የኢትዮጵያ ብሔራዊ ባንክ
NATIONAL BANK OF ETHIOPIA

ቁ.፻፴፮
ሚያዚያ ፳፻፲፮ ዓ.ም.

NO.136
APRIL 2023

ቡለቱ

BIRRITU

MAMO ESMELEALEM MIHRETU, BIOGRAPHY
GOVERNOR OF NATIONAL BANK OF ETHIOPIA
6

INFLATION FORECASTING MODELS AND FORECASTING COMBINATION ANALYSIS: THE CASE OF ETHIOPIA

7

በኢትዮጵያ ውስጥ በሥራ ላይ ያሉ ባንክና መድን ተቋማት
BANK AND INSURANCE INSTITUTION OPERATING IN ETHIOPIA

የኢትዮጵያ ብሔራዊ ባንክ
National Bank of Ethiopia

ስልክ ቁጥር
Telephone 0111517430

ፋክስ
Fax 0115-5-514588

የባንኮች ሥም ዝርዝርና አድራሻ / Banks Name & Address

የኢትዮጵያ ንግድ ባንክ **Commercial Bank Ethiopia**	**Tel** **Fax**	0115511271 0115514522
የኢትዮጵያ ልማት ባንክ **Development Bank of Ethiopia**	**Tel** **Fax**	0115518171 0115511606
አዋሽ ኢንተርናሽናል ባንክ **Awash international Bank S.C**	**Tel** **Fax**	01155700065 0116627765
ዳሽን ባንክ አ.ማ **Dashen Bank S.C**	**Tel** **Fax**	0114654127 0114653037
አቢሲኒያ ባንክ **Bank of Abyssinia S.C**	**Tel** **Fax**	0115530663 0115510409
ወጋገን ባንክ **Wegagen bank S.C**	**Tel** **Fax**	0115523526 0115523526
ህብረት ባንክ አ.ማ **United Bank S.C**	**Tel** **Fax**	0114655284 0114655243
ንብ ኢንተርናሽናል ባንክ **Nib International S.C**	**Tel** **Fax**	0115503304 0115504349
ኦሮሚያ ህብረት ሥራ ባንክ አ.ማ **Cooperative Bank of oromia S.C**	**Tel** **Fax**	0115506025 0115510489
አንበሳ ኢንተርናሽናል ባንክ አ.ማ **Lion international Bank S.C**	**Tel** **Fax**	0116627111 0116625999
ዘመን ባንክ አ.ማ **Zemen Bank S.C**	**Tel** **Fax**	0115540057 -
ኦሮሚያ ኢንተርናሽናል ባንክ አ.ማ **Oromia International Bank S.C**	**Tel** **Fax**	0115570201 0111561585
ብርሃን ኢንተርናሽናል ባንክ አ.ማ **Berhan International Bank S.C**	**Tel** **Fax**	01116630125 -
ቡና ኢንተርናሽናል ባንክ አ.ማ **Bunna International Bank S.C**	**Tel** **Fax**	011580831 0115158314
አባይ ኢንተርናሽናል ባንክ አ.ማ **Abay International Bank S.C**	**Tel** **Fax**	0115518923 0115528852
አዲስ ኢንተርናሽናል ባንክ አ.ማ **Addis International Bank S.C**	**Tel** **Fax**	0115549774 -
ደቡብ ግሎባል ባንክ **Debub Global Bank**	**Tel** **Fax**	0118501207/8 -
እናት ባንክ **Enat Bank**	**Tel** **Fax**	0115157475 -
ዘምዘም ባንክ **Zemzem Bank**	**Tel** **Fax**	+2515 582 308 -
አህዱ ባንክ አ.ማ **Ahadu Bank S.C**	**Tel**	+2515 583 971 +2515 582 751
ስንቄ ባንክ አ.ማ **Siinqee Bank S.C**	**Tel** **Fax**	0115571118 -
ሂጅራ ባንክ አ.ማ **Hijra Bank S.C**	**Tel** **Fax**	+2515 583 971 -
ጎህ ቤቶች ባንክ አ.ማ **Goh Betoch Bank S.C**	**Tel** **Fax**	+251116 687967 -
ሸበሌ ባንክ አ.ማ **Shabelle Bank S.C**	**Tel** **Fax**	+251257756976 +251 257880462
ፀደይ ባንክ አ.ማ **Tsedey Bank S.C**	**Tel** **Fax**	0111266595 -
ፀሐይ ባንክ አ.ማ **Tsehey Bank S.C**	**Tel** **Fax**	0111207783 -
አማራ ባንክ አ.ማ **Amhara Bank S.C**	**Tel** **Fax**	0118529028 -
ገዳ ባንክ አ.ማ **Geda Bank S.C**	**Tel** **Fax**	- -

የኢንሹራንስ ኩባንያዎች ሥም ዝርዝርና አድራሻ /Insurance companies Name & address

የኢትዮጵያ መድን ድርጅት Ethiopian Insurance Corporation	**Tel** **Fax**	011-5-51 24 00 011-5-51 74 99
ብሔራዊ የኢትዮጵያ ኢንሹራንስ ኩባንያ አ.ማ National Insurance Company of Ethiopia S.C.	**Tel** **Fax**	011-4-66 11 29 011-4-65 06 60
አዋሽ ኢንሹራንስ ኩባንያ አ.ማ Awash Insurance Company S.C.	**Tel** **Fax**	011-5-57 02 09 011-5-57 02 05 011-5-57 00 01 011-5-57 02 08
ሕብረት ኢንሹራንስ ኩባንያ አ.ማ United Insurance Company S.C.	**Tel** **Fax**	011-4-65 56 56 011-4-65 32 58 011-4-67 19 34
አፍሪካ ኢንሹራንስ ኩባንያ አ.ማ Africa Insurance Company S.C.	**Tel** **Fax**	011-6-63 77 16/19 011-6-62 45 79 011-6-63 82 53
ናይል ኢንሹራንስ ኩባንያ አ.ማ Nile Insurance Company S.C.	**Tel** **Fax**	011-4-42 60 00 011-4-42 57 54 011-4-42 60 08
ኒያላ ኢንሹራንስ ኩባንያ አ.ማ Nyala Insurance S.C.	**Tel** **Fax**	011-6-62 66 67/69 011-6-62 67 07 011-6-62 67 06
ግሎባል ኢንሹራንስ ኩባንያ አ.ማ Global Insurance Company S.C.	**Tel** **Fax**	011-1-56 74 00 011-1-56 04 83 011-1-56 62 00
ንብ ኢንሹራንስ ኩባንያ አ.ማ Nib Insurance Company S.C.	**Tel** **Fax**	011-5-53 51 29/32 011-5-52 81 93 011-5-52 81 94/96
አንበሳ ኢንሹራንስ ኩባንያ አ.ማ Lion Insurance Company S.C.	**Tel** **Fax**	011-6-18 70 00 011-6-63 29 40 011-6-63 29 36/47
ኢትዮላይፍ ኤንድ ጀነራል ኢንሹራንስ አ.ማ Ethio-Life & General Insurance S.C.	**Tel** **Fax**	011-5-54 96 50/52 011-5-54 96 53
ኦሮሚያ ኢንሹራንስ ኩባንያ አ.ማ Oromia Insurance Company S.C.	**Tel** **Fax**	011-5-50 31 38 011-5-54 51 31 011-8-95 95 80 011-5-50 31 92
አባይ ኢንሹራንስ አ.ማ Abay Insurance S.C.	**Tel** **Fax**	011-5-53 53 00 011-5-53 55 50 011-5-15 76 90
ብርሀን ኢንሹራንስ አ.ማ Berhan Insurance S.C.	**Tel** **Fax**	011-4-67 44 31 011-4-67 44 23 011-4-66 87 01
ፀሀይ ኢንሹራንስ ኩባንያ አ.ማ Tsehay Insurance S.C.	**Tel** **Fax**	011-1-11 97 70 011-1-11 98 27 011-1-11 98 86
ሉሲ ኢንሹራንስ ኩባንያ አ.ማ Lucy Insurance S.C.	**Tel** **Fax**	011-4-67 17 84 011-8-96 59 70 011-4 67 18 96
ቡና ኢንሹራንስ ኩባንያ አ.ማ Bunna Insurance S.C.	**Tel** **Fax**	011-1-57 60 54 011-1-11 96 35 011-1-115207
ዘመን ኢንሹራንስ አ.ማ Zemen Insurance S.C.	**Tel** **Fax**	251115575850 251116151415 251116150001
የኢትዮጵያ የጠለፋ መድን አ.ማ Ethiopian Reinsurance S.C.	**Tel** **Fax**	251115575757 251115575758

OPINION EXPRESSED IN THE ARTICLE DO NOT NECESSAIRLY REFLECT THE POLICIES AND STRAGIES OF THE NATIONAL BANK OF ETHIOPIA

for resources, please visit the NBE's offcial website
www.nbe.gov.et

የኢትዮጵያ ብሔራዊ ባንክ
National Bank of Ethiopia

Designed & Printed by
master print
ስ አራት ኪሎ ☎ +251 111 557 788 ገርጂ ☎ +251 116 298 777
✉ 31362 አዲስ አበባ ኢትዮጵያ
www.masterprintaddis.com

Birritu No.13

Birritu is a quarterly magazine published by the National Bank of Ethiopia. It presents in-depth articles, researches and news on Ethiopian Financial Sector

Address:

Birritu Editorial Office

Tel

+251 118 58 22 86

+251 115 53 00 40

P.O.Box

5550

www.nbe.gov.et

Addis Ababa , Ethiopia

[Content]
ማውጫ

INFLATION FORECASTING MODELS AND FORECASTING COMBINATION ANALYSIS: THE CASE OF ETHIOPIA

MAMO ESMELEALEM MIHRETU, BIOGRAPHY

የውጭ ምንዛሪ ተመን (Exchange Rate)

Rethinking Monetary Policy in a Changing World

IMF March 2023 Markus Brunnermeier

After decades of quiescence, inflation is back; to fight it central banks must change their approach

Dear esteemed readers, we are happy to meet you with the 136th issue of Birritu which consist of relevant and timely topics.

On the News column H.E's The new Governor, Ato Mamo Esmelealem Mihretu, Biography is presented.

The topic selected for research article is "Inflation Forecasting Models and Forecasting Combination Analysis: The Case of Ethiopia".

On the Educational and Informative section there are two articles about ''የውጭ ምንዛሪ ተመን'' and ''Rethinking Monetary Policy in a Changing World". Finally, on miscellany section there is a poem.

Dear readers, your feedbacks and comments are invaluable for enriching the next editions of Birritu. Please keep forwarding your comments and suggestions.

Birritu Editorial office

MAMO ESMELEALEM MIHRETU, BIOGRAPHY

Mamo E. Mihretu is the 10th Governor of the National Bank of Ethiopia (NBE). Before he was appointed as the Governor of NBE, Mr. Mamo served as the founding CEO of the Ethiopian Investment Holdings (EIH), the strategic investment arm of the government of Ethiopia. EIH manages all key commercial companies of the government of Ethiopia, such as Ethiopian Airlines and Ethio Telecom.

Mr. Mamo is a member of Ethiopia's Macroeconomic Council, which is the body that steers economic policy and strategic decisions. He has been a member and a Secretary of the Council for the last four and half years. He was an active member of the economic team that conceptualized, developed and implemented Ethiopia's economic reform program.

As a Board member of the Commercial Bank of Ethiopia (CBE) for four years, the largest financial institution in the country, Mr. Mamo chaired CBE's transformation program.

Mr. Mamo also served as a Senior Policy Advisor to the Prime Minister of Ethiopia and Ethiopia's Chief Trade Negotiator from 2018-2021. While working at the Office of the Prime Minister, Mr. Mamo helped create the policy and performance department that oversees performance outcomes of government agencies. Before joining the Ethiopian government in 2018. Mr. Mamo was a Senior Project Manager at the World Bank Group in Kenya from 2010 to 2018, working mainly on finance and competitiveness issues.

Mr. Mamo obtained a Master's Degree in Leadership, Public Administration and Economic Development from the Kennedy School of Government of Harvard University in the United States. He also holds a post-graduate degree in Trade and Investment from the Universities of Pretoria and University of Amsterdam. He was a gold medalist when he graduated from Addis Ababa University, School of Law.

INFLATION FORECASTING MODELS AND FORECASTING COMBINATION ANALYSIS: THE CASE OF ETHIOPIA

ECONOMIC MODELING AND STATISTICAL ANALYSIS DIRECTORATE

By: Chalachew Abinet

Chief Research Officer, Economic Modeling and Statistical Analysis Directorate

In this study different forecasting models and forecast combination techniques were evaluated to forecast Ethiopian inflation. The finding reveals that BVAR, ECM and Phillips curve model performs best respectively next to the bench mark (ARIMA) model. From the forecast combination techniques evaluated in this study winsored mean, median and trimmed mean performs best to forecast Ethiopian inflation.

ABSTRACT

The main objective of this study is to compare different inflation forecasting models and combinations techniques that best fit for Ethiopian inflation forecasting. In particular, the random walk model, ARIMA, ECM, VECM, Phillips curve and BVAR model was employed. Since Ethiopian CPI data does not follow random walk process using statistical analysis Augmented Dickey-Fuller test it was excluded in forecast performance evaluation and forecasting combination analysis. Therefore, in model comparison only five models have been compared using RMSE for both in-sample and pseudo out of sample forecasting. The empirical finding shows that, using both in-sample and pseudo out of sample forecast accuracy ARIMA model performs best than other models. Next to ARIMA model ECM and BVAR model performs best as compared to VECM and Phillips curve. On the other hand VECM performs worst than other models compared up to eight period ahead forecasts. In the study different forecast combination techniques were compared. From those forecasting combination techniques Winsorized Mean, Median and Trimmed Mean respectively performs best than Bats/Granger Method, Equal Weight and OLS. Compared to VECM model forecast combination leads best in a reduction of forecast error, although some of the individual models like ARIMA, ECM and BVAR perform better than forecast combinations.

Key words: Inflation, forecasting, forecast combination, ARIMA, BVAR and VECM, Forecast Evaluation;

INFLATION FORECASTING MODELS AND FORECASTING COMBINATION ANALYSIS: THE CASE OF ETHIOPIA

1. INTRODUCTION

The monetary policy in most central banks is designed for controlling inflation at low level because inflation has a clear welfare costs. Implementing monetary policy takes time lags depending on the responsiveness of financial markets and real economy to policy interventions. As a central bank National Bank of Ethiopia (NBE) has an objective of achieving and maintaining price stability by achieving single digit inflation rate. Therefore accurate and reliable inflation forecast for the future rate is necessary for the successful realization of NBE objectives.

Inflation forecasting is a fundamental task in setting monetary policy but it a challenging task which involves large number of specification choices. The choice of specification ranges from time series models (both univariate and multivariate) to theoretical models which each model have its own advantages and disadvantages.

Among the possible multivariate time series models Vector Autoregressive (VAR) models are popular tools for forecasting and policy analysis which doesn't suffer from an endogenueity problem but it may lead to a problem of over parameterization which may result inaccurate estimation of parameters. The over parameterization problem of VAR will be solved by using other alternative models like Bayesian Vector Autoregressive (BVAR) which applies shrinkage by explicitly imposing restrictions through prior distributions.

Ogunc (2019) uses BVAR model to compare the forecast performance of including small or many variables able to produce best forecast. The empirical result of Ogunc shows that the forecast accuracy of including small selected variables has high forecast performance than including many variables. On the other hand Papavangjeli (2019) do inflation forecast performance comparison between BVAR, VAR and benchmark univariate and found that BVAR model outperforms best than VAR and bench mark models.

Empirical literatures found that theoretical models are good in forecasting when the economy is weak/economic crises as compared to Autoregressive Integrated Moving Average (ARIMA), VAR and naïve models (Pretorious and Pensburg, 1996; Fisher et al. 2002; Onder, 2004; Dotsey et al. 2011and Buelens, 2012). ARIMA performs better as compared to Naïve and VAR during the period of stable inflation while for the period of high inflation VAR performs

better than ARIMA and static models (Mitra and Rashed, 1996). Lee (2012) compares the inflation forecasting power of ARIMA, Naïve and VAR for inflation targeting countries. Lee's empirical result shows that ARIMA model have better inflation forecasting performance than naïve and VAR models for inflation targeting countries which have stable inflation. Phillips curve is more accurate in forecasting inflation when the economy is weak compared with ARIMA, Naïve and VAR models (Pretorious and Pensburg, 1996; Fisher et al. 2002; Onder, 2004; Dotsey et al. 2011; Buelens, 2012) while it performs poorly during periods of stable inflation (fisher et al. 2002).

Different inflation forecast methodologies have different performance on different countries because different countries have unlike economic environments. Empirically there is no consensus that single model fits to all economy for inflation forecasting and there is no single forecast combination that fits to combine inflation forecasting from different models.

When we see Ethiopia's experience of inflation forecasting, currently NBE uses ARIMA model as a dominant model to forecast Ethiopian inflation rate which was developed by Chalachew (2011). Even though the forecast performance of existing ARIMA model in forecasting Ethiopian's inflation is good it should be compared with other forecasting models that currently exist in the literature. So the existing literature in Ethiopia shows there is not yet done any Ethiopia inflation forecast combination and forecast comparison analysis for different forecasting methodologies.

Therefore, the general objective of this study was to develop inflation forecasting models and make forecasting combination analysis in the case of Ethiopia. While the specific objectives are; develop different time series and theoretical models and produce inflation rate forecasting using those models, do a forecast comparison between inflation forecasting models by using their forecast accuracy and select the best fitted model for Ethiopian inflation forecast. Finally to identify the best forecast combination techniques using different forecasting combination techniques.

The main significance of this research paper is that it helps to identify the best inflation forecasting models and forecast combination techniques for Ethiopia economy by doing forecast comparison analysis among different models and forecast combination techniques. This study will be used as a reference for top management of National Bank of Ethiopia, academic staffs and government bodies in order to give an empirical insight in forecasting inflation and to provide policy recommendation based on the forecast accuracy of different models and forecast combination techniques. It also will give a motivation to other researchers to conduct a research on forecasting inflation and other macroeconomic variables which are relevant for policy decisions.

In this study time series and theoretical models were compared to select the best forecasting models. Univariate model considers the dependent variable and its past history or the autoregressive or moving average component, the multivariate model considers both the dependent and independent variables, while the Phillips triangle model includes dependent variable and the explanatory variables (output gap, expectation and other control variables which capture cost-push inflation). The forecasting techniques used in this study include ARIMA, ECM, VAR and BVAR and modified Phillips curve model (Gordon's triangle model).

2. LITERATURE REVIEW

2.1. THEORETICAL LITERATURE REVIEW

Sargent & Wallace (1981) states that the cause of inflation in developed countries is broadly identified as growth of money supply while the causes of inflation in developing countries, in contrast, is not a purely monetary phenomenon. According to Sergent and Wallace in addition to money supply fiscal imbalances and exchange rate depreciation dominate the inflation process.

According to Keynesian theory of demand pull inflation, inflation is caused by further increases in effective demand after full employment is attained. Keynes states that inflation is an excess of aggregate demand over the aggregate supply. If investment is less than saving deflationary gap exists and on the reverse inflationary gap. When the inflationary gap exists inflation increases because investment is more than adequate to fill the gap between income and consumption and Keynes assumes the government must be responsible for closing these gaps by using the policies of manipulating taxes, interest rate and government expenditure (Lin, 1967).

2.2. EMPIRICAL LITERATURE REVIEW

Aiol et al, (2010) consider combinations of subjective survey forecasts and model-based forecasts. Survey forecasts reflect individual forecasters' subjective judgment which able to adjust rapidly to changes in the data generating process conversely, forecasts from time-series models can efficiently incorporate past regularities in the data. Their empirical result suggest that a simple equal-weighted average of survey forecasts outperform the best model-based forecasts for a majority of macroeconomic variables and forecast horizons.

Akdogan et al. (2012) produce short term inflation forecasts in Turkey using univariate models, decomposition based approaches, a Phillips curve, motivated time varying parameter model, a BVAR models and dynamic factor models. A forecasting model with a good in-sample fit does not necessarily imply that it will have a good out-of sample performance so to solve this problem they divide total sample period (2003Q1:2011Q2) into training sample(2003Q1: 2009Q3) and the forecasting sample(2009Q4: 2011Q2). Using the training sample to estimate the forecasting models they produce one to four quarters ahead forecasts from their models following recursive window. Based on the forecast errors, models which incorporate more economic information outperform the benchmark random walk model. They further combine their forecasts by means of several weighting schemes and found that forecast combination leads to reduction of forecast errors compared to individual models, although some of the individual models perform alike in certain horizons.

Ajayi (2019) compares alternative inflation forecasting models in the case of OPEC and BRICS countries. Ajayi considers ARIMAX, ARIMA, SARIMA, naïve, VAR and VECM models. The univariate ARIMA model is generally favoured for the BRICS countries except South Africa. However in the case of OPEC countries the results are mixed between univariate and multivariate methods. For OPEC countries that have moderate inflation like Saudi Arabia, ARIMA model outperforms the multivariate model. In contrast, multivariate models generally outperform ARIMA models for countries with high inflation like Angola and Algeria.

Ogunc (2019) applies a BVAR approach for short-term inflation forecasting and compares the forecasting performance of BVAR under alternative specifications. In comparison of forecast performance Ogunc considers modeling in levels or in differences, choice of tightness, estimating BVARs of different model sizes and the accuracy of conditional and unconditional forecasts. The empirical result shows that BVAR forecasts using variables in log-difference outperform than using log-levels of the data. On the other hand when evaluating forecast performance in terms of model size, the lowest forecast errors belong to the models having relatively small number of variables.

Papavangjeli (2019) developes BVAR unconditional mean, random walk, ARIMA models to forecast short-term inflation, and the best performing among them is used as a benchmark to evaluate the forecast performance of the BVAR model. The results show that the BVAR approach, which incorporates more economic information outperforms the benchmark univariate and the unrestricted VAR models in the different time horizons of the forecast sample.

Pretorious and Pensburg (1996) forecast South Africa inflation and compare the forecast performance of theoretical models which includes Philips curve, traditional monetarist and money demand specifications with ARIMA. RMSE and MAE shows theoretical models have better forecasting performance as compared to ARIMA model. Fisher et al. (2002) compare the forecast performance of Phillips curve and naïve models during inflation volatility period in the United States and found that Phillips curve have better performance than naïve models. Atkeson and Ohanian (2001), Fischer et al.(2002), Orphanides and Van alorden(2005) and Stock and Watson(2007) stats that the relationship between unemployment and inflation is not stable because the historical data changes as a result of changes in the economic environment at that time univariate modes have better forecast performance.

Zardi (2017) develops and compares different time series models which include RW, SARIMA, a Time Varying Parameter model, BVAR and Dynamic Factor models in the case of Tunisia's short-term inflation forecast. Zardi two quarter forecast value result shows that models which incorporate more economic information outperform the RW. Zardi uses root mean squared weights method of forecast combination and found that the forecast combination leads best forecast performance than individual models. Timmermann (2004) used forecast combination to produce a better forecsts than best individual forecsting models.

3. RESEARCH METHODOLOGY

This section tells us about the research design, data type and source, model specification, description of variables and method of data analysis.

3.1. DATA SOURCE AND VARIABLES

In this paper quarterly time series data which ranges from 1999/2000Q1 to 2021/22Q2 was used. The data was collected from the NBE, Ministry of Planning and Development (MoPD) and Ethiopian Statistics Service (ESS). The variables included in the study are CPI, RGDPA,

M2, RGGDPGAP_700[2], Energy Price (EP), official exchange rate (EX), NEER, WTPP[3] and RFEA. The variables used as explanatory for each model specification depend on the model that is specified because there is difference in model specification. In this paper Random Walk (RW), ARIMA, Error Correction Model (ECM), Vector Error Correction Model (VECM), BVAR and Phillips curve models were considered. In the case of RW and ARIMA model lag values of dependent variable, auto regressive and moving average component was used explanatory variable respectively. While ECM consider an additional variable which is used as explanatory variables in addition to its lags, whereas in using VECM and BVAR all variables are used as endogenous. In the case of modified Phillips curve model (Gordon's triangle model, 1988) the dependent variable was CPI and the explanatory variables were output gap, energy price, expectation and official exchange rate. For all the variables incorporated in the model, seasonality has been tested and for those series that show seasonality, seasonality adjustment were made and the adjusted data is used for the analysis, all series were transformed to logarithm form to smooth the data.

3.2. RESEARCH DESIGN

The main objective of this study was to develop the best quarterly inflation forecasting models and determining the best forecast combination techniques. To achieve this objective causal research design which helps to predict the future inflation rate was considered.

3.3. MODEL SPECIFICATION

3.3.1. RANDOM WALK (RW)

A random walk or no-change model often found to forecast surprisingly well. It has been argued to robust to common forms of structural change (Kapetanios G. et al., 2007). The form of this model is given by

$$Y_t = Y_{t-1} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where y_t is Consumer Price Index, the h-step ahead forecast from this models is written as

$$E\left(y_{(t+h)/t}\right) = y_t$$

$$Where \;\; E\left(y_{(t+h)/t}\right) = E\left(y_{(t+h)}/y_t, y_{t-1}, y_{t-2} \ldots\ldots\right)$$

$$Y_t = Y_{t-1} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Random Walk model with drift is presented as follows;

$$Y_t = \alpha + Y_{t-1} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where; α is a drift parameter

[2] Scaled by adding 7000 to the output gap to make the negative value positive for making it convenient to do logarithmic transformation

[3] Sudan's CPI was excluding because our trade share with it is around 1.5% and considering its CPI which is more than 1000 for the last years over estimate trading partners CPI and causes misleading of parameter estimation

3.3.2. UNI-VARIATE ARIMA MODEL

Box and Jenkins time series modeling techniques is used to model and forecast inflation. The general notation of Box and Jenkins ARIMA model for non-seasonal component is given by a combination of three parts: Autoregressive (AR) order p, Moving Average (MA) order q, and the degree of Integration order d, ARIMA (p, d, q). Suppose there are N observations for a given univariate time series at given time t, say Y_1, Y_2,….. Y_t. Then, the Box-Jenkins ARIMA model for non-seasonal time series data is given by:

$$\Phi(B)\Delta^d Y_t = \mu + \theta(B)e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where: $\Phi(B)=1- \Phi_1B^1- \Phi_2B^2- \Phi_3B^3-\ldots.- \Phi_pB^p$ and $\theta(B) =1- \theta_1B^1- \theta_2B^2-\theta_3B^3- \ldots\ldots - \theta_qB^q$

B is the backward shift operator and Δ=1-B , Φ(B) and θ(β) is the non-seasonal AR and MA operator, d is the order of integration and et is Gaussian white noise, Y_t is the variable of interest CPI and μ is a constant. The Box and Jenkins ARIMA model has three main stages, i.e., identification, estimation and diagnostic checks.

ARIMA model assumes the time series data is stationary. The main weakness of ARIMA model is that it needs long time series data, have week forecast performance for long term and sensitive to outliers. When we see the strength of ARIMA model it only depends on the existing past time series data and have good forecast performance for short term and stable data.

3.3.3 ERROR CORRECTION MODEL (ECM) TECHNIQUE

ECM is useful to analysis both the short and long run effect between dependent and independent variables.

Basically, ECM can be written as:

$$\Delta Y_t = \alpha + \beta_1\Delta X_{1t} + \beta_2\Delta X_{2t} + \beta_3\Delta X_{3t} + \ldots + \beta_k\Delta X_{kt} - \gamma(Y_{t-1} - \delta_1 X_{1_{t-1}} - \delta_2 X_{2_{t-1}}\delta_3 X_{3_{t-1}} - \ldots - \delta_k X_{k_{t-1}}) + \varepsilon_t \ldots\ldots\ldots (5)$$

Where, Y and X are dependent and independent variables respectively, α is constant,

And δ_1, δ_2, δ_3,...., δ_k, are parameter estimates for long run and short run effect of an increase in X's on Y. γ Estimates the speed of adjustment to equilibrium after a deviation and ε_t is an error term. Based on the above ECM estimation techniques, the model with variables are specified as follows:

$$\begin{aligned}\Delta CPI_t = {} & \alpha + \beta_1\Delta\log(M2_{1t}) + \beta_2\Delta\log(NEERI_{2t)} + \beta_3\Delta\log \mathrm{RGDPGAP}_{7000_{3t}} \\ & + \beta_4\Delta\log RFEA_{4t} + \beta_5\Delta\log WTPP_{5t} - \gamma(CPI_{t-1} - \delta_1\log(M2_{1t-1}) - \delta_2\log(NEERI_{2t-1}) \\ & - \delta_3\log(\mathrm{RGDPGAP}_{7000_{3t-1}}) - \delta_4\log(RFEA_{4t}) - \delta_5\log(WTPP_{5t-1}) - \delta_6) + \varepsilon_t\end{aligned}$$

ECM model assumes there is co-integration between the variables of interest. The weakness of the ECM is exogenouity issue and its strength is it considers both short run and long run effects which give best forecast performance i.e. less affected by outliers than ARIMA model.

3.3.4. VARS

Since variables like inflation can be affected by many factors considering multivariate models is also important to forecast it and VAR model is one among those multivariate models. VAR model is a set of dynamic statistical equations involving

a set of variables where every variable is used to determine every other variable in the model and it became important for the last four decades for forecasting and evaluation of macroeconomic policy (Henry and Pesaran, 1993).

The standard linear reduced-form VAR model takes the form

$$Yt = A_{0+} \sum_{i=1}^{p} A_i Y_{t-i} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(6)$$

Where, Yt = (CPI_t, $M2_t$, $NEER_t$, $RGDPA_t$, FEA_t) is the vector of variables in the model and P is lag order selected using information criteria.

The forecasts from the VAR model are computed recursively

Where $Y_{t+h-i} = E\left(Y_{(t+h-i)/t}\right)$ *if t+h-i>t and* Y_{t+h-i} otherwise.

VAR model is used only when the variables are stationary at level or if there is no long run relationship between the variables and if the variables are stationary after differencing. But if the variables are not stationary and have co-integration instead of VAR model VECM is used.

The VECM provides a systematic way to treat non-stationary variables in a simultaneous equation system. The VECM captures both long run and short run relationship and it is written as follows:

$$\Delta Y_t = \alpha_0 + \beta Y_{t-1} + \sum_{i=1}^{p-1} \emptyset_{i+1} \Delta Y_{t-p+1} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots\ldots.(7)$$

Where, β contains co-integrating relations, or long run parameters. e_t is the corresponding error term; and Y_t is vector containing time series variables.

i. e. $\mathbf{Y_t} = (\mathrm{CPI_t}, \mathrm{M2_t}, \mathrm{NEERI_t RGDPA}, \mathrm{RFEA_t})$

The maximum likelihood estimation method which maximizes the log likelihood to obtain the parameter estimates. The main assumptions of VECM are that each variable should have the same number of lags and should satisfy stability condition. The strength of VECM model it allows us to obtain jointly long term and short term relationship between variables. The main weakness is that including more lags on VECM model has implications on degree of freedom.

3.3.5. BAYESIAN VARS (BVAR)

In using VAR there is an over parameterization problem which affects the accuracy of forecasting performance by consuming the models degree of freedom (Kapetanios, 2007). BVAR model was proposed by litterman in 1979 as an alternative model to standard VAR by solving the over-parameterization problem. Starting from defining the standard linear reduced-form VAR takes the form as specified above equation 6

$$Y_t = A_{0+} \sum_{i=1}^{p} A_i Y_{t-i} + X_t + u_t$$

Where Y_t = (CPI_t, $M2_t$ EX_t, $RGDPA_t$, $RFEA_t$) is the vector of variables in the model with lag order p which is selected by using information criteria, X_t is exogenous variable($WTPP_t$) , A_0 is a data vector of n random variables (5 x 1) vector (c_1, c_2, c_3, c_4, c_5) is a vector of constants, A_1, A_2, A_3, …, A_5 are 5 x 5 matrices of VAR coefficients, u_t ~N(0,Σ)

In BVAR model VAR is estimated by using the Bayesian shrinkage combining modeler's prior beliefs with data. Let say the parameter of interest is given by θ =(β,Σ_ε) and data by y then the prior distribution is given by π (θ), likelihood L(y/θ) and the posterior distribution (π(θ/y)) is given by

$$\pi(\theta/y) = \frac{\pi(\theta)L(y/\theta)}{\int \pi(\theta)L(y/\theta)d\theta}$$

Where the denominator ∫π(θ)L(y/θ)dθ is a normalizing constant which has no randomness and the posterior is proportional to the product of the likelihood and the prior.

$$\pi(\theta/y) \propto \pi(\theta)L(y/\theta)$$

To overcome the VAR over-parameterization problem of VAR model, BVAR allows shrinking parameters and in this paper Litterman/ Minnesota prior was considered to shrinkage the parameters to be estimated. The overall degree of shrinkage for Litterman prior is controlled by hyper-parameter λ. As λ → 0, shrinkage increases and prior dominates making data less influential (with a λ = 0 prior equals posterior), whereas λ → ∞, data dominates the prior (with λ = ∞ gives OLS estimates). In Minnesota prior four scalar parameters to be specified which are μ1,λ1,λ2,and λ3. The value assigned to the hyper parameter λ for the BVAR model under this study was determined by using machine learning algorism based Graeme (2016).

3.3.6. PHILLIPS CURVE

According to the Gordon's triangle model (1988) inflation is a function of three components: inertia, demand pull which is represented by the employment gap and cost push inflation (energy and food commodities prices shocks) that affect aggregate supply. So the Gordon's triangle model of inflation is specified as

$$\pi_t = \mu + \alpha\pi_{t-1} - \beta(u_t - \hat{u}) + \gamma z_t + \varepsilon_t \dots\dots\dots\dots\dots\dots (8)$$

Where, π_{t-1} is built in inflation/expectation, (u_t - û) unemployment gap and z_t supply factor. The unemployment gap is proxy by the output gap or capacity utilization gap. In this paper the researcher considers consumer price index as inflation rate, demand pull factor output gap which is a proxy of unemployment rate gap based on Okun's law relationship between the output gap and unemployment rate gap i.e. (u_t - û) = -θ(y_t - ŷ, M2 and cost-push factors (energy price,). Therefore, the triangle model for Ethiopian inflation forecast is specified as:

$$\pi_t = \mu + \alpha\pi_{t-1} + \delta(y_t - \hat{y}) + \gamma z_t + \varepsilon_t \dots\dots\dots\dots (9)$$

Where, z_t is a vector of cost push factors which includes energy price (Average Petroleum Spot Price) obtained from an equally weighted average of three crude oil spot prices (i.e. West Texas Intermediate, Dated Brent, and Dubai Fateh) and Official Exchange Rate. The modified triangle model to forecast Ethiopia's inflation rate with all listed variables is as follows:

$$CPI\_SA_t = \mu + \alpha CPI\_SA_{t-1} + \delta(RGDPA_t - RGDPP) + M2_t + EX_t + EP_t + \varepsilon_t \dots\dots\dots (10)$$

3.4. FORECAST EVALUATION

Selecting the best forecasting techniques from alternative models is an important issue in time series forecasting. Dieng (2008) uses RMSE to select best models from exponential smoothing, naïve, ARIMA and Spectral model and found that ARIMA model was the best model to forecast vegetable prices in Senegal. Ajayi(2019) compares different inflation forecasting models in the case of OPEC and BRICS countries. Using MAPE, RMSE and Theil's U-statistic and found that ARIMA models outperform than other modes for countries that have stable inflation and VAR outperform than Univariate modes for high inflation countries. Akdogan et al. (2012) use RMSE to compare forecast performance and found models which incorporate more economic information outperform than single equation model. Zardi C. (2017) using RMSE found that multivariate modes forecasts outperform than benchmark models.

To sum up the quality of inflation forecast is evaluated by using MAPE and RMSE. RMSE is relatively best to compare forecast performance of different models. In this study RMSE is used to select the best model and forecast combination which is calculated as follows:

$$RMSE = \sqrt{\sum_{i=1}^{n} \frac{(\hat{y}_i - y_i)^2}{n}} \dots\dots\dots\dots\dots\dots (11)$$

Where, n is number of observation, $\hat{y}$ is the predicted value and y_i is the actual observed value of consumer price index. RMSE is calculated based on in-sample forecast and pseudo out of sample forecast. A model that have low RMSE as compared to other model indicates the model have good forecast performance than those models that have high RMSE.

3.5 FORECAST COMBINATION

In forecasting some models may adapt quickly structural changes while others may be slowly responding. To solve this single model forecast problem forecast combination is important. By combining forecasts from models with different degrees of adaptability we may produce better performing forecasts compared to a single model. In addition to structural breaks using combining forecasts helps to reduces individual forecasting models misspecification biases by averaging out the biases and can yield unbiased forecasts even if the individual forecasts are biased (Granger and Ramanathan, 1984, Bates and Granger 1969). Stock and Watson (2004) on seven OECD countries, Lack (2006) and Kapetanios et al(2006) on UK inflation and Kapetnaios et al(2007) on UK GDP growth found that forecast combination outperforms than single and bench mark models. Akdogan et al. (2012) combine their forecasts and the results reveals that forecast combination leads to a reduction in forecast error compared to most models, although some of the individual models perform alike in certain horizons. Zardi (2017) combine forecast values by means leads to a reduction in forecast error compared to individual models.

There are different methods of forecast combination among those methods simple average, median, trimmed mean, Winsorized mean and ordinary least squares (OLS) regressions are the most common ones that are applied in this research paper.

3.5.1 SIMPLE AVERAGE/ EQUAL WEIGHT

According to Stock and Watson (2004) simple average forecast combination is found to be best combination methodology which outperforms more sophisticated forecast combinations. Simple average forecast combination for N models is given as follows:

$$F^c = \frac{1}{N}\sum_{i=1}^{N} Fi \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (12)$$

3.5.2 MEDIAN FORECAST COMBINATION

Median forecast combination is insensitive to outliers (Palm and Zellner, 1992). It is rank based forecast combination methodology proposed by Armstrong (1989), Hendry and Clements (2004), Stock and Watson (2004) and Trimmermann (2006). To do median forecast combination the variable of interest (CPI), there are N not perfectly collinear predictors, $f_t = (f_{1t}, f_{2t}, \ldots\ldots\ldots\ldots f_{Nt})$For each point in time, the median method gives a weight of 1 to the median forecast and a weight of 0 to all other forecasts the combined forecast is obtained by f_t) = median(f_t) i.e.

For odd number of models $\widehat{f_t} = f(\frac{N}{2} + 0.5)$,

For even number of models $\widehat{f_t} = \frac{1}{2}(f_{N/2}) + (f_{N/2+1})$

3.5.3. TRIMMED MEAN

Trimmed mean method of forecast combination is an interpolation between simple average and median and it is less sensitive to outliers than simple average approach which was proposed by Armstrong (2001), stock and Watson (2004) and Jose and Winkler (2008). Let Yt is the variable of interest (CPI) and there are N predictor $f_t = (f_{1t}, f_{2t}, \ldots\ldots\ldots\ldots f_{Nt})$ for each point in time. The order of forecast is computed as

$f_t^{ord} = (f_{(1)t}, f_{(2)t}, \ldots\ldots\ldots\ldots f_{(N)t})$. Using trim factor $\lambda(\text{i.e.the}\frac{\text{top}}{\text{bottom}} 100 * \lambda\%)$, let $\lambda = 20\%$ are trimmed and the combined forecast is

$$\widehat{y_t} = \frac{1}{N(1-2\lambda)}\sum_{i=\lambda N+1}^{(1-\lambda)N} f(i) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (13)$$

3.5.4. WINSORIZED MEAN

It gives weight in handling outliers instead of removing all together as of trimmed mean approach do by limiting outliers at certain level rather than removing them, allowing at least some degree of influence. Let say Yt is the variable of interest and there are N not perfectly collinear predictors $f_t = (f_{1t}, f_{2t}, \ldots\ldots\ldots\ldots f_{Nt})$ for each point in time the order forecasts are $f_t^{ord} = (f_{(1)t}, f_{(2)t}, \ldots\ldots\ldots\ldots f_{(N)t})$ Using a trim factor λ $(\text{i.e.the}\frac{\text{top}}{\text{bottom}} \lambda\% \textit{ are winsorized})$ and setting K=Nλ the combined forecast is calculated as (Jose and Winkler, 2008). let λ=20%

$$\widehat{y_t} = \frac{1}{N}\left[Kf_{(k+1)t} + \sum_{i=\lambda N+1}^{(1-\lambda)N} f_{(i)t} + Kf_{(N-K)t}\right] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (14)$$

3.5.5. ORDINARY LEAST SQUARES (OLS) REGRESSION

This method of forecast combination used OLS estimate coefficients as a weight for forecast combination. For N individual predictors given the variable of interest Y_t against forecasts

$$Y_t = \alpha + \sum_{i=1}^{N} w_i f_i + \varepsilon_t$$

Which helps to find the estimated value of $\hat{w}_i$ from the OLS and used as a weight for forecast combination and the forecast combination will be found as

$$\widehat{Y_t} = \hat{\alpha} + \sum_{i=1}^{N} \hat{w}_i f_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (15)$$

3.5.6. BATS/GRANGER METHOD

Bates and Granger use the estimated RMSE to compute combination weights.

$$f^c = \sum_{i=1}^{N} fi * \frac{\hat{\delta}^{-2}(i)}{\sum_{j=1}^{N} \hat{\delta}^{-2}(j)} \dots\dots\dots\dots\dots\dots\dots\dots\dots (16)$$

Where $\hat{\delta}^{-2}$ (i) is the estimated mean squared prediction error of model i.

3.6. METHOD OF DATA ANALYSIS

The collected data based on the specification model was analyzed using eviews. To accomplish the study inferential analysis was used and to maintain the validity and robustness of the model different diagnostics tests was conducted depending on the nature of the model.

4. RESULT AND ANALYSIS

In this section unit root test, model estimation, selection and forecast combination analysis was done and best forecast models and combination techniques were selected based on RMSE.

4.1. ADF UNIT ROOT TEST

TABLE 1: ADF UNIT ROOT TEST

Variables	With Intercept		Intercept and Trend	
	t-Statistic	Prob.*	t-Statistic	Prob.*
LCPI_SA	1.174	0.998	-2.487	0.334
LRGDPA	-0.319	0.917	-2.688	0.244
LM2_SA	3.107	1.000	-3.057	0.123
LRFEA_SA	-1.929	0.318	-2.112	0.532
LRGDPGAP_7000	-3.112	0.029	-2.965	0.148
LNEER	-1.300	0.6266	0.387	0.999
LEX	2.536	1.0000	-0.8903	0.9519
LEP	-2.256	0.189	-2.240	0.462
LWTPP	1.7632	0.9997	0.0654	0.9965
DLCPI_SA	-4.666	0.000	-4.995	0.001
DLNEERI	-8.545	0.000	-8.487	0.000
DLRGDPA	-9.138	0.000	-9.089	0.000
DLM2_SA	-6.132	0.000	-7.399	0.000
DLEX	-3.722	0.005	-6.940	0.000
DLRFEA_SA	-15.449	0.000	-15.482	0.000
DLRGDPGAP_7000	-5.488	0.000	-5.469	0.000
DLEP	-8.218	0.000	-8.185	0.000
DLWTPP	-4.930	0.001	-5.2031	0.002

Source: Author's Computation

To smooth the data logarithmic transformation and seasonal adjustment was applied. CPI, M2, RFEA have seasonality and seasonally adjusted data were used for model analysis. The unit root test analysis of ADF unit root test shows that all variables are not stationary at log level rather all variables are stationary at first difference as presented in table 1.

4.2 CO INTEGRATION TEST

Since the variables Log(CPI_SA), Log(M2_SA), log(NEERI), Log(RGDPA), Log(RFEA_SA) are stationary at first difference for VAR model specification, checking the existence of co integration is important. To check the existence of co integration Johansson co-integration test was used and the test result shows there exists co integration between the specified variables. Due to the existence of co-integration instead of VAR, VECM which considers long run and short run effect was used to forecast Ethiopian inflation.

4.3 BVAR PRIOR OF HYPER PARAMETER DETERMINATION

In using BVAR model before estimating the posterior setting the priors is a precondition using likelihood and prior information model. Based on Graeme (2016) priors of hyper-parameters for the litterman/Minnesota priors were set using a machine learning algorism from the available observation. To select the priors for Univariate AR estimate with theil's inequality coefficient was considered. In determining priors based on Graeme (2016) μ1,λ1 and λ2 was set between 0.1 and one and using a machine learning algorism one, 0.95 and 0.95 was selected as a prior respectively. For λ3 the prior was set between 0.1 and 3.5 and 0.1 was selected as a prior. Based on the determined hyper parameter priors and using litterman/Minnesota the BVAR model was estimated.

4.4 TESTING THE EXISTENCE OF RW FOR CPI DATA

Testing the existence of RW in the given data is an important diagnostics test before using RW model. Therefore, before using a RW model for inflation forecasting whether the time series data follows a random walk or not was tested. To check this there are two tests time series plot and statistical analysis and in this study a more formal test, statistical analysis was used. There is a hypothesis test outlined in 1979 by Dicker and Fuller, and it is called the augmented Dickey-Fuller test. The null hypothesis states slope or the coefficient of the lagged values is equal zero (RW) vs not equal to zero (not RW).

$$dlog(CPI\_SA) = c + \beta log(CPI\_SA_{(-1)}) + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots (17)$$

TABLE 2: AUGMENTED DICKEY-FULLER TEST RANDOM WALK TEST

Dependent Variable: DLOG(CPI_SA)
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C LOG(CPI_SA)	-0.020245 0.013151	0.020127 0.005042	-1.005901 2.608224	0.3172 0.0107
F-statistic Prob(F-statistic)	6.802833 0.010692	Durbin-Watson stat		1.546995

Source: Author's Computation

The result of augmented Dickey-Fuller test shows the probability value of coefficient of lag value log(CPI) is 0.01 which is less than 5%. The null hypothesis of the CPI data follows a RW process is rejected therefore; RW model is not used to forecast Ethiopian inflation.

4.5. FORECAST EVALUATION

To compare the model forecast performance both in-sample and Pseudo Out-of-Sample forecast evaluation techniques were considered. For in-sample forecast evaluation total data which ranges from 1999/2000q1 to 2021/22q3 was used for estimation and forecast performance of models was evaluated using RMSE as follows:

TABLE 3: IN-SAMPLE FORECAST EVALUATION OF DIFFERENT MODELS

Accuracy Measure	Model				
	ARIMA(2,1,2)	ECM	VECM	BVAR	Phillips
RMSE	9.62	9.93	13.76	10.30	12.70

Source: Author's Computation

Using in-sample forecast the 1st, 2nd and 3rd best models for Ethiopian inflation forecast are ARIMA (2,1,2), ECM and BVAR as compared to VECM and Phillips.

A pseudo out-of-sample model forecast performance evaluation was also done by dividing the total data in to training and testing time period. The first estimation for all models is done with data ranging from 1999/2000Q1 to 2018/19Q4 and forecasts was done up to 2019/20q4 which helps to compute RMSE. The estimation is then extended by incorporated one quarter forecast ranges from 1999/2000q1 to 2019/20Q1 and the four quarters ahead forecast is obtained from 2019/20Q2 to 2020/21Q1 and the RMSE is again computed. This process continues recursively until the estimation sample reaches to 2020/21q4 and forecast is done up to 2021/22q3. Given the above recursive window procedures the RMSE is presented in table 4 for all five models.

TABLE 4: PSEUDO OUT-OF-SAMPLE FORECAST EVALUATION USING RMSE

Model	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
ARIMA(2,1,2)	1.393	3.537	3.472	4.142	5.183	10.613	15.679	20.676
ECM	6.688	7.932	8.347	8.725	9.379	17.771	27.396	34.447
VECM	8.439	12.314	15.730	19.416	22.539	28.575	34.917	41.559
BVAR	6.081	8.049	8.015	7.363	10.252	18.598	24.725	29.566
Phillips	5.917	9.208	12.064	14.731	16.261	19.668	22.703	25.591

Source: Author's Computation

A pseudo out-of-sample forecast evaluation was done for eight quarters ahead forecasts to compare the different models. For pseudo out-of-sample forecast different ARIMA models was compared and ARIMA (2,1,2) was selected as a best model using training data sets. As shown in table four, the best performing individual model of each horizon differs except ARIMA model which performs best up to eight quarters ahead forecast consistently. So far, the performance of

the BVAR, ECM and Phillips has close forecast superiority on average for the specified quarters.

In both pseudo out of sample and in-sample forecast evaluation ARIMA model outperforms all models. Following ARIMA, BVAR, ECM and Philips performs best than VECM respectively. While VECM performs least as compared to ARIMA, ECM, BVAR and Philips models.

4.6. FORECAST COMBINATION

To combine forecast values from different models simple average/equal weight, Median, Trimmed mean, Winsorized mean, Ordinary Least Squares regression and Bats/Granger forecast combination methods were considered. The comparisons for the forecast combination accuracy were done using RMSE for both in-sample and outsample forecast models which are presented as follows.

TABLE 5: IN-SAMPLE FORECAST EVALUATION FOR DIFFERENT FORECAST COMBINATIONS

Accuracy Measure	Equal Weight	Median	Trimmed Mean	Winsorized Mean	OLS	Bats/Granger
RMSE	6.1927	5.8305	5.8199	5.8274	5.924	5.9399

Source: Author's Computation

Based on the in-sample model forecast accuracy measure of RMSE the 1st, 2nd and 3rd best forecast combination methods for Ethiopian inflation are trimmed mean, winsorized mean and median as compared to the equal weight, OLS and Bats/granger method of forecast combination. Based on the pseudo out-of-sample model forecast the 1st, 2nd and 3rd best forecast combination methods for Ethiopian inflation are Winsorized Mean, Median and trimmed mean as compared to the equal weight, OLS and Bats/granger method using RMSE as a forecast accuracy measure.

Evaluation of forecast combination performance for the specified six forecast combination techniques which includes equal weight, median, winsorized mean, OLS and Bats/granger is presented in table 6.

TABLE 6: PSEUDO OUT-OF-SAMPLE FORECAST EVALUATION FOR DIFFERENT FORECAST COMBINATIONS

Combination Method	h ahead forecast							
	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
Equal Weight	7.99	11.49	13.29	15.23	17.87	26.58	35.19	42.79
Median	9.21	11.91	12.67	13.24	15.21	26.30	34.88	41.60
Trimmed Mean	8.67	11.72	13.17	14.34	16.76	26.08	34.97	42.06
Winsorized Mean	7.51	10.77	12.35	13.91	16.07	24.58	33.57	40.97
Bats/Granger Method	9.34	13.04	15.37	17.69	20.65	29.63	38.62	46.52
OLS	24.86	20.07	17.17	21.37	26.34	31.92	37.05	44.09

Source: Author's Computation

To sum up the forecast combination performance of Winsorized mean, median and Trimmed mean outperforms best than other forecast combination techniques which includes OLS, Equal weight, Bats/Granger Method.

4.7. DISCUSSION

To finalize this study theoretical and time series models which includes ARIMA, RW, ECM, VECM, BVAR and Phillips curve model were

used. Before using a RW model for inflation forecasting checking whether the time series CPI data follows a RW or not was checked using augmented Dickey-Fuller test. The null hypothesis slope or the coefficient of the lagged values equal zero (RW) was rejected and RW model cannot be used for forecasting Ethiopian inflation. Therefore, the remaining models which are ARIMA(2,1,2), ECM, VECM, Phillips curve and BVAR were used for comparison of forecast performance of Ethiopian inflation.

Table 7 shows that ARIMA(2,1,2) model has best forecast performance as compared to ECM, VECM, Phillips curve and BVAR both for in-sample and pseudo out sample forecasting which is supported by (Kinene, 2016). The empirical result in this study shows that univariate model ARIMA(2,1,2) model have best forecast performance than multivariate time series model is not in-line with the finding of Akdogan et al. (2012) and Ajayi (2019) who found multivariate models peform better than univariate models.

TABLE 7: FORECAST EVALUATION OF DIFFERENT MODELS AND COMBINATION TECHNIQUES

Model	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8	Average Forecast performance	Rank
ARIMA(2,1,2)	1.4	3.5	3.5	4.1	5.2	10.6	15.7	20.7	8.09	1
BVAR	6.1	8.0	8.0	7.4	10.3	18.6	24.7	29.6	14.09	2
ECM	6.7	7.9	8.3	8.7	9.4	17.8	27.4	34.4	15.08	3
Phillips	5.9	9.2	12.1	14.7	16.3	19.7	22.7	25.6	15.78	4
Winsorized-Mean	7.5	10.8	12.4	13.9	16.1	24.6	33.6	41.0	19.99	5
Median	9.2	11.9	12.7	13.2	15.2	26.3	34.9	41.6	20.63	6
Trimmed Mean	8.7	11.7	13.2	14.3	16.8	26.1	35.0	42.1	20.99	7
Equal Weight	8.0	11.5	13.3	15.2	17.9	26.6	35.2	42.8	21.31	8
VECM	8.4	12.3	15.7	19.4	22.5	28.6	34.9	41.6	22.93	9
Bats/Granger Method	9.3	13.0	15.4	17.7	20.6	29.6	38.6	46.5	23.84	10
OLS	24.9	20.1	17.2	21.4	26.3	31.9	37.0	44.1	27.86	11

Source: Author's Computation

As of Akdogan et al. (2012), Zardi (2017) and Timmermann (2004) forecast combination peforms better than each specific model forecasting but in the case of ethiopian acording to this research paper investigation ARIMA, ECM and BVAR model have best forecast performance than different forecast combinaiton techiniques applied in this study. BVAR model best performance next to ARIMA model is supported by Papavangjeli (2019) who found that BVAR models peform better than VAR model in the case of Albanian.

5. CONCLUSION AND RECOMMENDATIONS

5.1. CONCLUSION

The main objective of this paper is to select the best forecasting models and forecast combination techniques for producing Ethiopian inflation forecast. The study considers six models; RW, ARIMA, ECM, VECM, BVAR and Phillips curve models. Before using RW model whether the Ethiopian CPI time series data follows a RW or not was tested but for the specified data coverage it doesn't follow a RW process. So ARIMA, ECM, VECM, BVAR and Phillips curve were considered for forecasting Ethiopian inflation and their

forecast performance was evaluated using RMSE for in-sample and pseudo out of sample forecast. ARIMA model fits best compared to ECM, VECM, BVAR and Phillips curve models using RMSE for both in-sample and pseudo out of sample forecasting. BVAR and ECM perform best following ARIMA model as compared to VECM and Phillips curve models while, VECM model have least forecast performance than Phillips, ECM, BVAR, ARIMA for both in-sample and pseudo out of sample forecasting.

In addition to forecast performance of different econometrics models forecast combination analysis was done in this study. Using forecast combination is important because a single model may be affected by structural changes and model specification bias which will be captured by forecast combination of more than one model. Forecast combination techniques considered in this study were Winsorized Mean, Trimmed Mean, Median, Bats/Granger Method, Equal Weight and OLS. The forecast combination result evaluation using RMSE shows that Winsorized Mean, Median and Trimmed Mean performs best for both in-sample and pseudo out of sample forecast.

5.2. RECOMMENDATION

- Since forecast performance of ARIMA model is best as compared to ECM, VECM, BVAR and Phillips curve NBE better to continue using ARIMA model to forecast inflation especially for short period of time.
- In addition to ARIMA model, NBE better to adapt BVAR, ECM and Phillips curve models which capture structural changes or policy changes and have good forecast performance respectively next to ARIMA (bench mark model).
- Since forecast combination techniques reduce bias like structural changes and model specification bias as compared to single model so NBE better to use Winsorized Mean, Median and Trimmed Mean method of forecast combination techniques which have good forecast performance as compared to Bats/Granger Method, Equal Weight and OLS.

REFERENCES

Aiol M. et al. (2010). Forecast Combinations. Banco de Mexico,Working Paper,2010-04 , 1-32

Ajayi O. V. (2019). Comparison of Alternative Inflation Forecasting Models in OPEC and BRICS countries . Thesis submitted for the degree of Doctor of Philosophy at the Kingston University Department of Economics.

Akdogan K. et al. (2012). short-term inflation forecasting models for turkey and a forecast combination analysis. Central Bank of the Republic of Turkey,working paper NO:12/09

Armstrong J. S. (1989). Combining Forecasts: The End of the Beginning or the Beginning of the End?. International Journal of Forecasting, 5(4),585–588.

Armstrong J.S. (2001). Combining Forecasts and principles of forecasting. Springer , 417-430.

Atkeson A. and Ohanian L. E. (2001). Are Phillips curves useful for forecasting inflation. Federal Reserve Bank of Minneapolis Quarterly Review, 25(1):2–11.

Bates J. M. and Granger C. W. J. (1969). The combination of forecasts." Operations Research Quarterly, 20, pp. 451-468.

Buelens C. (2012). Inflation Forecasting and the crisis: assessing the impact on the performance of different forecasting models and methods", . Economic papers 451/March2012.

Chalachew, A. (2011). Forecasting Ethiopia's Inflation by using ARIMA models. National Bank of Ethiopia , PP.1-37.

Dickey D.A.& Fuller W.A.(1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root, Journal of the American Statistical Association,74:366a, 427-431

Dieng A. (2008). Alternative Forecasting Techniques for Vegetable Prices in Senegal. https://www.bameinfopol.info/IMG/pdf/Dieng_MP_1_.pdf , 5-10.

Dotsey M. Fujita S. & Stark T. (2011). Do Phillip curve conditionally help to forecast inflation. . Working Paper Research Department, Federal Reserve Bank of Philadelphia .

Fisher J D. M. Liu C. T and Zhou R. (2002). "When can we forecast inflation?". Economic Perspectives, Federal Reserve Bank of Chicago, 30 – 42.

Gordon R.J. (1988). Macroeconomics: Theory and Policy, "Modern theories of inflation.". Boston, Massachusetts.: McGraw-Hill.

Graeme W. (2016). BVAR Hyper-parameter Selection using EViews, .

Granger C. W. J. and Ramanathan R. (1984). Improved methods for combining forecasts, . Journal of Forecasting, Vol.3, , 197–204.

Hendry D.F. & Clements M.P.(2004).Pooling of Forecasts.The Econometrics Journal,7(1), 1–31.

References

Henry S.G.B and Pesaran B. (1993). VAR models of inflation, bank of England quarterly bulletin, https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/1993/var-models-of-inflation.pdf , PP 1-9.

Jose V. R. R. and Winkler R. L. (2008). Simple Robust Averages of Forecasts: Some Empirical Results. International Journal of Forecasting, 24(1), .

Kapetanios G. Labhard V. and Price S. (2007). "Forecast combination and the Bank of England's suite of statistical forecasting models,". Bank of England Working Paper No. 323.

Kapetanios G. Labhard V. and Price S., 2. (2006). "Forecasting using predictive likelihood model averaging,. Economic Letters, 91, , pp. 373-379.

Kinene A. (2016). Forecasting of the Inflation Rates in Uganda: a comparison of ARIMA, SARIMA and VECM models. Masters in Applied Statistics, Örebro University School of Business, Örebro University .

Lack C. (2006). Forecasting Swiss inflation using VAR,. Swiss National Bank Economic Studies, No.2.

Lee U. (2012). Forecasting inflation for targeting countries: A comparison of the predictive performance of alternative inflation forecast model. Journal of Business Economics Studies, 18(1), 75-95.

Lin M.T. (1967). Keynes's Theory and Inflation, A thesis submitted in partial fulfillment of the requirements for the degree of MA in economics, Kansas State University, Kansas .

Mitra D. & Rashid M. (1996). Comparative accuracy of forecasts of inflation: A Canadian Study. Applied Economics, 28(12), 1633-1637

Ogunc F. (2019). A Bayesian VAR Approach to Short-Term Inflation Forecasting,. Central Bank of the Republic of Turkey, Working Paper No: 19/25 , 1-24.

Onder O. (2004). Forecasting Inflation in Emerging Markets by Using the Phillips Curve and Alternative Time Series Models, . Taylor & Francis, Ltd, Vol. 40, No. 2 .

Orphanides A. and van Norden S. (2005). The reliability of inflation forecasts based on output gap estimates in real time. . Journal of Money, Credit and Banking, 37(3):583–601.

Palm F. C.and Zellner A. (1992.). To combine or not to combine? issues of combining forecasts. Journal of Forecasting, 11(8):687–701

Papavangjeli M. (2019). Forecasting the Albanian short-term inflation through a BVAR model. Bank of Albania, IHEID Working Paper No. HEIDWP16-2019

Pretorius C J and Janse van Rensburg T N. (1996). The Forecast Performance of Alternative Models of Inflation, . South African Reserve Bank Occasional Paper No. 10.

Sargent and Wallace. (1981). some unpleasant monetarist arithmetic,. Federal Reserve Bank of Minneapolis Quarterly Review , Vol.5, PP.1-17).

Stock J. H. and Watson M. M. (2007). Why has U.S. inflation become harder to forecast? . Journal of Money, Credit, and Banking, , 39(7):3–34.

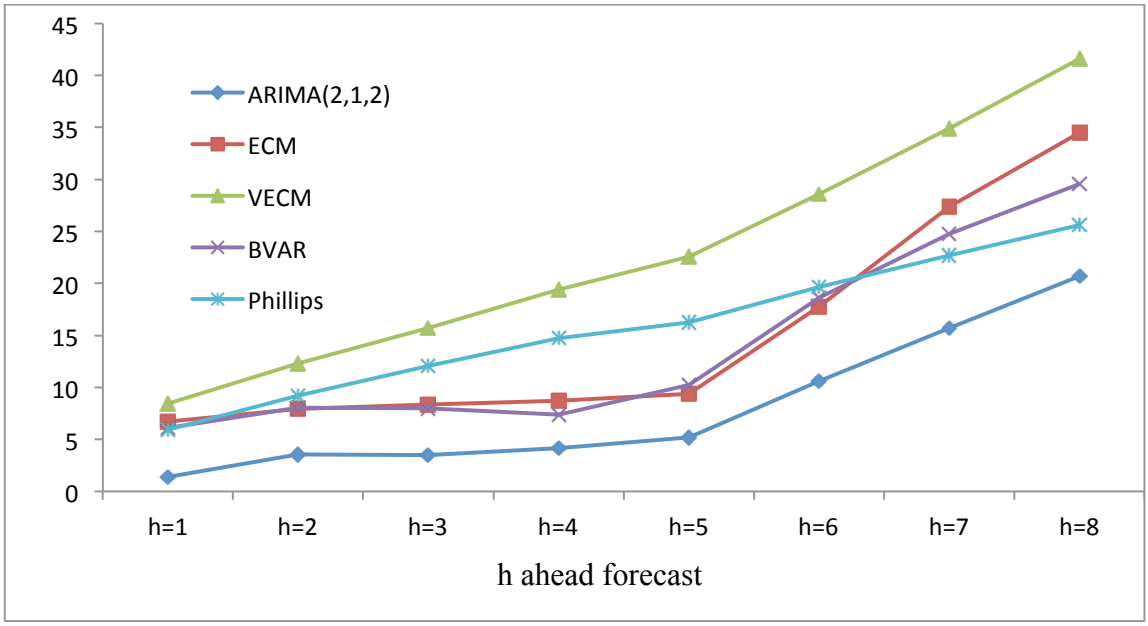
Stock J. H. and Watson M. W. (2004). Combination Forecasts of Output Growth in a Seven-Country Data Set. . Journal of Forecasting, 23(6), , 405–430.

Timmermann A.(2006). Forecast Combinations. In: Elliott, G., Granger, C. W. J., and Timmermann, A. (ed.), Handbook of Economic Forecasting, 1, 135–196.

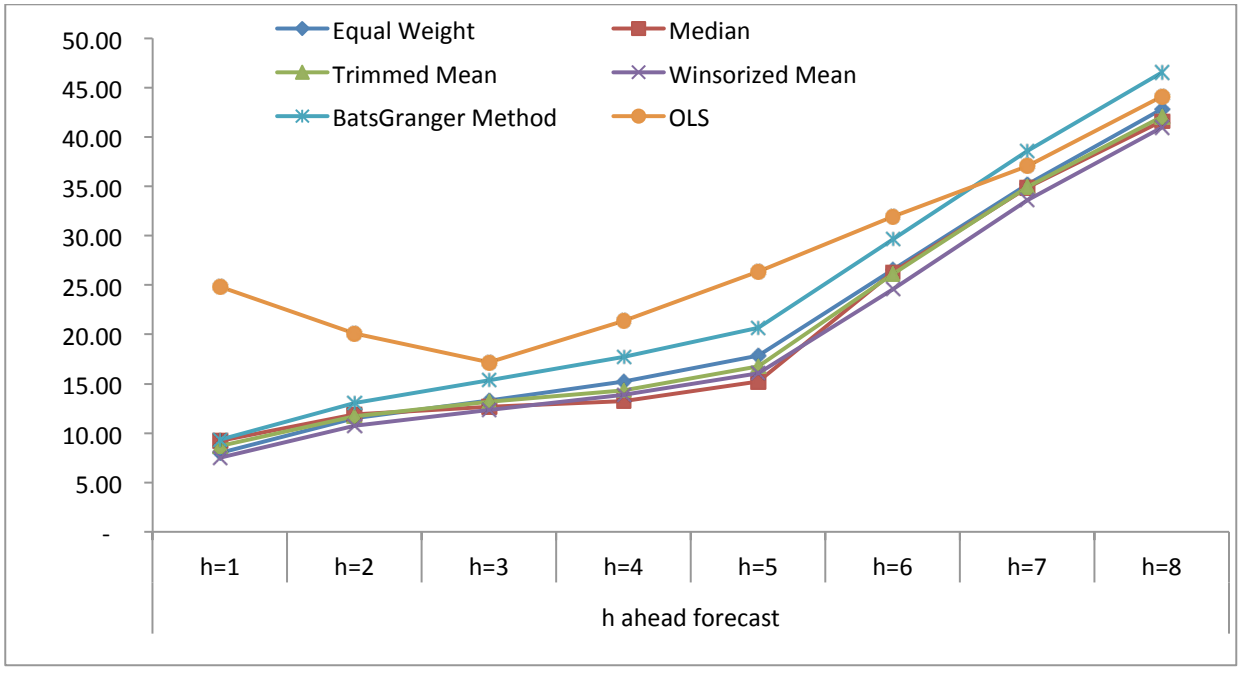
Timmermann A. (2004). Forecast Combination. https://econweb.ucsd.edu/~atimmerm/combine .pdf , PP.1-84.

Zardi C. (2017). Forecasting inflation in a macroeconomic framework: An application to Tunisia. , Graduate Institute of International and Development Studies Working Paper, No. 07-2017. http://hdl.handle.net/10419/162468 , 1-25.

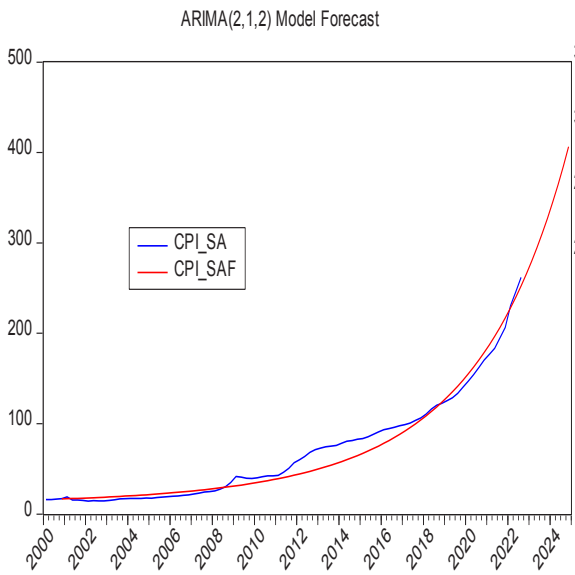
Annex I: Individual Models RMSEs for Each Horizon

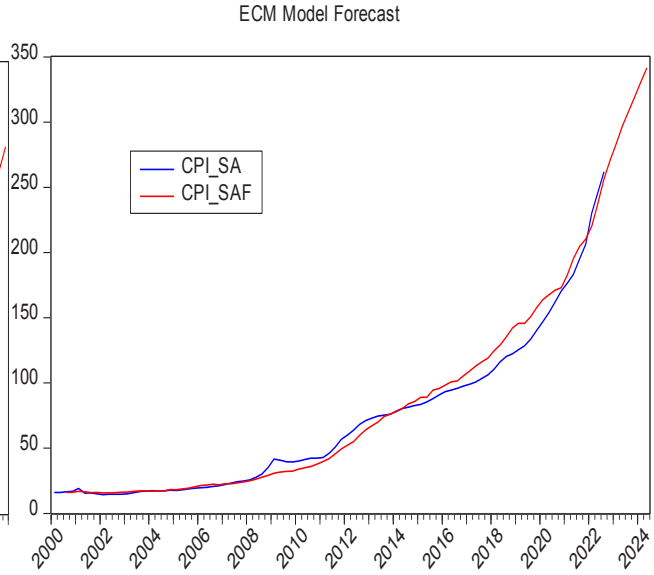


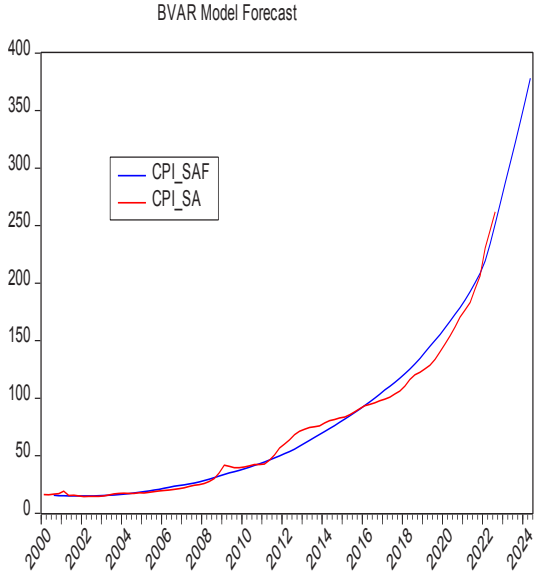
Annex II: Relative Forecasting Performance (RMSE) of the Combination Strategies

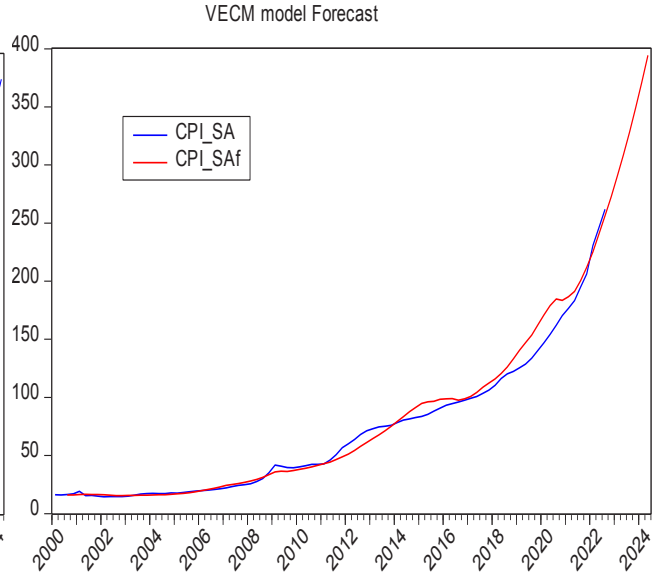


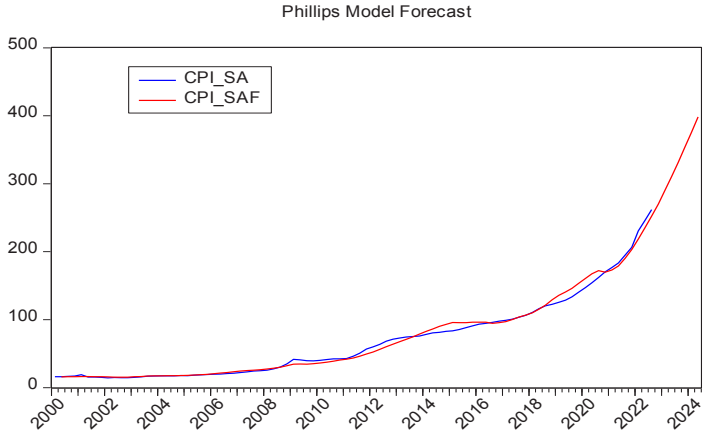
Annex III: Comparison between Actual and Model Forecast of CPI_SA











ዮውጭ ምንዛሪ ተመን (Exchange Rate)[1]

ሀብታሙ ወርቅነህ
በኢትዮጵያ ብሔራዊ ባንክ የውጭ ኢኮኖሚ ትንተና እና ዓለም አቀፍ ግንኙነት ዳይሬክተር

1. መግቢያ

የውጭ ምንዛሪ ተመን የአንድ ሀገርን የውጭ ንግድ እና ኢንቨስትመንትን እንዲሁም በሀገራት መካከል የሚዘዋወር ገንዘብን ከሚወስኑ ጉዳዮች ዋናው በመሆኑ በሞጣኔ ሃብት ሞሁራን በስፋት ከሚተነተኑ ዓበይት የማክሮ ኢኮኖሚ ጽንሰ ሀሳቦች አንዱ ነው። ይህ ጉዳይ ሀገራችን በሞትከተለው ፖሊሲ ምክንያት በተለያዩ ሞሁራን ዘንድ በተደጋጋሚ ለውይይት ሲቀርብ ይታያል። የዚህ ጽሁፍ አላማም ስለ ውጭ ምንዛሪ ተመን ትርጓሜ፣ አለካክ፣ ተጽእኖው እና የኢትዮጵያ ሁኔታ ዳሰሳ በማድረግ ለአንባቢ ተጨማሪ ግንዛቤ መፍጠር ይሆናል።

2. የውጭ ምንዛሪ ተመን ትርጉም

ቀለል ባለ መልኩ ሲታይ የውጭ ምንዛሪ ተመን የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ ጋር ያለውን እሴት ያሳያል። ይህም ማለት የውጭ ምንዛሪ ተመን ለማወቅ የአንድን ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ ጋር በማካፈል የሚሰላ ነው። የሀገር ውስጥ ገንዘብ/የውጭ ሀገር ገንዘብ (ምሳሌ ብር/ዶላር)) ወይም በግልባጩ የውጭ ሀገር ገንዘብ/የሀገር ውስጥ ገንዘብ (ምሳሌ ዶላር/ብር) ማስላት ይቻላል ስለሆነም የፖሊሲ ትንታኔ በሚሰራበት ወቅት ትርጓሜው ስለሚለያይ በየትኛው መንገድ እንደተሰላ አስቀድሞ ማወቅ ያስፈልጋል። ይህም ኖሚናል የውጭ ምንዛሪ ተመን ይባላል። የመጀመሪያውን ማለትም የሀገር ውስጥ ገንዘብ/የውጭ ሀገር ገንዘብ አሰላልን ወስደን የውጭ ምንዛሪ ተመን ከጨመረ የሀገር ውስጥ ገንዘብ እሴት ከውጭ ሀገር ገንዘብ አንጻር መዳከምን (depreciation) ያሳያል። በተቃራኒው ከቀነሰ የሀገር ውስጥ ገንዘብ እሴት ከውጭ ሀገር ገንዘብ አንጻር መጠንከሩን (appreciation) ያሳያል። ለምሳሌ በሀምሳ ብር አንድ የአሜሪካ ዶላር ይገዛ ከነበረበት ወደ ሀምሳ አንድ ብር ከፍ ካለ የብር እሴት ከአሜሪካ ዶላር አንጻር መዳከምን (depreciation) ያሳያል በአንጻሩ በሀምሳ አንድ ብር ይገዛ የነበረ አንድ የአሜሪካ ዶላር ወደ ሀምሳ ብር ዝቅ ካለ የብር እሴት ከአሜሪካ ዶላር አንጻር መጠንከሩን (appreciation) ያሳያል።

3. የውጭ ምንዛሪ ተመን ሥርዓቶች

የውጭ ምንዛሪ ተመንን ለመወሰን የሚዘረጋ ስርዓት የውጭ ምንዛሪ ተመን ስርዓት (regime) ይባላል። የውጭ ምንዛሪ ተመን ስርዓት አይነቶችን ስንመለከት እንደ የዓለምአቀፍ የገንዘብ ድርጅት (IMF) ምደባ በአሁኑ ወቅት ሶስት ዋና ዋና ሞድቦች ያሉ ሲሆን እነዚህም በጥብቅ ውሳኔ የተተመነ (hard pegs) ፣ በልል ውሳኔ የተተመነ (soft pegs) እና በገበያ ስርዓት (በውጭ ምንዛሪ አቅርቦትና ፍላጎት) የተወሰነ (floating regimes) ናቸው።

በጥብቅ ውሳኔ የመተመን (hard pegs) ስርዓት ማለት አንድ ሀገር የሌላ ሀገር ገንዘብ ህጋዊ ገንዘብ አድርጎ (Arrangements with no separate legal tender) ስትቀበል ነው። ይህም ሊሆን የሚችለው ሀገራት የሞጣኔ ሀብት ወይም የንግድ ህብረት ፈጥረው አንድ አይነት የሞጣኔ ሃብት ህግ እና ስርዓት በሚከተሉበት ወቅት ሊሆን ይችላል። ስለሆነም በእነዚህ ሀገራት መካከል አንድ አይነት የጋራ መገበያያ ገንዘብ ይኖራቸዋል ማለት ነው። ሌላው በጥብቅ ውሳኔ የመተመን (hard pegs) ስርዓት አይነት የከረንሲ ቦርድ አደረጃጀት ስርዓት (Currency board arrangements) ሲሆን ይህም የአንድ ሀገር ማዕከላዊ ባንክ ግልጽ በሆነ ህግ በተወሰነ የአሰራር ስርዓት መጠኑ የተገለጸ የውጭ ምንዛሪ በህግ በተተመነ/በተወሰነ የውጭ ምንዛሪ ተመን እንዲሸጥ የሚያሰችል ስርዓት ነው። ስለሆነም ማዕከላዊ ባንኩ ገንዘብ ወደ ሞጣኔ ሃብቱ የሚያሰርጸው የውጭ ምንዛሪ በመሸጥ ብቻ ይሆናል ማለት ነው። ይህም የአንድ ሀገር ማዕከላዊ ባንክ በሞጣኔ ሃብቱ ላይ ያለውን ሚና በእጅጉ ይገድበዋል።

ሁለተኛው የውጭ ምንዛሪ ተመን ስርዓት (regime) አይነት በልል ውሳኔ የተተመነ (soft pegs) ስርዓት ሲሆን ይህም ሶስት የተለያዩ የስርዓት አይነቶችን ይዟል። የመጀመሪያው በአግድሞሽ በተቀመጠ ወሰን መተመን (Peg within horizontal band) ሲሆን ይህም የውጭ ምንዛሪ ተመኑ አንድ ቋሚ ማዕከላዊ ተመን እንዲኖረው ዓላማ በማድረግ

[1] ይህን ጽሁፍ ለማጠናቀር የዓለምአቀፍ የገንዘብ ድርጅት (IMF) ድረገጽን፣የኢትዮጵያ ብሄራዊ ባንክ ዶክመንቶችን፣ የተለያዩ የድረገጽ ጽሁፎችን እና የሳልቫቶር “Internatioanl Economics” መጽሀፍትን እንደ ማጣቀሻ ተጠቅሟል።

በተግባር ግን በተወሰነ መጠን (ለምሳሌ በ +1 እና በ -1 መካከል) ከፍ ወይም ዝቅ እንዲል የሚያስችል ስርዓት ነው። ሁለተኛው በልል ውሳኔ የተተመነ (soft pegs) ስርዓት አይነት ተንቋቃቂ/ተሳቢ ተመነ (Crawling pegs) ሲሆን ይህም የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ አንጻር በየጊዜው ሳይስተጓጎል በቋሚነት/በመደበኛነት በጥቂቱ እንዲጨምር/እንዲቀንስ የሚያስችል ስርዓት ነው። ሶስተኛው የዚህ ስርዓት አይነት ተንቋቃቂ/ተሳቢ ወሰን ስርዓት (crawling bands) ሲሆን ይህ ስርዓት የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ አንጻር የምንዛሪ ተመኑ ተለዋዋጭ በሆነ ህዳግ (fluctuation margins) ከማዕከላዊ ቋሚ/መደበኛ ተመኑ (central rate) እንዲቀንስ ወይም እንዲጨምር የሚያስችል ስርዓት ነው፡ ፡ ነገር ግን ይህ ቋሚ/መደበኛ ተመን (central rate) በየጊዜው የሚለዋወጥ ይሆናል።

ሶስተኛው የውጭ ምንዛሪ ተመን ስርዓት (regime) አይነት ገበያ መር ስርዓት (floating regimes) ሲሆን፤ በውስጡ ሁለት የተለያዩ የስርዓት አይነቶችን ይይዛል፡ ፡ የመጀመሪያው ከፊል አስተዳደራዊ እና ከፊል ገበያ መር ስርዓት (managed floating regime) ሲሆን በዚህ ስርዓት የውጭ ምንዛሪ ተመን የሚወሰነው እንደ አስፈላጊነቱ በማዕከላዊ ባንኩ ቀጥተኛ ወይም ተዘዋዋሪ ተጽእኖ እና በገበያ ስርዓት ነው። በአሁኑ ወቅት ሀገራችን የምትከተለው የውጭ ምንዛሪ ተመን ስርዓት ይህን ስርዓት ነው። ሁለተኛው የተንሳፋፊ ስርዓት (floating regimes) አይነት ፍጹም ነጻ የሆነ የተመን ስርዓት (Independently floating regime) ሲሆን በዚህ ስርዓት የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ አንጻር የምንዛሪ ተመኑ የሚወሰነው በገበያ ስርዓት (በውጭ ምንዛሪ አቅርቦትና ፍላጎት) ነው። ይህ ስረዓት በአሁኑ ሠዓት በተለያዩ ሀገራት በስፋት በስራ ላይ ያለ የውጭ ምንዛሪ ተመን ስርዓት ነው፡ ፡ የዓለምአቀፍ የገንዘብ ድርጅትም ሀገራት ይህን ስርዓት እንዲተገብሩ የሀገራትን ማዕከላዊ ባንኮች ያበረታታል። ይህ ጽሁፍም ማዕከላዊ ባንኮች ይህን አይነት የውጭ ምንዛሪ ተመን ስርዓት በስራ ላይ በሚያውሉበት ወቅት የውጭ ምንዛሪ ተመን የሚያሳየውን ባህሪ እና ተጽእኖ ላይ በመመርኮዝ ዳሰሳ የሚያደርግ ይሆናል።

4. የውጭ ምንዛሪ ተመንን የሚወስኑ ሁነቶች

ከላይ ለመግለጽ እንደተሞከረው በዚህ ጽሁፍ ፍጹም ነጻ የሆነ የተመን ስርዓትን (Independently floating regime) ታሳቢ በማድረግ ሲሆን፤ በዚህ ስርዓት የውጭ ምንዛሪ ተመን መዳከም (depreciation) አልያም መጠንከር (appreciation) ምክንያቶች እነማን ናቸው? የሚለውን መዳሰስ ሲሆን በተጨማሪም ወደፊት ሀገራችን የምትከተለው የውጭ ምንዛሪ ተመን ስርዓት (regime) አይነት ቢሆን ምን ይከሰታል በሚለው ዙሪያ ተጨማሪ ግንዛቤን ይፈጥራል።

በገበያ መር/ነጻ የውጭ ምንዛሪ ተመን ስርዓት የውጭ ምንዛሪ ተመን የሚወሰነው በውጭ ምንዛሪ አቅርቦት (supply) እና ፍላጎት (demand) ይሆናል። በአንድ ሀገር የውጭ ምንዛሪ አቅርቦት (supply) ምንጮች የሸቀጦች ወጪ ንግድ፣ የአገልግሎት ወጪ ንግድ፣የሃዋላ ገቢ፣ የውጭ ቀጥተኛ ኢንቨስትመንት እና የውጭ ብድር ሲሆኑ የውጭ ምንዛሪ ፍላጎት (demand) የሚመነጨው ደግሞ ለሸቀጦች ገቢ ንግድ፣ ለአገልግሎት ገቢ ንግድ፣ ለውጭ እዳ ክፍያ፣ ለሃዋላ ክፍያ፣ እና እንደ ካፒታል ሂሳብ ፖሊሲ ሁኔታ በሌላ ሀገር ኢንቨስትመንት (የውጭ ቀጥተኛ ኢንቨስትመንትን ጨምሮ) ለማካሄድ ነው። ስለሆነም በአንድ ሀገር የተረጋጋ የውጭ ምንዛሪ ተመን እንዲኖር ከላይ የተጠቀሱት የውጭ ምንዛሪ አቅርቦት ምንጮች መልካም አፈጻጸም ሊኖራቸው ይገባል፤ አልያም የውጭ ምንዛሪ ፍላጎት አነስተኛ መሆን ይኖርበታል። ፍላጎት ከአቅርቦት ከበለጠ ግን የውጭ ምንዛሪ ተመን ያልተረጋጋ ይሆናል። ይህም የማክሮ ኢኮኖሚ መዛባትን ያስከትላል።

በአንድ ሀገር የውጭ ምንዛሪ አቅርቦት (supply) ከፍተኛ ከሆነና ከውጭ ምንዛሪ ፍላጎት (demand) ከበለጠ የውጭ ምንዛሪ ተመን (exchange rate) ይጠነክራል (appreciat) ይህም ማለት ወደሀገር የገባው የውጭ ምንዛሪ መጠን ከፍተኛ ስለሚሆን ይህንንም ወደ ሀገር ውስጥ ገንዘብ ለመቀየር ከፍተኛ የሀገር ውስጥ ገንዘብ ፍላጎት ስለሚኖር የሀገር ውስጥ ገንዘብ ውድ ይሆናል። ስለሆነም አንድ የውጭ ሀገር ገንዘብ ለመግዛት ቀደም ሲል ከሚያስፈልገው የሀገር ውስጥ ገንዘብ አንጻር አነስተኛ የሀገር ውስጥ ገንዘብ ያስከፍላል ማለት ነው። ይህም የሀገር ውስጥ ገንዘብ ከውጭ ሀገር ገንዘብ አንጻር እሴቱ መጠንከሩን ያሳያል። በአንጻሩ የውጭ ምንዛሪ ፍላጎት (demand) ከውጭ ምንዛሪ አቅርቦት (supply) ከበለጠ የውጭ ምንዛሪ ተመን ይዳከማል (depreciate) ይህም ማለት አንድ የውጭ ሀገር ገንዘብ ለመግዛት ቀደም ሲል ከሚያስፈልገው የሀገር ውስጥ ገንዘብ አንጻር ከፍተኛ የሀገር ውስጥ ገንዘብ ያስፈልጋል ማለት ነው። ይህም የሀገር ውስጥ ገንዘብ ከውጭ ሀገር ገንዘብ አንጻር እሴቱ መዳከሙን ያሳያል።

ከላይ ለመግለጽ እንደተሞከረው የአንድ ሀገር ገንዘብ እሴቱ ከሌላ ሀገር ገንዘብ አንጻር መዳከም (depreciate) ወይም መጠንከር (appreciate) የሚወሰነው በውጭ

ምንዛሪ አቅርቦትና ፍላጎት ስለሆነ ገንዘቡ እንዲጠነክር የሚፈልግ ሀገር የውጭ ምንዛሪ ምንጩን ማጠናከር ሲኖርበት በአንጻሩ የውጭ ምርቶችን የመጠቀም ፍላጎቱ ከፍተኛ ከሆነ በውጭ ምንዛሪ ተመኑ ላይ ጫና በመፍጠር ከሌላ ሀገር ገንዘብ አንጻር የዚያ ሀገር ገንዘብ እሴት ደካማ ይሆናል ማለት ነው። በቀጣይ ክፍል ደግሞ የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ አንጻር መዳከም (depreciate) ወይም መጠንከር (appreciate) በአንድ ሀገር ምጣኔ ሀብት ላይ የሚያሳድረውን ተጽእኖ እናያለን።

5. የውጭ ምንዛሪ ተመን መዳከም ወይም መጠንከር ምጣኔ ሃብታዊ ተጽእኖ

የውጭ ምንዛሪ ተመን መዳከም (depreciation) ወይም መጠንከር (appreciation) በአንድ ሀገር ምጣኔ ሃብት ላይ የሚያሳድረው ተጽእኖ በተለያዩ ዘርፎች ላይ ይንጸባረቃል። የውጭ ምንዛሪ ተመን መዳከም (depreciation) በሌላ አገላለጽ የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ አንጻር እሴቱ በሚቀንስበት ወቅት ያለውን ተጽእኖ ስንመለከት፤ የሀገሩ ገንዘብ ከሌላ ሀገር ገንዘብ ጋር ያለው ዋጋ ሲዳከም በውጭ ንግድ ሚዛን ላይ አዎንታዊ (positive/surplus) ተጽእኖ ይኖረዋል። ይህም ማለት የውጭ ምንዛሪ ተመን መዳከም የዛን ሀገር ወጪ ንግድ (export) ያንቀሳቅሳል፡ ፡ ይህንንም በምሳሌ ስናየው አንድ ኩንታል ቡና በ 400 የአሜሪካ ዶላር በውጭ ገበያ ይሸጣል እንበል እና የብር የምንዛሪ ተመን ከአሜሪካ ዶላር አንጻር ሀምሳ ሶስት (53) ብር ቢሆን፤ በዚህ የምንዛሪ ተመን ስሌት ላኪው ከቡናው ሃያ አንድ ሽ ሁለት መቶ ብር (400 X 53 = 21,200) የሚያገኝ ይሆናል። ነገር ግን የብር የምንዛሪ ተመንን ከአሜሪካ ዶላር አንጻር ከሀምሳ ሶስት ብር ይልቅ ሀምሳ አራት ብር ብናደርገው ነገር ግን የቡና ዋጋ ባለበት (400 የአሜሪካ ዶላር) ቢሆን ለላኪው ሁለት አማራጮች ይኖሩታል። አንደኛው ከሌላ ሀገር ቡና ጋር ተወዳድሮ ስለሆነ በዓለም ገበያ የሚሸጠው ብዙ ደንበኞችን ወደ እሱ ለመሳብ ዋጋውን ከ400 ዶላር ወደ 388.9 ዶላር ዝቅ አድርጎ ቢሸጥ ወደ ብር ሲለወጥ ተመሳሳይ 21,200 ብር (388.9 X 54 = 21,200) በማግኘት ብዙ ደምበኛ መሳብ ይችላል ምክንያቱም የሱ ተፎካካሪ የሆኑ የሌላ ሀገር ቡና ላኪዎች የእኛ ሀገር የብር የምንዛሪ ተመን እንሱን ስለማይመለከት በ 400 ዶላር መሸጣቸውን ይቀጥላሉ ዝቅ እናድርግ ቢሉ የእነሱ ሀገር የውጭ ምንዛሪ ተመን ስላልተለወጠ አያዋጣቸውም ይከስራሉ፡ ፡ ይህም (ማለትም የምንዛሪ ተመኑ ከሀምሳ ሶስት ብር ወደ ሀምሳ አራት ብር በመዳከሙ) ለኢትዮጵያዊው ላኪ ተጨማሪ ቡና እንዲልክ እገዛ ያደርግለታል፤ በሀገር ደረጃ ሲታይም ወጪ ንግድ እንዲያድግ ያግዛል። ሌላው የብር መዳከም በወጪ ንግዱ ላይ ያለው ሁለተኛው ተጽእኖ ቡና ላኪው በዓለም ገበያ የሀገራችን ቡና ከሌሎች በተለየ ተፈላጊ ነው ብለን ብናስብ (በእርግጥም ተፈላጊ ነው) እና የሀገራችን ላኪዎች የፈለጉትን ያክል በለለው የዓለም ገበያ ቢያቀርቡ ገዥ አያጡም ብለን ተጨማሪ ታሳቢ ብናደርግ፤ የብር የምንዛሪ ተመን ከአሜሪካ ዶላር አንጻር ከ53 ብር ወደ 54 ብር ሲዳከም ቡና ላኪው የሚያገኘው የብር መጠን ከ 21,200 ብር ወደ 21,600 ብር ከፍ ይልለታል፡ ፡ ይህም የንግድ ስራውን እንዲያስፋፋ፣ ለሀገር ውስጥ ቡና አምራቾች የተሻለ ዋጋ በመክፈል ብዙ እንዲያመርቱ ማድረግ ስለሚያስችለው የወጪ ንግድ (export) እንዲጨምር እገዛ ያደርጋል።

በአንጻሩ የውጭ ምንዛሪ ተመን መዳከም (depreciation) በገቢ ንግድ (import) ላይ ያለው ተጽእኖ አሉታዊ ነው።ይህም ማለት የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ ጋር ያለው ዋጋ ሲዳከም ገቢ ንግድን (import) በሀገር ውስጥ ገበያ በሀገር ውስጥ ከተመረቱት ምርቶች አንጻር እንዲወደድ ያደርገዋል። ይህም በሀገር ውስጥ የውጭ ሸቀጦች ተፈላጊነት እነዲቀንስ ያደርጋል። ይህን በ 100 የአሜሪካ ዶላር የሚሸጥ ጫማን በምሳሌነት ወስደን ስናየው የብር የምንዛሪ ተመን ከአሜሪካ ዶላር አንጻር ሀምሳ ሶስት ብር ሲሆን፤ በዚህ የምንዛሪ ተመን ስሌት አስመጪው ለጫማው አምስት ሽ ሶስት መቶ ብር (100 X 53 = 5,300) የሚከፍል ይሆናል። ነገር ግን የብር የምንዛሪ ተመንን ከአሜሪካ ዶላር አንጻር ከሀምሳ ሶስት ብር ወደ ሀምሳ አራት ብር ሲዳከም አስመጪው በብር ሲለወጥ 5,400 ብር (100 X 54 = 5,400) ይከፍላል። ይህም የሀገር ውስጥ ጫማ ገዥዎች ብር ከመዳከሙ በፊት ከነበረው አንጻር በ100 ብር ስለሚወደድባቸው የጫማ ፍላጎታቸው ከውጭ ከሚገባው ወደ ሀገር ውስጥ ይዞራል ይህም ገቢ ንግድ እንዲቀንስ ያስችላል።

ስለሆነም የአንድ ሀገር ገንዘብ ከሌላ ሀገር ገንዘብ ጋር ያለው እሴት ሲዳከም የወጪ ንግድ እንዲንስበት(እንዲጨምር) በማድረግ በአንጻሩ የገቢ ንግድ ስለሚዳከም የንግድ ሚዛን ትርፋ/ጤናማ (surplus) እንዲሆን በማስቻል የማክሮኢኮኖሚ መረጋጋትን ያረጋግጣል። ነገር ግን የውጭ ምንዛሪ ተመን መዳከም (depreciation) የተጠቀሰውን ውጤት ለማምጣት የውጭ ምንዛሪ ተመን እንዲዳከም ሲደረግ ታሳቢ መደረግ ያለባቸው ዋና ዋና ጉዳዮችን ስናይ የመጀመሪያው ከወጪ ንግድ አንጻር ትርፋ/ስራ ላይ ያልዋለ የማምረት አቅም (unutilized capacity) ሊኖር ይገባል። ከላይ ቡናን እንደምሳሌ ወስደን ባየነው መሰረት የውጭ ምነዛሪ ተመን ሲዳከም ላኪው የቡናውን ዋጋ በመቀነስ ከሌሎች ሀገሮች ላኪዎች በተሻለ ብዙ ቡና በዓለም አቀፍ

ገበያ መሸጥ ይችላል። ይህ እንዲሆን ግን የግድ ወይ በመካዘን የተከማቸ ትርፍ ቡና መኖር አለበት አለያም በማሳ ለመለቀም የደረሰ ብዙ ቡና መኖር አለበት። ይህ በሚሆንበት ጊዜ የውጭ ምንዛሪ ተመን መዳከም በውጪ ንግዱ ላይ ጉልህ አስተዋጽኦ ይኖረዋል። ካልሆነ ግን የውጭ ምንዛሪ ተመን መዳከም ፋይዳ አይኖረውም። ። ሁለተኛው ቅድመ ሁኔታ የገቢ ንግድ ለዋጋ የሚሰጠው ምላሽ (price elasticity) ምንድን ነው? የሚለው ነው። ። በተለያየ ሀገራት ለአንድ ለአንድ ምርቶች ዋጋ ጨመረም ቀነሰ ወደ ሀገር ውስጥ የመግባት መጠናቸው ላይቀንስ ይችላል። ለምሳሌ በሀገራችን ነዳጅ፣ የለፈር ማዳበሪያ፣ መድሀኒት እና መሰል ምርቶች በሀገር ውስጥ በበቂ ሁኔታ እስካልተመረቱ ድረስ ወደ ሀገር ውስጥ መግባታቸውን አያቆሙም፤ ይህም የውጭ ምንዛሪ ተመን መዳከም በገቢ ንግድ ላይ እርባና እንዳይኖረው ያደርጋል።

በአንጻሩ የውጭ ምንዛሪ ተመን መጠንከር (appreciation) በወጪ ንግድ ላይ ያለውን ተጽእኖ ስናይ በአጭሩ ከላይ ከተጠቀሰው ተቃራኒ ይሆናል። ይህም ማለት የውጭ ምንዛሪ ተመን መጠንከር (appreciation) የወጪ ንግድ (export) ያዳክማል በአንጻሩ የገቢ ንግድን (import) ያበረታል። ይህም የንግድ ሚዛን ጉድለት (deficit) እንዲያስመዘግብ በማድረግ የማክሮኢኮኖሚ መዛባትን ያስከትላል።

የውጭ ምንዛሪ ተመን በአንድ ሀገር ምጣኔ ሃብት ላይ የሚያሳድረው ሁለተኛ ተጽእኖ በጥቅል ሀገራዊ ምርት (GDP) ላይ ነው። በማክሮኢኮኖሚ እንደሚታወቀው ጥቅል ሀገራዊ ምርት (GDP) የፍጆታ፣ ኢንቨስትመንት፣ የመንግስት የሸቀጦችና አገልግሎት ወጪ እና የተጣራ ውጭ ንግድ ድምር (GDP=C+I+G+X−M) ነው። ሰለሆነም የውጭ ምንዛሪ ተመን መዳከም (depreciation) ወጪ ንግድን (X) በመጨመር እና ገቢ ንግድን (M) በመቀነስ ጥቅል ሀገራዊ ምርት (GDP) እንዲያድግ ያግዛል በአንጻሩ የውጭ ምንዛሪ ተመን መጠንከር (appreciation) ወጪ ንግድን (X) በመቀስ እና ገቢ ንግድን (M) በመጨመር ጥቅል ሀገራዊ ምርት (GDP) እንዳያድግ ያደርጋል። ስለሆነም የውጭ ምንዛሪ ተመን የአንድ ሀገር ምጣኔ ሃብት ላይ አውንታዊም አሉታዊ ሚና ይጫወታል። በሌላ በኩል ሲታይ ደግሞ አንዳንድ ገቢ ምርቶች (ለምሳሌ የለፈር ማዳበሪያ ለግብርና፣ የጥሬ እና የካፒታል እቃዎች ለማኑፋክቸሪንግ ዘርፍ) በቀጥታ ለኢንቨስትመንት (I) ስለሚውሉ የውጭ ምንዛሪ ተመን ሲጠነክር በብዛት እነዚህን እቃዎች በእርካሽ ዋጋ (በሀገር ውስጥ ገንዘብ) ለማስገባት ይጠቅማል ይህም የሀገር ምጣኔ ሃብትን ያሳድጋል ።

ሶስተኛው የውጭ ምንዛሪ ተመን ተጽእኖ ዋጋ ላይ ነው። የውጭ ምንዛሪ ተመን መዳከም በተለይ ያች ሀገር አብዛኛውን ምርቷን ከውጭ የሞታስገባ ከሆነ ከላይ እንዳየነው የገቢ ንግድን ውድ ስለሚያደርግ የዋጋ ንረትን (imported inflation) ያስከትላል። ሌሎች ተጽእኖዎችን ስንመለከት ደግሞ በውጭ የካፒታል ፍሰት (የውጭምንዛሪ ባልተረጋጋበት ሁኔታ ማለትም ወዲያው የሚዳከም ወዲያው የሚጠነክር ከሆነ ኢንቨስተሮች በዚያ ሀገር መዋለነዋያቸውን በማውጣት መሰራት አይፈልጉም) ፣ በወለድ ምጣኔ (ከላይ እንዳየነው የውጭ ምንዛሪ ተመን ሲዳከም የዋጋ ንረትን ስለሚያስከትል የዋጋ ንረትን ለመቆጣጠር ደግሞ ማዕከላዊ ባንኮች የወለድ ምጣኔን ክፍ ስለሚያደርጉ) እና ሌሎች የማክሮኢኮኖሚ አማላካቾች ላይ ነው።

6. የውጭ ምንዛሪ ተመን ሥርዓት በኢትዮጵያ

ከላይ ለመግለጽ እንደተሞከረው የተለያዩ የውጭ ምንዛሪ ተመን ሥርዓት አይነቶች እንዳሉ አይተናል። ኢትዮጵያም በተለያዩ ጊዜያት የተለያዩ አይነት የውጭ ምንዛሪ ተመን ስርዓት አይነቶችን ስትተገብር ቆይታለች፤ በመተግበር ላይም ትገኛለች። እ.ኤ.አ ከ1977 ዓ.ም ጀምሮ የውጭ ምንዛሪ ተመን ስርዓት በመተግበር ላይ የሚገኝ ሲሆን በዛን ወቅት የነበረው የውጭ ምንዛሪ ተመን በ2.07 ብር 1 የአሜሪካን ዶላር እንዲገዛ (ETB 2.07 per 1 USD) የወሰነ ስርዓት (pegged) ተዘርግቷል። ይህም በደርግ ስርዓት ቀጥሏል። በመሆኑም በሀገሪቱ አሉታዊም አውንታዊም ተጽእኖ አስከትሏል። አውንታዊ ተጽእኖውን ስናይ የገቢ ንግድ በሀገር ውስጥ እርካሽ በማድረግ የተረጋጋ የዋጋ ንረት እንዲኖር አስችሏል። በአንጻሩ ይህ ስርዓት ወጪ ንግድ በዓለም አቀፍ ደረጃ ተፎካካሪ እንዳይሆን አድርጓል በተጨማሪም የጥቅል ሀገራዊ ምርት (GDP) እድገትን ከገደቡ የማክሮኢኮኖሚ አማላካቾች አንዱ ለመሆን ችሏል፣ የውጭ ምንዛሪ አቅርቦት ከፍላጎት እንዲያንስ በማድረግ የጥቁር ገበያ (parallel foreign exchange rate) እንዲፈጠር አድርጓል። ስለሆነም እነዚህን አሉታዊ ተጽእኖ ከግምት በማስገባት የኢህአዴግ መንግስት እ.ኤ.አ በጥቅምት 1992 ወደ ከፊል አስተዳደራዊ እና ከፊል ገበያ መር ስርዓት (managed floating regime) ተሸጋግሯል። ። ይህንንም ተከትሎም የብር የውጭ ምንዛሪ ተመንን 142 በመቶ እንዲዳከም በማድረግ በ5 ብር 1 የአሜሪካን ዶላር እንዲገዛ (ETB 5 per 1 USD) ተወስኗል። ቀጥሎም እ.ኤ.አ የውጭ ምንዛሪ የችርቻሮ ግብይት ስርዓት (foreign exchange retail auction system) ተዘረጋ። እ.ኤ.አ በ1998 ሳምንታዊ የውጭ ምንዛሪ የጥቅል ግብይት ስርዓት (weekly foreign exchange wholesale auc-

tion system) ተዘረጋ። ይህም በመሆኑ በህጋዊው እና በህገ ወጡ የውጭ ምንዛሪ ተመን መካከል የነበረው ልዩነት በእጅጉ ቀንሶ ወደ ነጠላ አሃዝ ወርዷል። በተመሳሳይ እ.ኤ.አ በ1998 የንግድ ባንኮች የውጭ ንግድ ስራን ከኢትዮጵያ ብሔራዊ ባንክ በመውሰድ እንዲሰሩ የሚፈቅድ መመሪያ ወጥቷል። ነገር ግን የኢትዮጵያ ብሔራዊ ባንክ ተጽእኖ ከፍተኛ ነበር። እ.ኤ.አ በ2001 ሳምንታዊ የውጭ ምንዛሪ የጥቅል ግብይት ስርዓት (weekly foreign exchange wholesale auction system) በባንክ ለባንክ የውጭ ምንዛሪ ጨረታ ስርዓት (inter-bank foreign exchange dealing system) ተለውጧል። ስለሆነም በህጋዊው እና በህገ ወጡ የውጭ ምንዛሪ ተመን መካከል ያለው ልዩነት ወደ ዜሮ (0.6% እ.ኤ.አ 2004) ወርዷል ይህ የተረጋጋ ሁኔታም ለረጅም ጊዜ ቆይቷል። ይሁን እንጅ እ.ኤ.አ ከ2015 ጀምሮ በህጋዊው እና በህገ ወጡ የውጭ ምንዛሪ ተመን መካከል ያለው ልዩነት በእጅጉ ሰፍቷል። ይህም ሊሆን የቻለው ከላይ እንደተገለጸው የውጭ ምንዛሪ ፍላጎቱ ከአቅርቦቱ በእጅጉ በመብለጡ፣ የሀገር ውስጥ ምርት እድገት ቢያሳይም ለውጭ ገበያ የሚቀርበው ምርት በአይነት እና በጥራት አለመጨመር፣ ከውጭ የሚገቡ ሸቀጦችን በሀገር ውስጥ በበቂ ሁኔታ የመተካት ስራ አለመስራት አንዳንዶችም (ለምሳሌ ነዳጅ እና የአፈር ማዳበሪያ) በአጭር ጊዜ በሀገር ውስጥ መተካት አለመቻል፣ ልል የገንዘብ ፖሊሲ እና የፌሲካል ፖሊሲ ያስከተለው ተጨማሪ የውጭ ሸቀጦች ፍላጎት፣ በቂ የዓለማቀፍ መጠባበቂያ ክምችት (ቢያንስ የ3 ወራት የገቢ ንግድን የመሸፈን የሚያስችል) ባለመኖሩ የውጭ ምንዛሪ ገበያውን ማረጋጋት ባለመቻሉ ነው።

ይህን ቁልፍ የማክሮ ኢኮኖሚ መዛባት ችግር ለመቅረፍ እ.ኤ.አ በ2019 መንግስት የ3 ዓመታት የሀገር በቀል የኢኮኖሚ ሪፎርም ፕሮግራም ቀርጾ ወደ ገበያ መር የውጭ ምንዛሪ ስርዓት በ 3 ዓመታት በመሸጋገር ችግሩን ለመፍታት ታቅዶ የነበረ ቢሆንም በውጫዊ (ኮሮና) እና ውስጣዊ (ጦርነት) ተግዳሮቶች ምክንያት እንደታቀደው እውን ሳይሆን ቀርቷል።

7. መደምደሚያ

ከላይ ከቀረበው ጽሁፍ መረዳት እንደሚቻለው የውጭ ምንዛሪ ተመን በሞጣኔ ሃብት ዘርፍ ውስብስብ ከሆኑ ጉዳዮች አንዱ ሲሆን በአንድ ሀገር ሞጣኔ ሃብት ላይ አሉታዊም ሆነ አውንታዊ ተጽእኖ ያሳድራል። አውንታዊ ጎኑ እንዲያመዝን ማዕከላዊ ባንኮች የሀገሩን ሞጣኔ ሃብት ባህሪ ያገናዘበ የውጭ ምንዛሪ ተመን ስርዓት መዘርጋት ይኖርባቸዋል። ይህ ስርዓት ውጤታማ ይሆን ዘንድ ሀገራት የወጭ ንግዳቸውን ሊያጎለብቱ ይገባል። በአንጻሩ ደግሞ የገቢ ንግዳቸውን በሀገር ውስጥ ምርት የመተካት እና የውጭ አገልግሎትን የመሳብ ሰፊ ስራ መስራት ይጠበቅባቸዋል። ስለሆነም የተረጋጋ የውጭ ምንዛሪ ተመን እንዲኖር ማዕከላዊ ባንክ የሀገሩን ሞጣኔ ሃብት ባህሪ ያገናዘበ የውጭ ምንዛሪ ተመን ስርዓት መዘርጋት እና በቂ ዓለማቀፍ መጠባበቂያ ክምችት መያዝ ሲኖርበት የዘርፍ መስሪያቤቶች (እንደ ግብርና፣ንግድ፣ አገዳሰትሪ፣ ቱሪዝም ሚኒስቴር እና ሌሎች) ደግሞ የወጪ ምርቶች እና አገልግሎቶች በሀገር ውስጥ ምርት በስፋት የሚተኩበትን ስራ ማከናወን ይጠበቅባቸዋል።

Rethinking Monetary Policy in a Changing World

IMF March 2023 Markus Brunnermeier

After decades of quiescence, inflation is back; to fight it central banks must change their approach

Monetary theory in economics has consisted of various schools of thought rather than a single unified model. Each of these schools emphasizes different forces that drive inflation and recommends a distinct policy response. Different times have raised different challenges—and each required its own policy approach.

Now, a resurgence of inflation requires yet another shift in emphasis in monetary policy. The predominant intellectual framework central banks have followed since the global financial crisis that began in 2008 neither stresses the most pressing looming issues nor mitigates their potential dire consequences in this new climate.

Following a lengthy period of low interest rates and low inflation, the global economy is entering a phase characterized by high inflation and high levels of both public and private debt. Fifteen years ago, central banks saw an urgent need to incorporate financial stability and deflation concerns into their traditional modeling of the economy and developed unconventional tools to deal with both.

Although financial stability remains an important concern, there are important differences between the current environment and the one that followed the global financial crisis:

- Public debt is now high, so any interest rate increase to fend off inflation threats makes servicing the debt more expensive—with immediate and large adverse fiscal implications for the government. Since the beginning of the COVID-19 crisis in early 2020, it is also evident that fiscal policy can be a significant driver of inflation.
- Instead of deflationary pressures, most countries are experiencing excessive inflation. That means there is now a clear trade-off between a monetary policy that tries to reduce aggregate demand by raising interest rates and one that aims to ensure financial stability.
- The nature and frequency of shocks have changed. Historically shocks were mostly from increases or decreases in demand—with the prominent exception of the supply shocks during the so-called stagflation of the 1970s. Now there are many shocks: demand vs. supply, specific risks vs. systemic risks, transitory vs. permanent. It is difficult to identify the true nature of these shocks in time to respond. Central bankers need to be more humble.

Monetary policy requires a modified approach that is robust to sudden and unexpected changes in the macroeconomic scenario. Policies that are effective in one macroeconomic environment may have unintended consequences when conditions suddenly change. This article will discuss the main challenges central banks will face, which monetary theories will be in the limelight, and how central banks can avoid becoming complacent and end up fighting the last war.

THE MONETARY-FISCAL INTERACTION

Central banks seem to act as the directors of modern economies, setting interest rates with the goal of stabilizing inflation and often attaining full employment as well (in developed economies). An essential cornerstone of this approach, which can be called monetary dominance, is

central bank independence. A central bank has de jure independence if it legally has the ultimate authority to set interest rates without interference from the government. However, de factoin dependence is also important: when setting interest rates, the central bank should not have to worry about whether higher rates will increase government indebtedness or default risk. Indeed, as the central bank hikes interest rates and the government has to pay more for its debt, the hope is that authorities will cut back on expenditures, thereby cooling the economy and lowering inflation pressure. The ability of central banks to set monetary policy and control the economy in more fraught times hinges on its independence.

The low interest rates and less extreme public debt levels that prevailed after the global crisis permitted central banks to ignore what were then relatively inconsequential interactions between monetary and fiscal policy. The period following the 2008 crisis was one of monetary dominance—that is, central banks could freely set interest rates and pursue their objectives independent of fiscal policy. Central banks proposed that the core problem was not rising prices, but the possibility that weak demand would lead to a major deflation. As a result, they focused primarily on developing unconventional policy tools to allow them to provide additional stimulus. Central banks also felt emboldened to pursue policies that would simultaneously meet the need for further stimulus and achieve social objectives, such as hastening the green transition or promoting economic inclusion.

During the COVID-19 crisis, circumstances changed dramatically. Government spending rose sharply in most developed economies. In the United States, the federal government provided massive and highly concentrated support in the form of "stimulus checks" sent directly to households. European countries initially implemented somewhat more modest programs (largely focused on preventing workers from being let go) and on spending programs to assist the green and digital transitions. Fiscal expansion seems to have been a primary driver of inflation in the United States but has contributed to inflation in Europe as well. But as spending was increasing, countries were hit by supply shocks of unprecedented proportion, largely the result of pandemic-related problems—such as supply chain disruptions. These added to inflation pressures.

The pandemic demonstrated that monetary policy does not always control inflation on its own. Fiscal policy also plays a role. More important, the accompanying buildup of public debt raised the possibility of fiscal dominance—in which public deficits do not respond to monetary policy. Whereas low debt levels and the need for stimulus allowed monetary and fiscal authorities to act in tandem following the global financial crisis, the prospect of fiscal dominance now threatens to pit them against one another. Central banks would like to hike interest rates to rein in inflation, whereas governments hate higher interest expenses. They would prefer that central banks cooperate by monetizing their debt—that is, by purchasing government securities private investors won't buy.

Central banks can retain independence only if they promise not to accede to any government desires to monetize excessive debt, which would then force authorities to cut spending or increase taxes, or both—so-called fiscal consolidation.

A key question for policy is what determines the winner of any contest between fiscal and monetary dominance. Legal guarantees of central bank independence are insufficient, by themselves, to guarantee monetary dominance: legislatures can threaten to change laws and

international treaties can be ignored, which could cause a central bank to hold off its preferred policy. To promote monetary dominance, the central bank must remain well capitalized: if it requires frequent recapitalization from the government, the central bank looks weak and risks losing public support. Central banks with large balance sheets that contain many risky assets and pay interest on the reserves to private banks may have large losses as interest rates rise. Those losses could result in increased pressure from fiscal authorities to refrain from raising interest rates.

Most important, the central bank must keep public opinion on its side, because the public is the ultimate source of its power and independence. That means the central bank should effectively communicate the rationale for its actions to retain public support, especially in the face of fiscally driven inflation. A central bank ultimately maintains its dominance if it is able to credibly promise that it will not bail out the government by monetizing public debt if there is a default.

THE THREAT OF FINANCIAL DOMINANCE

Central banks face new challenges in the interaction between monetary and financial stability. They now operate in an environment in which private debt is high, risk premiums on financial assets are depressed, price signals are distorted, and the private sector relies heavily on the liquidity the central bank provides in a crisis. The key difference between the period after the 2008 crisis and the situation today is that inflation is excessively high. A decade and a half ago, central banks' twin goals of stimulating economic activity and financial stability through unconventional policies coincided. Now, there are clear trade-offs between inflation management and financial stability, because interest rate hikes to fight inflation threaten to destabilize financial markets.

After the global crisis, central banks faced the dual problem of weak demand and financial instability and committed to doing "whatever it takes" to address both. Once conventional interest rate stimulus was exhausted, they turned to unconventional quantitative easing (QE) programs, in which they purchased large amounts of risky assets from the private sector, hoping that the resulting fall in credit spreads would spur lending and real activity. These QE programs also enabled central banks to play a new significant role as market maker of last resort, buying securities when no one else would.

There are always trade-offs between their goals of price stability and financial stability—even if that tension becomes clear only in the long run.

The large purchases of private assets caused central bank balance sheets to swell, and that expansion was not undone when the crisis ended because central banks feared that doing so quickly would cause economic damage. The willingness to maintain large balance sheets has led to a buildup of private debt, depressed credit spreads, distorted price signals, and high house prices from increased mortgage lending. The private sector has come to depend on the liquidity provided by central banks and has grown accustomed to the low-interest-rate environment. Indeed, financial markets have come to expect that central banks will always step in when asset prices fall too low. Because the private sector has become so dependent on the central bank, the contractionary effect of unwinding central bank balance sheets may be significantly more visible than the stimulus provided by QE. It is not yet clear which problems may afflict the financial sector when the monetary policy environment abruptly changes,

but the potential losses faced by pension funds in the United Kingdom in 2022 provide a stark warning. Those funds used techniques that when unraveled had the potential to seriously distort long-term interest rates and trigger a larger crisis. The Bank of England had to step in to buy UK bonds to forestall a crisis after long-term rates climbed.

Now, in an environment that compels central banks to raise rates to combat inflation, their goals of inflation stability and financial stability conflict. The reliance of the private sector, especially the capital markets, on central bank liquidity has led to a situation of financial dominance, in which monetary policy is restricted by concerns about financial stability. In such an environment, monetary tightening could wreak havoc on the financial sector and further render the economy vulnerable to even small disturbances. The extent of financial dominance depends on whether private banks are sufficiently capitalized to withstand losses and on the smoothness of private bankruptcy proceedings. A well-functioning insolvency law would insulate the system from spillover effects from the failure of an individual institution and make it less likely that a central bank would feel compelled to bail it out. These issues make it difficult for central banks to bring down inflation without causing a recession—and somewhat undermine their de facto independence.

These problems call for rethinking how monetary policy interacts with financial stability. It is crucial that central banks aim to restore price signals smoothly in private markets in which they have intervened excessively. They should also recognize that there are always trade-offs between their goals of price stability and financial stability—even if that tension becomes clear only in the long run. The buildup of central bank balance sheets leads to financial distortions and constrains their future actions. Central banks should anticipate this tension and impose greater macroprudential oversight—that is, regulating not only with an eye to the soundness of individual institutions, as has been the aim of financial regulation historically, but also to ensure the soundness of the financial system as a whole. Such enhanced macroprudential regulation should have a particular focus on monitoring dividend payouts and buildup of risk in the nonbank capital markets. Finally, central banks should reconsider their roles as lenders and market makers of last resort and ensure that any interventions are only temporary. Central banks should focus on communicating a policy framework that smooths liquidity conditions without leading to permanent asset purchases.

INFLATION EXPECTATIONS AND ANCHORS

Today a flurry of supply and other shocks are pushing up inflation and threaten to separate inflation expectations from the central bank's inflation target, or anchor. After the so-called Great Moderation of the 1980s and 1990s—when inflation and economic growth were both favorable—inflation expectations were stable across developed economies. Following the global financial crisis, there were even fears that overall prices would fall (deflation). But the rapid inflation that followed the COVID-19 pandemic made central banks realize that the time for deflation worries had passed; the possibility that inflation will exceed central bank targets in the intermediate term is again a concern.

Central banks overlearned the lessons of the 2008 crisis, which caused them to abandon their traditional approach to inflation expectations. This intellectual shift was largely responsible for the initial misdiagnosis of the inflation threat during the pandemic. Central banks took for granted that inflation had been conquered since the 1980s, which led them to assume that

inflation expectations would always remain well anchored. Under that assumption, central banks believed it was possible to run the economy hot—that is, letting unemployment fall below the so-called natural (or noninflationary) rate—without incurring much risk. They also considered it safe to make long-term policy commitments (such as forward guidance that they would keep interest rates low far into the future), because those commitments did not seem likely to have long-term inflationary consequences. But such commitments can hurt expectations if central banks in the future cannot keep them. Moreover, the fear of deflation led central banks to adopt a data-driven approach to policy that intentionally delayed any tightening. To ensure that economic output would not be cut off prematurely, central banks would not raise rates when they expected higher future inflation (say, because unemployment below its natural level was expected to lead to overheating). Instead, they would wait until inflation materialized before taking action.

Central banks also took a complacent approach to dealing with supply shocks. The economic models typically employed by central banks often imply that monetary policy should not fully neutralize inflation caused by supply shocks because such inflation is only temporary (ending when the supply increases) and interest rate policy is meant to control aggregate demand. Instead, the standard argument is that the central bank should trade off the benefits of cooling the temporary inflation against the costs of stifling economic growth. However, failing to react to supply shocks by taking steps to reduce demand could destabilize the inflation anchor and prevent the central bank from achieving its goals down the road. Paradoxically, the Ukraine war strengthened the inflation anchor because it gave central banks cover to explain why inflation rose so much.

The intellectual framework adopted by central banks after the 2008 crisis does not yet appear to have de-anchored inflation expectations. But it would be costly to wait until de-anchoring begins to alter the framework. Warning signals have already emerged in recent inflation expectations data. The loss of the inflation anchor, with its attendant consumer and business uncertainty, would hinder both aggregate demand and supply. That would have important consequences both for central banks—because it would hamper their ability to control inflation—and for economic activity, because consumers and firms would hesitate to buy and invest.

To address these problems, central banks should return to a monetary approach in which stabilizing inflation expectations is a central priority. Policy cannot tighten only after inflation occurs. Instead, central banks should take action as soon as warning signals flash. Central banks must incorporate both households' and financial markets' expectations of future inflation, since those expectations shape both aggregate demand conditions and asset prices.

MARKUS K. BRUNNERMEIER is the Edward S. Sanford Professor of Economics at Princeton University.

ልብ ወለድ

ስንቱን አስቦ መርምሮ
አምጦ ወልዶ አዕምሮ
ቢፈጥር አንድ ታሪክ
የሰውን ልብ የሚማርክ
እንዴት አይከፋው አይነድ
ሲባልበት ልብ ወለድ

ባየህ በቀለ
ከአንጂነሪንግና፣ ንብረትና ትራንስፖርት አገልግሎት
አስተዳደር ዳይሬክቶሬት
የኢትዮጵያ ብሔራዊ ባንክ

CAPITAL GOODS FINANCE COMPANIES

No	Name Of Company	Address	Phone	Fax
1	Waliya Capital Goods Finance Business S.Co	Bahirdar	058-2206780	0582 205 342
2	Oromia Capital Goods Finance Business S.Co	Addis Ababa	0115-571307	251-0115571411
3	Addis Capital Goods Finance Business S.Co	Addis Ababa	0111-262445	251-0111263479
4	Debub Capital Goods Finance Business S.Co	Hawasa	046 2125191	251-462 125 170
5	Kaza Capital Goods Finance Business S.Co	Mekelle	0344 40 00 85	0342 40 00 84
6	Ethio lease Ethiopian Goods Finance Business S.Co	Addis Ababa	0116 393 397	0116 392 730

Information on Micro Finance Institutions

NBE MFI No.	Name of Institutions	Telephone No.	Fax No.
001	Yegna Microfinance Institutions S.Co	0911318756 / 091202835	
002	Dedebit Credit and Saving Institution S.C.	034-4409306 / 0914702214	251-034-4406099 251-034-2400208
003	Omo Micro Finance Institution S. Co.	096619611 GM 046-2202053/ 0462207384	251-046 – 220-20-52
004	Gasha Micro Financing S. Co.	0118952389/90/91 0911240437	
005	Vision Fund Microfinance Institution S. Co.	0116463569 0911211823 (GM)	251-011 – 6293346
006	Sidama Micro Finance Institution S.Co.	046-2200850 / 0462206151 0916836687 (GM)	251-046 – 2204704
007	Africa Village Financial Services S. Co.	0116532052 / 0113204732 0911296401 (GM) 0913113446	
008	Buusaa Gonofaa Micro Financing S. Co.	0114162491 0911223679 (GM) / 0912017087 (FM))	251-011 – 4162501
009	PEACE Micro Financing S. Co.	0116678059 / 0911219506 (GM)	251-011 - 4654088
010	Addis Credit and Saving Institution S. Co.	0111572720 011111512/13 0911406174 (GM)	251-011 – 1573124
011	Meklit Micro Finance Institution S. Co.	0113484152 / 0113482183 0911318625 (GM)	251-011 – 5504941
012	ESHET Micro Finance Institution S.Co.	0113206451/52 0911677434 GM)	251-011 – 3206452
013	Wasasa Micro Finance Institution S.Co.	0911-67-38-22 / 0113384133	251-0113679024
014	Benishangul-Gumuz Micro Financing S.Co.	057-7750666 / 057-7752042 0911951484 Gm	251-057 – 7751734 251-057 - 7750060
015	Kendil Micro Finance Institution S. Co.	046 1105952 / 3831 / 5663	251-046-11015
016	Metemamen Micro Financing Institution S. Co.	6615398/6635801/0913460432(GM)	251-011 – 6186140
017	Dire Micro Finance Institution S. Co.	0251129702/1127072/1119246/47 0911353890 (GM)	251-025 – 1120246
018	Aggar Micro Finance S.Co.	6183382/3104 0911689457 (GM)	251-011 - 6183383
019	One Micro Finance Institution S. Co.	0911658497 (GM) / 0911169263 (Finance GM) 0911418280 (Aster)	
020	Harbu Micro Financing Institution S. Co.	0116185510 / 0911512633 (GM)	251-011 - 6630294
021	Digaf Micro Credit Provider S. Co.	0112787390/2782252/0910-27-52-34 0911936785 (GM)	
022	Harar Micro Microfinance Institution S. Co.	025-6663745/025-6664078/0912401911	251-025 - 6661628
023	Lefayeda Credit and Saving S.Co.	0116296976 / 0118237179	
024	Tesfa Micro Finance Institution S. Co.	0115526205 / 0911831882	251-011 - 5512763
025	Gambella Micro Financing S. Co.	0475511250/0475512252 / 0917823153	0475511271 / 0475512390
026	Dynamic Micro Finance S. Co. (Approved 23/03/09)	01155491585540390 / 0915766908(GM)	
027	Somali Micro finance Institution S.Co.	0257752122257-756976/77 0915768505 (GM)	0257780462
028	Specialized Financial and Promotional Institution S. Co.	0116622780 0911625576	251-011 - 6614804
029	Lideta Micro Finance Institution S.C.	0914788554 0344450064/32	0344452829 /0344450383

Information on Micro Finance Institutions

NBE MFI No.	Name of Institutions	Telephone No.	Fax No.
030	Nisir Micro Finance Institution S.Co.	0115500700/701 /0912364092 0911059722 / 0911875165	305/1250
031	Adaday Micro finance Institution S.Co.	0342405095/69 /0914749064	0342405217
032	Rays Micro Finance Institution S.Co.	0913386180	496/1110
033	Afar Microfinance Institution	0913399644	0336660748
034	Kershi Micro Finance Institution S.Co.	0118 721106/02	
035	Debo Micro Finance Institution S.Co.	0911758872	
036	Sheger Micro Finance Institution S.C	0113 698998	
037	Yemsirach Micro Finance Institution S.C	0118312404	
038	Grand Micro Finance Institution S.Co.	0912116101	
039	KAAFI Microfinance Institution S.Co.	0946877364	
040	Sahel Microfinance Institution S.Co.	0252789263	
041	Gogiba Microfinance Institution S.C.	0911951484	
042	Wallet Mocrofinance Institution S.C	0912116101	
043	Tana Microfinance Institution S.C	0911153087/0912974550	
044	ELSABI Microfinance Institution S.C	251116732829	
045	NEO Microfinance Institution S.C	0911805994	
046	Yeshewa Birhane Microfinance Institution S.C	0911645046	
047	Awera Amba Microfinance S.C	0916823282	
048	Amel Microfinance S.C	0911707269	
049	Akufada Microfinance S.C	0988999996	

የኢትዮጵያ ብሔራዊ ባንክ

NATIONAL BANK OF ETHIOPIA