.13	56.78	0.44
Mixed Pulses Milled Kg	4.51	-0.01	4.71	0.15	11.95	0.28	27.17	0.12	45.84	0.21
Vetch Milled Kg	3.94	-0.02	3.95	0.18	9.99	0.31	23.24	0.10	36.25	0.27
Peas Split Kg	4.70	-0.04	4.61	0.13	10.54	0.25	21.78	0.12	37.10	0.20
Peas Split Roasted Kg	4.13	-0.01	4.36	0.17	11.58	0.30	23.31	0.09	37.24	0.24
Horse Beans Split Roasted Kg	4.14	-0.10	3.72	0.21	10.09	0.30	20.67	0.10	33.05	0.27
Lentils Split Kg	4.37	0.22	5.82	0.14	15.33	0.33	35.14	0.18	57.02	0.14
Vetch Split Roasted Kg	3.08	-0.06	3.09	0.24	8.10	0.34	17.60	0.13	29.65	0.33
Chick Peas Split Roasted Kg	5.49	-0.11	4.59	0.17	12.00	0.27	24.33	0.14	41.06	0.14
Niger Seed Kg	3.25	0.05	4.50	0.17	11.86	0.27	24.82	0.20	40.74	0.15
Linseed White Kg	4.37	0.06	5.70	0.17	18.16	0.29	43.09	0.24	72.19	0.23
Linseed Black Kg	3.36	0.02	4.14	0.18	11.48	0.32	24.35	0.12	38.77	0.17
Sesame Seed Kg	3.91	0.02	5.43	0.18	15.08	0.28	33.16	0.42	65.86	0.24
Sunflower Kg	2.70	0.02	3.43	0.13	8.72	0.27	17.89	0.22	33.73	0.20
Castor Beans Kg	2.49	0.01	3.18	0.13	6.59	0.24	15.12	0.11	22.55	0.24
Rape Seed Kg	2.95	0.00	3.34	0.16	8.74	0.31	19.66	0.15	28.12	0.14
Ground Nut Shelled Kg	5.30	-0.04	5.54	0.11	13.95	0.28	29.01	0.10	41.12	0.19
Spaghetti Local Without Egg Kg	5.68	0.06	7.22	0.08	15.85	0.25	26.30	-0.01	30.60	0.20
Pastini Kg	7.98	0.01	8.49	0.03	15.99	0.26	29.75	0.03	36.59	0.10
Macaroni Local Without Egg Kg	5.33	0.01	5.60	0.05	11.55	0.25	18.96	0.02	24.95	0.18

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Enjera Teff Mixed 325 gm	0.71	0.00	0.71	0.15	2.04	0.27	3.87	0.08	5.53	0.22
DaboTraditionalAmbasha350gm	0.72	-0.03	0.73	0.15	2.49	0.35	4.78	0.03	5.96	0.25
Dabo Traditional Sheleto 350 gm	0.66	-0.03	0.66	0.13	2.15	0.41	3.59	0.06	4.73	0.51
Bread Wheat Bakery 350 gm	1.23	0.00	1.26	0.10	3.08	0.23	4.66	0.02	5.62	0.22
Beef Kg	10.43	0.04	16.57	0.17	41.14	0.27	110.19	0.12	180.97	0.22
Fish Fresh Kg	2.05	0.36	6.76	0.23	13.09	0.26	33.86	7.65	638.47	4.30
Sardines Imported 125gm	6.55	0.04	6.57	0.05	14.09	0.28	28.93	0.06	37.83	0.15
Cow Milk Unpasteurized Lt	2.35	0.05	2.84	0.08	6.09	0.25	13.98	0.18	24.30	0.14
Cow Milk pasteurized Lt	2.73	0.13	4.38	0.12	11.16	0.30	25.46	0.05	31.42	0.18
Camel Milk Lt	6.19	-0.06	2.88	0.08	7.21	0.34	18.08	0.11	26.55	0.26
Goat Milk Lt	3.06	-0.02	3.43	0.12	8.57	1.20	24.68	0.08	25.54	0.14
Powdered Milk Edget 450 gm	13.16	0.64	26.84	0.08	65.25	0.29	136.98	0.05	169.29	0.13
Yoghurt Traditional Lt	3.62	0.05	4.50	0.08	9.83	0.26	23.36	0.11	36.23	0.17
Cheese Cottage Kg	4.06	0.06	5.40	0.19	15.24	0.26	37.97	0.12	62.24	0.20
Egg Traditional Dozen	3.36	0.04	4.67	0.15	12.66	0.28	30.14	0.09	45.85	0.15
Butter Unrefined Kg	19.66	0.02	26.68	0.13	63.94	0.29	138.52	0.09	212.78	0.13
Cooking Oil Imported Lt	11.20	0.18	12.38	0.09	21.27	0.12	27.30	0.02	26.53	0.06
Cooking Oil Local Lt	11.65	0.01	11.55	0.16	26.68	0.25	52.26	0.10	72.89	0.17
Ethiopian Kale Kg	0.60	0.11	0.92	0.15	2.54	0.37	6.50	1.17	21.18	0.11
Cabbage Kg	1.04	0.02	1.29	0.11	2.73	0.27	6.13	0.08	8.40	0.28
Lettuce Kg	1.44	0.06	1.97	0.12	5.11	0.33	15.22	0.12	20.01	0.51

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Spinach Kg	0.97	0.03	1.18	0.12	2.63	0.25	6.82	0.13	9.69	0.21
Carrot Kg	1.57	0.01	1.69	0.08	4.18	0.30	10.02	0.16	15.33	0.11
Tomatoes Kg	1.91	0.03	2.36	0.12	5.39	0.27	12.81	0.14	17.01	0.39
Onions Kg	3.43	-0.01	2.96	0.11	6.16	0.33	11.87	0.13	17.83	1.39
Garlics Kg	5.47	0.14	7.10	0.18	21.91	0.47	44.79	0.16	63.47	1.01
Leaks Kg	2.45	-0.02	2.68	0.14	5.91	0.26	13.59	0.14	19.96	0.40
Pepper Green Kg	2.08	1.01	3.85	0.16	10.37	0.25	21.96	0.12	30.91	0.10
Pumpkin Kg	1.01	-0.10	0.57	0.16	1.31	0.24	2.87	0.12	4.96	0.58
Green Peas Kg	1.79	0.21	2.95	0.17	8.27	0.36	20.71	0.14	32.57	0.17
Beet Root Kg	1.19	0.23	1.48	0.09	3.42	0.28	7.92	0.11	11.59	0.13
Banana Kg	1.43	0.06	2.12	0.10	4.99	0.29	11.99	0.21	22.19	0.21
Orange Kg	1.70	0.09	2.78	0.13	6.76	0.27	18.29	0.29	35.51	0.12
Lemon Kg	1.79	0.07	2.65	0.12	6.27	0.25	15.23	0.14	23.94	0.42
Tangerine Kg	2.27	0.05	3.26	0.12	7.73	0.29	20.71	0.16	34.93	0.21
Papaya Kg	1.03	0.12	1.74	0.12	4.60	0.31	11.92	0.10	16.97	0.20
Avocado Kg	1.65	0.33	2.72	0.06	5.50	0.27	12.11	0.10	18.31	0.16
Pepper Whole Kg	8.82	0.01	9.19	0.53	32.28	0.25	58.18	0.16	64.35	0.32
Black Pepper Local Kg	13.11	0.10	15.90	0.21	83.70	0.58	269.75	0.10	346.99	-0.04
Long Pepper Local Kg	13.64	0.11	12.55	0.09	28.38	0.34	68.14	0.07	95.58	0.15
White Cumin Bishops Weed Local Kg	27.09	-0.15	7.29	0.14	19.97	0.50	41.58	0.02	50.48	0.13
Black Cumin Local Kg	27.01	-0.10	8.81	0.19	30.92	0.34	60.25	0.20	79.65	0.10

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Ginger Dry Local Kg	8.61	-0.11	8.47	0.23	28.56	0.70	76.61	0.31	148.55	0.08
Ginger Wet Local Kg	5.43	-0.25	2.61	0.15	11.78	0.87	25.83	0.52	57.17	-0.07
Cloves Imported Kg	44.76	0.80	67.96	-0.08	111.79	0.54	343.83	-0.01	375.33	0.05
Cinnamon Imported Kg	48.47	0.24	25.20	0.00	47.30	0.26	95.16	0.10	153.91	0.23
Cardamon Local Kg	35.28	0.19	19.63	0.02	51.31	0.34	104.11	0.13	240.38	0.23
Turmeric Flour Local Kg	10.40	-0.21	4.89	0.04	17.74	0.57	26.54	0.09	39.78	0.07
Chillies Whole Kg	9.83	0.06	10.90	0.23	34.82	0.37	81.37	0.30	80.57	0.26
Basil Dry Kg	8.94	-0.04	9.14	0.06	21.70	0.28	53.21	0.18	68.56	0.02
Potato Kg	1.23	0.01	1.45	0.11	3.70	0.33	6.83	0.08	10.11	0.35
Sweet Potato Kg	0.74	-0.02	0.82	0.10	2.08	0.33	4.94	0.09	7.38	0.27
Kocho Unprocessed Kg	0.79	0.13	1.53	0.14	4.10	0.32	10.80	0.11	18.14	0.62
Bula Kg	1.83	0.70	4.54	0.11	9.28	0.23	22.03	0.09	29.20	0.76
Tea Leaves Local 100 gm	2.02	0.01	2.01	0.01	2.60	0.39	9.93	0.07	10.78	0.06
Coffee Whole Kg	5.71	-0.08	5.67	0.27	18.00	0.38	34.56	0.08	37.53	0.17
Coffee Beans Kg	11.73	-0.07	12.42	0.27	42.20	0.37	78.84	0.03	98.67	0.12
Coffee Leaves Kg	2.78	0.23	4.59	0.11	10.20	0.25	25.65	0.12	34.65	0.29
Buck Thorn Leaves Kg	2.97	0.01	3.78	0.12	9.09	0.35	27.30	0.06	31.09	0.26
Chat Kg	7.32	0.23	17.48	0.15	44.21	0.26	103.59	0.05	109.33	0.27
Malt Barley Kg	3.13	0.03	3.74	0.14	9.82	0.27	20.88	0.17	25.10	0.21
Malt Wheat Kg	3.09	0.02	3.62	0.14	9.62	0.27	18.40	0.07	25.38	0.16
Salt Kg	1.97	0.08	1.49	-0.01	2.72	0.27	5.22	0.18	10.08	0.13

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Sugar Kg	6.05	-0.03	6.21	0.11	12.65	0.19	17.97	0.04	26.75	0.34
Honey Kg	11.58	0.04	15.35	0.11	36.82	0.26	88.49	0.14	155.52	0.17
Canned Tomato Local 410 gm	7.27	0.00	6.66	0.01	12.45	0.28	27.83	0.07	34.02	0.03
Ambo Mineral Water 500 cc	2.17	0.01	2.20	0.05	3.87	0.21	8.55	0.09	10.14	0.07
Coca Cola Fanta 300 cc	2.08	0.02	2.19	0.06	3.96	0.21	8.30	0.06	10.19	0.07
Pepsi Cola Mirinda 300 cc	2.12	0.02	2.19	0.06	3.94	0.21	8.39	0.06	10.33	0.07
Araki Local 900 cc	26.57	-0.03	23.29	0.01	37.23	0.21	72.64	0.05	88.63	0.12
CognacLocal900cc	25.38	-0.06	19.46	0.02	34.24	0.24	72.49	0.06	90.86	0.13
BrandyLocal900cc	24.52	-0.04	20.33	0.01	35.02	0.23	73.35	0.07	91.80	0.12
GinLocal900cc	69.98	-0.17	23.45	0.01	37.54	0.21	74.11	0.05	89.97	0.12
SarisWineNormal750cc	49.47	-0.12	9.25	0.15	24.80	0.24	52.53	0.10	78.17	0.10
Katikalla Lt	10.64	-0.16	7.02	0.09	16.34	0.27	31.71	0.07	44.83	0.17
BeerBedele330cc	4.30	-0.11	3.26	0.05	6.19	0.22	11.89	0.05	14.80	0.10
BeerHarar330cc	4.43	-0.12	3.22	0.06	6.08	0.21	11.73	0.05	14.73	0.10
BeerMetaAbo330cc	3.27	0.00	3.35	0.05	6.13	0.21	12.09	0.06	14.69	0.11
Nyala Packet	4.35	0.00	4.12	0.01	7.03	0.21	13.92	0.14	20.57	0.37
AbujedidKombArbaMin150cmM	5.43	0.02	6.53	0.09	15.55	0.31	30.04	0.04	40.66	0.07
KhakiS10000Twil110cmMeter	10.43	0.00	11.23	0.10	28.95	0.35	63.89	0.09	87.75	0.30
PoplinKombArbaMinch150cmM	19.17	-0.14	10.90	0.02	22.55	0.34	48.22	0.03	59.86	0.12
Polyster Arba Minch Awasa Meter	13.05	0.13	15.13	0.03	31.82	0.31	68.20	0.05	85.26	0.16
Jersi Meter	12.62	0.08	13.47	0.01	29.86	0.32	58.07	0.00	68.84	0.14

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Cotton Kg	7.84	-0.11	5.45	0.08	13.00	0.38	28.61	0.02	34.56	1.24
Woolen Suit Men No	253.89	0.02	256.76	0.01	323.89	0.12	645.25	0.11	892.72	0.11
Khaki Suit Men No	30.83	0.08	43.08	0.08	103.42	0.30	293.51	0.14	455.29	0.14
Khaki Suit Boys No	19.28	0.10	26.81	0.06	59.20	0.30	181.71	0.14	276.81	0.21
Netela No	21.50	0.00	24.71	0.07	66.86	0.38	180.77	0.07	249.15	0.15
Gabi No	52.27	-0.01	58.09	0.09	165.00	0.37	445.08	0.08	626.61	0.14
Shirts Long Sleeved Local No	30.25	0.00	33.63	0.07	66.15	0.27	171.53	0.09	242.08	0.11
Shirts Long Sleeved Imported No	51.83	-0.01	46.36	0.03	96.97	0.30	233.96	0.08	334.93	0.14
Shirts Short Sleeved Imported No	50.91	0.00	44.59	0.01	84.28	0.30	211.61	0.08	306.84	0.13
Socks Cotton Imported Pair	7.10	0.10	5.97	0.00	11.03	0.27	24.69	0.06	29.31	0.06
Sweater Local Men No	27.15	0.54	41.71	0.07	86.71	0.25	207.10	0.10	289.82	0.16
Sweater Local Women No	38.73	0.04	36.16	0.03	65.89	0.27	186.38	0.13	265.73	0.11
Shash Imported No	21.75	-0.17	10.31	0.01	15.03	0.18	30.97	0.07	40.45	0.11
Singlets Local White No	12.56	-0.06	11.65	0.09	25.04	0.25	57.10	0.06	67.15	0.12
Jeans Trouser No	58.07	1.24	80.05	0.05	205.86	0.32	432.98	0.03	469.19	0.08
Kemisna Netela No	75.04	3.18	116.06	0.02	211.64	0.26	621.44	0.16	1119.90	0.35
Sweater Men Imported No	78.34	2.07	93.28	0.01	160.95	0.26	346.79	0.05	434.36	0.12
Sweater Women Imported No	101.68	-0.06	63.28	0.00	116.88	0.27	271.09	0.07	338.68	0.03
Nylon Dress No	222.46	0.76	40.26	0.04	76.19	0.46	325.52	0.08	375.16	0.06
Tetron Trouser No	66.55	-0.07	50.70	0.04	106.58	0.34	312.67	0.09	408.15	0.10
Leather Jacket No	297.37	0.46	470.15	0.09	792.26	0.18	1672.72	0.04	1805.60	0.11

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Under Wear China No	52.68	-0.22	12.98	0.00	21.46	0.28	53.76	0.06	79.82	0.27
Sweater Local for Boys No	17.46	0.02	20.05	0.09	45.15	0.29	119.27	0.11	192.35	0.23
Socks Imported Cotton Pair	9.57	-0.19	3.57	-0.05	5.45	0.28	14.54	0.09	19.29	0.09
Jeans trouser	42.10	2.91	56.45	-0.01	118.05	0.34	268.63	0.02	305.75	0.09
Shirt Long Sleeved Imported Boys	22.98	0.87	25.06	0.01	44.43	0.33	135.93	0.10	215.84	0.21
Short for Boys No	7.73	-0.05	7.43	0.58	85.72	0.81	351.45	0.12	461.94	0.10
Anbessa Leather Shoes Men Local	67.66	0.08	88.97	0.06	181.27	0.22	395.21	0.09	540.20	0.08
Leather Shoes Men Craft Pair	116.81	0.46	120.31	0.07	376.88	0.39	1117.53	0.07	1076.96	0.20
Walking Shoes Imp Non-Leather Pair	136.77	-0.12	89.68	0.04	170.32	0.24	363.09	0.05	505.40	0.21
Canvas Shoes China Men Pair	23.22	0.02	25.93	0.05	55.96	0.34	179.52	0.12	270.69	0.12
Plastic Shoes Local Women Pair	13.87	-0.13	7.66	-0.05	9.97	0.19	21.14	0.14	32.35	0.07
Slippers Sponge Adult China Pair	14.05	-0.16	7.13	-0.02	14.15	0.34	31.57	0.06	43.94	0.13
Wall Paints Super Fluid Plastic	61.88	4.00	88.53	0.01	208.81	0.58	570.40	1.27	325.71	0.18
Coarse Aggregate Gravel Meter Cu	140.23	0.39	165.39	0.09	242.70	0.14	459.19	0.06	517.98	0.01
Hollow Concrete Block 20x20x40 cm	31.48	-0.18	2.86	0.13	6.50	0.15	9.54	0.04	11.27	0.08
Floor Board 4m Length No	19.73	2.06	42.47	0.07	70.03	0.19	157.70	0.08	204.23	0.12
Iron Pipe 6mt 12inch Wide Loc	35.17	10.02	65.06	0.14	155.34	0.22	255.53	0.02	382.26	0.24
Gutter N32 Meter	32.28	-0.12	23.70	0.10	53.17	0.20	89.04	0.11	121.16	0.33
Window Glass 50cmx50cmx3mm	105.78	-0.06	18.92	0.00	29.09	0.20	53.32	0.07	83.50	0.46
Water Tanker 1metercube No	763.11	0.34	1036.8	0.07	1992.40	0.21	3600.42	0.03	4175.42	0.08
Stone for House Construction Met	35.72	0.00	37.17	0.08	79.01	0.30	192.12	151.68	54266.32	0.13

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Fire Wood Meter Cube	51.59	-0.02	61.68	0.17	155.85	0.21	335.13	-0.03	33.40	0.32
Charcoal Kg	1.85	-0.04	1.31	0.13	3.00	0.24	7.46	0.12	10.20	0.07
Dung Cake Kg	0.37	0.01	0.42	0.15	0.80	0.21	2.68	0.86	3.11	4.78
Kerosine Lt	2.86	0.01	3.10	0.15	8.47	0.27	14.21	0.04	17.16	0.07
Diesel Lt	3.30	0.02	3.84	0.15	10.21	0.28	16.83	-0.01	17.25	0.08
Eveready Drycell No	1.94	0.01	1.86	0.04	3.31	0.18	5.89	0.09	10.33	0.24
Table Wanza Machine made Varnish	218.20	0.01	274.14	0.07	540.19	0.21	1112.63	0.16	2249.63	0.22
Chairs Wanza Machine Made Varnish	53.22	0.08	72.92	0.09	219.07	0.32	497.87	0.15	932.45	0.27
Cupboard Wanza 2 doors Varnish	939.86	0.01	1045.8	0.04	1831.66	0.21	4196.53	0.11	6225.58	0.09
Double Bed Wanza 120 cm Varnish	446.03	0.03	572.83	0.09	1257.47	0.26	3213.23	0.14	5381.96	0.13
Sofas Complete No	2396.1	0.20	2968.5	0.07	6269.06	0.24	14558.7	0.10	19961.83	0.08
Book Shelves Wanza 3 Shelves No	235.47	0.08	352.23	0.07	640.57	0.19	1405.98	0.12	2152.48	0.14
Bed Sheet Non-Patterned Bahir Dar	46.58	0.01	48.64	0.06	107.27	0.31	251.84	0.04	318.32	0.27
Bed Sheet Patterned Kombolcha 1	68.72	0.04	76.82	0.04	148.29	0.29	356.24	0.05	451.52	0.07
Bed Cover Patterned Kombolcha	64.73	0.04	64.79	0.06	124.45	0.33	414.16	0.15	693.46	0.15
Blanket Woolen Debre B160	85.93	-0.02	82.38	0.01	143.07	0.26	298.43	0.03	361.41	0.07
Mattress Sponge AA Foam 120 cm	300.49	0.01	301.69	-0.01	515.87	0.26	1112.02	0.08	1792.88	0.14
Towel Local Kombolcha No	13.61	0.00	12.24	0.09	36.21	0.32	84.98	0.05	90.47	0.12
Water Pot No	4.73	0.03	5.99	0.12	14.38	0.23	33.66	0.12	51.87	0.31
Jebena Medium Size No	2.26	0.03	2.94	0.12	7.77	0.28	22.04	0.16	37.60	0.15
Mitad Griddle of Clay No	5.64	0.48	11.15	0.14	26.38	0.21	62.66	0.13	100.47	0.23

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Local Stove Lakech No	8.29	0.02	8.10	0.10	26.41	0.36	70.64	0.10	99.30	0.24
Cup for Coffee China No	4.25	-0.16	1.23	0.02	2.37	0.31	5.46	0.03	6.96	0.14
Plate Clay imported No	2.58	0.46	4.29	0.00	9.15	0.38	28.07	0.13	44.99	0.14
Sefed No	5.78	0.02	7.30	0.11	17.95	0.25	43.57	0.14	68.90	0.16
Sack 100 Kg Capacity No	4.90	0.08	5.29	0.05	5.65	0.16	9.81	0.02	10.96	0.07
Cooking Pan Medium Local No	26.00	0.02	27.24	0.05	45.40	0.14	68.37	0.02	85.56	0.18
Tray Nickel Medium N45 Local No	21.04	-0.09	16.17	0.01	28.77	0.22	45.35	0.00	52.91	0.17
Electric Mitad Aluminum No	271.56	3.92	399.11	0.02	642.54	0.21	1305.09	0.06	1856.12	0.14
Gas Stove Kerosine China No	33.80	0.28	38.34	-0.01	66.57	0.28	143.89	0.04	207.47	0.18
Jerrycan 20 Litres No	17.19	4.76	20.78	-0.02	22.71	0.05	35.64	0.11	47.76	0.14
Bucket 20 Litres No	11.75	2.02	15.61	0.02	28.28	0.18	43.65	0.04	58.09	0.12
Glass for Tea Duralex No	3.40	-0.04	3.22	0.03	4.75	0.16	8.27	0.06	11.33	0.15
Kuraz Small Local Kerosine Lamp	1.12	-0.01	1.10	0.03	2.05	0.25	4.89	0.10	10.44	0.12
Flash Light No	6.44	0.00	6.58	0.02	12.29	0.24	24.72	0.06	28.74	0.12
Electric Bulb Philips 4060 Watt	3.11	-0.04	2.31	-0.02	3.30	0.47	14.42	0.11	20.78	0.13
Hard Soap Local 200 gm	1.85	-0.01	1.85	0.03	3.82	0.38	7.09	0.08	10.39	0.09
Hard Soap Imported 200 gm	2.31	0.02	2.20	0.04	5.01	0.33	10.47	0.01	11.95	0.08
Detergent Omo 50 gm	1.32	-0.05	1.02	0.06	2.45	0.24	4.24	0.06	5.19	0.10
Incense Kg	7.21	1.29	9.97	0.11	30.26	0.37	93.72	0.11	129.61	0.18
Sandal Wood No	0.45	-0.09	0.26	-0.01	0.34	0.15	0.60	0.08	0.82	0.13
Toilet Paper Mamko Roll	3.48	-0.05	3.05	0.00	5.09	0.22	9.61	0.09	13.87	0.06

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Dry Cleaning Suit Men No	13.13	0.04	15.32	0.05	22.62	0.12	38.83	0.08	54.02	0.11
Maid Servant Month	25.95	0.10	42.72	0.12	111.89	0.27	308.08	0.18	615.26	0.22
Unskilled Service Daily Laborer	6.15	0.04	7.89	0.12	20.12	0.24	50.65	0.17	91.71	0.16
Ampicillin 250 mg Local 56 Caps	20.15	-0.05	16.49	-0.03	20.99	0.14	35.34	0.01	27.22	0.12
Tetracycline 250 mg Local 56 Caps	10.60	-0.05	9.31	0.01	13.15	0.14	23.83	0.10	33.99	0.18
Chloramphenicol 250 mg Local 56	15.68	-0.04	12.86	-0.02	15.66	0.12	34.72	0.18	51.21	0.08
Cough Syrup Berantine Local125c	7.53	0.11	8.95	0.04	10.72	0.13	21.52	0.09	28.47	0.93
Bactrim 480 mg Local 30 Pills	8.97	0.00	6.81	-0.03	7.05	0.08	12.00	0.11	16.58	0.18
Mezel l250 mg Local 30 Caps	4.43	0.17	4.95	0.02	7.26	0.14	12.35	0.10	16.86	0.12
Asprin 300 mg Local 20 Pills	2.49	-0.08	2.03	0.02	2.59	0.09	4.16	0.10	6.54	0.35
Doctors Fee Government per-visit	0.97	0.11	1.83	0.10	3.51	0.18	6.28	0.11	8.45	0.09
Doctors Fee Private per-visit	8.44	0.01	9.33	0.02	11.85	0.10	20.27	0.11	28.58	0.07
Injection Service Charge Once	1.03	-0.02	1.08	0.03	1.40	0.10	2.53	0.14	4.24	0.58
Benzene Lt	233.63	-0.09	5.31	0.14	12.32	0.23	19.08	0.38	29.42	0.01
Motor Oil Mobil Lt	20.77	1.50	20.18	0.05	53.37	0.42	102.46	0.27	111.15	0.14
Car Washing and Greasing No	21.93	0.18	28.73	0.04	41.60	0.13	71.47	0.10	99.07	0.08
Bus Fare per km Tarif	30.57	-0.07	0.19	0.00	0.68	2.37	0.44	0.20	1.33	0.12
Bus Fare within Town Trip	27.09	3.75	0.42	0.08	1.08	0.34	1.61	-0.04	1.55	0.18
Taxi Fare Trip	10.07	0.20	0.80	0.06	1.16	0.13	1.76	0.07	2.32	0.23
Animal Transport fare Trip	12.59	4.68	21.63	0.12	36.13	0.12	55.48	0.11	90.81	0.32
Cart Fare Trip	56.22	-0.15	0.89	0.03	1.29	0.14	2.17	0.06	3.24	0.19

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
TV Set Philips 21inch Colored No	3568.5	-0.04	2892.8	-0.05	3166.20	0.12	4720.11	0.06	6096.72	0.06
Cassette Recorded Original Local	12.88	-0.01	10.68	-0.05	10.09	0.06	13.58	0.04	18.65	0.35
Radio Set Philips 3 Band No	165.08	-0.05	135.66	0.02	224.01	0.22	393.95	0.00	423.25	0.09
Newspaper Addis Zemen No	0.60	-0.02	0.91	0.46	2.28	0.12	3.62	0.10	6.81	0.50
Exercise Book 50 Leaves Local No	3.73	-0.13	1.97	0.03	3.33	0.20	6.90	0.16	12.70	0.13
Pencil China No	0.87	-0.19	0.26	0.05	0.94	0.46	2.07	0.05	2.92	0.19
Ball Point Bic England No	0.79	0.47	1.15	0.06	1.82	0.18	3.72	0.09	6.24	0.33
Day School Fee Private Grade 9	37.84	18.81	118.51	0.07	162.20	0.15	347.99	0.16	611.34	0.18
Night School Fee Government Gr 9	12.04	5.51	22.79	0.06	34.76	0.13	64.09	0.11	100.20	1.33
Blade TOPAZ No	2.59	-0.17	0.27	0.02	0.53	0.31	1.22	0.09	1.98	0.14
Hair Dressing Traditional No	1.54	1.31	3.38	0.13	7.01	0.17	13.87	0.11	22.00	0.09
Hair Dressing Modern No	5.43	0.48	7.97	0.06	14.59	0.19	28.44	0.08	39.62	0.13
Barber Mens' Hair Cut No	3.70	-0.05	3.21	0.03	4.75	0.15	10.16	0.16	18.65	0.22
Paraffin Hair Oil 330 cc	6.76	0.66	8.05	0.03	17.85	0.29	33.89	0.06	42.41	0.08
Umbrella Men Medium Local No	26.98	-0.04	20.39	-0.01	36.65	0.33	89.50	0.03	114.03	0.15
Umbrella Women Medium Imported	24.40	-0.04	19.13	0.01	41.43	0.37	122.26	0.06	145.37	0.06
Hand Bag Imported Synthetic No	90.32	0.69	60.31	-0.12	111.68	0.38	250.84	0.04	300.34	0.16
Sheep 1015 Kg No	62.45	0.12	117.39	0.18	275.59	0.26	719.43	0.11	1276.55	0.22
Goat 1015 Kg No	53.45	0.09	96.15	0.21	249.84	0.27	666.90	0.12	1260.96	0.28
Heifer 24 Years No	325.01	0.01	473.39	0.21	1252.46	0.23	3050.54	0.10	4802.29	0.28
Cow 4 Years and Above No	500.58	0.01	716.39	0.20	1893.58	0.23	4560.64	0.09	7141.36	0.23

COMMODITIES	1997-2001		2002-2006		2007-2011		2012-2016		2017-2020	
	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation	Price	Inflation
Bull 24 Years No	379.25	0.00	559.45	0.23	1560.11	0.24	3921.92	0.10	6079.05	0.30
Ox 4 Years and Above No	689.54	0.01	1093.0	0.23	3033.52	0.24	7405.86	0.09	11796.40	0.25
Hen Indigenous No	6.79	0.04	9.97	0.21	27.39	0.27	66.99	0.10	112.25	0.23
Cock Indigenous No	9.83	0.04	14.52	0.20	39.50	0.30	102.25	0.12	179.87	0.29
Donkey No	255.50	-0.01	340.55	0.19	907.20	0.22	2022.82	0.07	2573.92	0.10
Horse No	508.68	0.01	683.18	0.17	1645.22	0.22	3655.71	0.09	5227.06	0.41
Mule No	891.44	-0.01	1091.79	0.16	2773.81	0.25	6770.39	0.09	9158.07	0.23
Coffin Medium Quality No	148.27	0.05	188.35	0.05	340.68	0.24	809.91	0.12	1210.34	0.31

Table 2 (A): Headline inflation computed from the CSA data

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
January	0.055	0.342	0.461	0.158	0.691	0.343	0.100	0.168	0.545	0.738	0.475	0.134	0.677	0.932
February	0.270	0.099	0.297	0.156	0.808	0.464	0.133	0.119	0.610	0.724	0.429	0.902	0.746	0.776
March	0.555	0.345	0.351	-0.155	0.908	0.569	0.162	0.104	0.630	0.684	0.627	0.355	0.853	0.835
April	0.113	0.167	0.309	0.154	0.161	0.608	0.177	0.140	0.643	0.684	0.511	0.131	0.801	0.436
May	0.199	0.253	-0.171	0.716	0.170	0.642	0.143	0.174	0.621	0.593	0.253	0.948	0.867	0.647
June	0.943	0.258	0.151	0.268	0.201	0.498	0.132	0.121	0.667	0.610	0.067	0.677	0.990	0.220
July	0.394	0.063	0.264	-0.152	0.322	0.366	0.122	0.129	0.593	0.609	0.095	0.545	0.288	0.763
August	0.564	0.279	0.244	0.131	0.712	0.312	0.100	0.134	0.576	0.865	0.373	0.595	0.550	0.769
September	0.226	0.190	-0.118	0.295	0.562	0.241	0.083	0.212	0.589	0.707	0.286	0.679	0.607	0.985
October	0.191	0.148	-0.202	0.799	0.364	0.236	0.102	0.339	0.690	0.087	0.721	0.663	0.700	0.744
November	0.219	0.249	0.157	0.290	0.304	0.180	0.107	0.355	0.754	0.431	0.360	0.675	0.902	0.254
December	0.134	0.244	0.394	0.281	0.272	0.127	0.145	0.460	0.811	0.259	0.576	0.647	0.963	0.985
Headline Inflation (Average)	**0.322**	**0.220**	**0.178**	**0.245**	**0.456**	**0.382**	**0.125**	**0.205**	**0.644**	**0.583**	**0.398**	**0.579**	**0.745**	**0.695**

Table 2 (A): Headline inflation computed from the CSA data continued

Month	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
January	0.305	0.666	0.145	0.278	0.769	0.130	0.309	0.305	0.763	0.550
February	0.247	0.538	0.155	0.343	0.570	0.148	0.308	0.250	0.940	0.224
March	0.267	0.437	0.177	0.414	0.427	0.204	0.375	0.221	0.268	0.275
April	0.088	0.346	0.214	0.564	0.341	0.084	0.230	0.223	0.259	0.573
May	0.311	0.264	0.193	0.662	0.286	0.468	0.334	0.265	0.979	
June	0.397	0.253	0.198	0.000	0.280	0.313	0.349	0.335	0.050	
July	0.301	0.253	0.281	0.123	0.234	0.481	0.317	0.423	-0.973	
August	0.244	0.233	1.751	0.382	0.209	0.335	0.162	0.247	-0.070	
September	0.160	0.265	0.480	0.464	0.200	0.319	0.208	0.641	0.442	
October	0.050	0.221	0.418	0.517	0.192	0.307	0.304	0.294	-0.070	
November	0.907	0.156	0.284	0.259	0.171	0.358	0.266	0.928	0.110	
December	0.789	0.166	0.250	0.956	0.158	0.360	0.263	0.831	0.960	
Headline Inflation (Average)	**0.339**	**0.316**	**0.379**	**0.414**	**0.320**	**0.292**	**0.285**	**0.414**	**0.305**	**0.405**

Table 2 (B): Core inflation computed from the CSA data: Permanent or Monetary Contribution

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
January	0.04	0.00	0.32	-0.06	0.00	-0.07	0.04	0.18	0.05	0.02	0.12	0.43	-0.04	0.66
February	0.20	-0.03	-0.02	0.03	0.00	-0.03	0.00	0.04	0.29	0.20	0.28	1.21	0.19	0.29
March	-0.08	0.00	0.01	-0.02	0.02	0.12	-0.02	0.02	0.22	0.19	0.19	0.37	0.03	0.24
April	0.23	0.06	0.01	-0.05	0.62	-0.02	0.01	0.08	0.24	0.13	0.11	0.00	0.21	0.00
May	-0.05	0.24	0.04	-0.09	0.01	0.03	0.04	0.04	0.04	0.10	0.12	0.28	0.37	0.04
June	-0.07	0.11	-0.07	-0.38	-0.03	0.00	0.00	0.36	0.03	0.09	0.20	0.27	-0.02	0.63
July	0.00	0.16	0.00	-0.03	0.02	0.11	0.00	-0.05	0.01	0.22	0.17	0.07	-0.12	0.25
August	-0.02	0.23	-0.02	-0.32	-0.07	0.01	0.00	0.05	0.01	0.14	0.46	0.03	0.02	0.10
September	0.09	-0.01	0.00	0.01	0.00	-0.01	0.07	0.00	0.08	0.19	0.09	-0.24	0.04	0.18
October	-0.54	-0.02	-0.02	-0.18	0.11	-0.02	0.30	0.44	0.08	0.33	1.22	0.32	0.26	0.24
November	-0.05	0.05	-0.06	0.00	0.50	0.01	0.26	0.03	0.14	0.48	0.60	0.05	0.26	0.36
December	1.18	0.17	-0.15	-0.06	0.00	-0.04	0.12	0.03	0.31	0.04	-0.02	0.22	-0.02	0.14
Core Inflation (Average)	**0.08**	**0.08**	**0.00**	**-0.10**	**0.10**	**0.01**	**0.07**	**0.10**	**0.13**	**0.18**	**0.30**	**0.25**	**0.10**	**0.26**

Table 2 (B): Core inflation computed from the CSA data: Permanent or Monetary Contribution continued

Month	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
January	0.805	0.380	0.088	0.221	0.008	0.039	-0.020	0.084	0.009	-0.011
February	0.479	0.016	0.160	0.085	0.613	-0.002	0.039	0.168	0.369	-0.014
March	0.494	-0.021	0.000	0.237	-0.022	0.028	0.236	0.098	0.247	-0.023
April	0.191	0.005	-0.004	0.307	0.063	0.025	0.058	0.181	0.084	-0.011
May	0.413	0.098	-0.006	-0.005	-0.019	0.302	0.060	0.009	-0.023	
June	0.003	-0.002	0.024	0.067	0.102	-0.016	0.135	0.171	-0.258	
July	0.400	0.075	0.030	0.000	-0.031	0.017	0.138	0.175	0.208	
August	0.192	-0.008	0.111	0.056	-0.072	0.096	-0.027	0.173	0.000	
September	-0.007	-0.063	0.026	-0.108	0.199	0.058	0.002	-0.002	0.083	
October	0.048	0.098	0.067	0.182	0.009	0.205	-0.140	0.139	-0.008	
November	0.194	0.000	0.122	0.023	0.241	-0.136	0.048	0.195	0.222	
December	0.060	0.090	0.753	0.065	0.084	0.000	0.071	0.211	0.514	
Core Inflation (Average)	0.273	0.055	0.114	0.094	0.098	0.051	0.050	0.133	0.121	-0.015