THE EFFECT OF COVID-19 ON MACROECONOMIC STABILITY IN ETHIOPIA

(Uncertainty Shock Impact, Transmission Mechanism and the Role of Fiscal Policy)

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Abstract

This study investigated the impact of COVID-19 pandemic uncertainty shock on the macroeconomic stability in Ethiopia in the short run period. The World Pandemic Uncertainty Index (WPUI) was used a proxy variable to measure COVID-19 Uncertainty shock effect. The pandemic effect on core macroeconomic variables like investment, employment, prices (both food & non-food prices), import, export and fiscal policy indicators was estimated and forecasted using Dynamic Stochastic General Equilibrium (DSGE) Model. The role of fiscal policy in mitigating the shock effect of coronavirus pandemic on macroeconomic stability is also investigated.

The finding of the study reveals that the COVID-19 impact lasts at least three years to shake the economy of Ethiopia. Given that the Ethiopian economy heavily relies on import to supply the bulk of its consumption and investment goods, COVID-19 uncertainty effect starts as supply chain shock, whose effect transmitted into the domestic economy via international trade channel. The pandemic uncertainty shock effect is also expected to quickly transcend to destabilize the economy via aggregate demand, food & non-food prices, investment, employment and export shocks.

The VAR estimate indicates that COVID-19 uncertainty shock results a massive rise in import in the six months following the outbreak of the pandemic. The finding in this regard is expected, as the pandemic triggers massive demand in food and pharmaceuticals, for which Ethiopia is import dependent on both items. In the next two years, however, the import bill of Ethiopia shows a decline. Reduction in aggregate demand (both consumption & investment expenditures) is one explanation for decline in import size in 2013 and 2014 E.C.

The price dynamics as forecasted in the upcoming three years in Ethiopia tells the direction of impacts of COVID-19 uncertainty shock to shake the macroeconomic order. The findings in this regard revealed the structural breakups of Ethiopian economy, characterized by its inability to withstand shocks. As signaled in forecasted price dynamics on both food and non-food price indices, COVID-19 was a supply shock in its first time impact, but quickly trans-passes to demand shock. And in the next few years the demand shock outweighs the supply shock.

The results of estimations indicate that food prices to sky rocketed at least until the end of 2014 E.C (2021/22 E.F.Y). On the other hand, except communication & hotel & restaurant prices, other components of non-food price indices show a slump. The decline in non-food price level is a clear showcase of under-consumption characterizes the economic order in Ethiopia in the coming three years.

COVID-19 uncertainty shock puts huge loss in the investment sector in Ethiopia at least in the coming two years 2013 and 2014 E.C (2020/21-2021/22). In this regard, the pandemic effect transmitted to shake investment expenditure via the length of the pandemic period itself and export performances, both of which are exogenous shocks.

The study identified that general under consumption features the Ethiopian economy in the next couple of years. Therefore, the government is expected to enact incentives/policy directions which can boost business confidence. A managed expansionary fiscal policy is found to be key to promote investment, employment and to stabilize food & non-food prices. A particular role of fiscal policy was identified to stabilizing food, transport and communication prices. More importantly, price stabilization policies of the government can have spillover effects in boosting aggregate demand by spurring investments (and widening employment opportunities) in transport/logistics, hotel & restaurant, culture & tourism and export sectors in particular.

1. INTRODUCTION

1.1.Background & Justification

Quiet unprecedented in the world history in memory, all corners of the globe is living at a standstill following the outbreak of coronavirus pandemic. A highly contagious viral disease, Cvid-19 (the scientific name of the disease) has stopped virtually every human activity at global scale, as people`s movement curbed;; by way of controlling the spread of the pandemic (Fetzer, T. et al, March 2020, Politico, March 19/2020).

Expertise commentaries on Covid-19 dub the disease an economic pandemic, to signify counting the cost of the cure is getting dear than the problem itself. The size of the shock will be determined mostly by the measures taken to avoid large scale contagion and to limit the area of spread. Thus, the containment measures – the disruption to work processes, the limitations on meetings and travel – will be a larger negative supply shock than the number of deaths, even if the latter could still turn out to be large. Full or partial lockdown, like in China, is one of the most extreme measures and can bring production and consumption almost to a standstill. Such extreme measures are likely to remain restricted to certain areas and will be difficult to maintain for a long time (Baldwin, R. and Weder di Mauro, B., 2020).

On the most extreme case, the economic cost of COVID-19 to the world is predicted to be close 2.5 trillion USD, a size of GDP of Britain. The global financial market is also losing massively day by day. As has been reported from the world stoke exchange markets, the three weeks of damages of covid-19 is even worse than the three years of great depression of 1930`s, and the 2008 financial crisis (later economic crisis) (Bloomberg Economic Study).

While those costs are incurred at the starting days of the outbreak, one can imagine how the cost would surge as corona-days count. In the years after the pandemic, the world has to expect the biggest economic challenge ever. African economies already small enough to shake by the shocks of global economy, the continent should also prepare for the worst economic hit (Africa News, March 31/2020; REUTERS, March 24/2020).

For many analysts, COVID-19 is dismantling not just the economy, but also changing the way all sorts of human transactions hold, locally and globally. Indeed we are witnessing COVID-19`s staggering impacts in changing the way political business functions; also in its effect of reshaping intra-personal & inter-personal communications too. Scholars are also predicting for its impact in restructuring the global order by triggering for global actions forward, something the world has been missing in the past decades or so.(Politico, March 19/2020)

Ethiopia announced the first case of coronavirus on March 13 2020. Since then Coronavirus has taken the single most topic grabbing the dialogue among the Ethiopian society. The government of Ethiopia has also considered the issue a number one national agenda, where a number of measures and actions taken to fight the spread of the disease. (Africa News, REUTERS)

In a bid to curb the spread of the disease thereby limiting the movement of people, the government announced for schools & universities to shut-down; also large portion of personnel in the public service were set to stay home.

So far, the government of Ethiopia has allotted 5 billion birr for expenses on COVID-19 emergency activities. The private & public sector entities, and the general public have also been contributing in terms of monetary capital, equipment and residential also in response to the national call for assistances as waged by the government of Ethiopia later March/2020 (FBC).

While massive actions and many actors are preparing for the inevitable war against the coronavirus in Ethiopia, it is also wise to set aside resources to make for life after COVID-19. As we note from history, deadly pandemics are inherent to human civilizations, where disease outbreaks comes and go leaving their legacies & scars. The same holds to COVID-19 too. Hence, while mobilizing all our efforts to the inevitable war, it also important to design how we may ease the hard times we are awaited after COVID-19.

At least at this point in time, COVID-19 is much a media issue than an academic topic. In fact the problem is newer and it takes time to deal it with empirics, but that does not mean there is no scope for academic interventions. Indeed, the academic circle can (should) look the matter on table for expertise treatise, and come up with sound way forward that can be used by governments in the fight against coronavirus.

So far pioneering works on the topic were undertaken by think thank groups and professional institutions working in Ethiopia. In this regard, the policy researches by Ethiopian Economics Association and Policy Institute has produced two policy papers on COVID-19 economic wide impact on Ethiopia. A study by EEA[2], titled, *The economy wide impact of the COVID-19 in Ethiopia: Policy and Recovery options',* investigated the short, medium and long term impacts of COVID-19 on the Ethiopian economy. Using a dynamic Computable Equilibrium (CGE) model, the study captured the impact of the pandemic on productivity growth of labor and capital the impacts on Foreign Direct Investments and Remittances, export demand, import supply, transaction costs and the anticipated government interventions. The study reported the pandemic effect under mild and severe case scenario. Accordingly, under amplified (or severe) pandemic scenario, the total loss on the economy as a result of COVID-19 shock is estimated at 310 billion birr in FY 2020/21, whose effect downgraded the forecast estimate on economic growth in 2020/21 to 0.6%[3].

A study by FDRE Policy Institute (PI) aimed at identifying key policy alternatives to tackle the social and economic impacts of CIVID-19 on Ethiopia. An exploratory study investigated determinant factors on effectiveness and implications of public health measures aimed at mitigating the effect of COVID-19. Accordingly, factors related to demographic, economic and social settings are important in determining the economic damages associated with the public health measures to contain or suppress the virus. The study recommended targeted and combined social and economic policy measures to overcome COVID – 19 effects on the economy[4].

Another policy research, which was authored by Alemayehu Geda[5], investigated the dynamic impact of the pandemic on the Ethiopian economy. Using auto-regressive distribution lag model (ADL) model, the study focused on the COVID-19 effect on the service sector of Ethiopia.

Finding from this study reveal that a ten percent increase in confirmed weekly cases in Ethiopia is found to lead to a 1.1 and 6.8 percent reduction in demand for hotels in the long and short run, respectively This reduction becomes 8.5% and 3.7 % for restaurants and air travel services in the short run. The study further estimated that demand for services in the tourism sector to decline

[2] Tadele Ferede, Getachew Diriba and Lulit Mitik Beyene. 2020
[3] The pre-pandemic growth projection for Ethiopian economy was 9% in the year 2020/21.
[4] Alebel Bayrau Weldesilassie and Tassew Woldehanna. 2020.
[5] Alemayehu Geda. 2020

by about 15 to 17 percent for a ten percent increase in confirmed weekly cases in the short run. In the other hand, the estimation from the study indicated COVID-19 shock results in an increase in the demand for communication services, where a 10% increase in weekly cases estimated to increase the demand for Zoom software demand (a proxy variable to communication service) by 5.6 percent both in the short run and the long run.

Empirical evidences so far on the effect of COVID-19 on Ethiopian economy did not address the dynamic impact through the channel of uncertainty impact of the pandemic on macroeconomic stability. Therefore, this study tries to fill this gap. As such, analysis and inferences were made on COVID-19 uncertainty shock effect on the pillars of macroeconomic stability: Investment, Employment, Export expenditure, Import demand, Price Indices (both food and Non-Food prices) and Government Expenditures. Moreover, the role of fiscal policy to mitigate the effect of the pandemic in the short run period is also investigated.

1.2.Objectives

The general objective of this study is to identify, measure and interpret the impact of COVID-19 uncertainty shock on the macroeconomic stability in Ethiopia in the short run.\

Specific Objectives

- Diagnose into the transmission mechanism of the COVID-19 uncertainty shock effect into the Ethiopian economy
- Estimate and forecast uncertainty shock effect on real variables in the macroeconomic order: Investment expenditure, export, import, food & non-food prices, level of employment and government expenditure.
- Investigate the role of fiscal policy measures to ease the potential shock effects of COVID-19 pandemic on macroeconomic instability

1.3.Significance of the Study

This study can provide valuable evidences for macroeconomic policy interventions aimed at mitigating the shock effects of coronavirus pandemic on Ethiopian economy in the short run period. The significance of the study can also be in invigorating expert discussions and/or initiating further inquiry on the subject.

2. COVID-19 PANDEMICS: HEALTH AND ECONOMIC IMPACTS

As we note from history, deadly pandemics have always been inherent to human civilizations. In the past two centuries alone, the world has seen a total of eight major pandemics. In the 20th century three outbreaks recorded as global pandemic: the historic 'Spanish Influenza' of 1918, (killed over 100 Million people): the 'Asian flu' of 1957 (killed 1.1 million people) and the 'Hong Kong flu' of 1968 (killed 1 million people worldwide)

The 21st century has seen five pandemic outbreaks: N1H1 in 2009 ('575,400 killed), Severe Acute Respiratory Syndrome – SARS (with 7 to 17% fatality rate) in 2002, Middle East Respiratory Syndrome – MERS (with 35% fatality rate) in 2012, and Ebola which peaked in 2013-14 (with 25% to 90% fatality rate).

Currently the world is struggling with the fifth pandemic in 21st century, the coronavirus pandemic- COVID-19.

Table 1: Record on World`s Major Pandemics in History (14th -21st Century)

Event	Start Year	End Year	Total Deaths
Black Death	1347	1352	75,000,000
Italian Plague	1623	1632	280,000
Great Plague of Sevilla	1647	1652	2,000,000
Great Plague of London	1665	1666	100,000
Great Plague of Marseille	1720	1722	100,000
First Asia Europe Cholera Pandemic	1816	1826	100,000
Second Asia Europe Cholera Pandemic	1829	1851	100,000
Russia Cholera Pandemic	1852	1860	1,000,000
Global Flu Pandemic	1889	1890	1,000,000
Sixth Cholera Pandemic	1899	1923	800,000
Encephalitis Lethargica Pandemic	1915	1926	1,500,000
Spanish Flu	1918	1920	100,000,000
Asian Flu	1957	1958	2,000,000
Hong Kong Flu	1968	1969	1,000,000
1N1 Pandemic	2009	2009	203,000

Source*: *Alfani and Murphy (2017), Taleb and Cirillo (2020), https://en.wikipedia.org/wiki/List_of_epidemics and references there

2.1. COVID-19 – EPIDEMOLOGICAL TIMELINE

In late December 2019, a new pneumonia of unknown cause was identified in Wuhan pro, People's Republic of China (PRC). In subsequent days and weeks, massive laboratory studies undertaken on the cause of the newer pneumonia. On 11 February 2020, World Health Organization officiate the disease outbreak in China as caused by coronavirus, naming the disease COVID-19.

Earlier medical investigations about COVID-19 reported the disease '*an extremely contagious but not especially fatal, and that in the majority of cases, it is no worse than the seasonal flu'*. As medical studies goes on, however, the diseases can causes serious respiratory infections that would lead to death. Subsequent medical studies then reported the risk of death from COVID-19 between 1 and 4 per cent.

As of early March 2020, the COVID-19 epidemic was very much centered in China, with over 90% of reported cases located there. In late January, the disease had begun spread out of China. In the mentioned period, the two hardest hit nations outside China were Japan and Korea. The World Health Organization declared the outbreak a Public Health Emergency of International Concern on 30 January 2020. As of 31 January 2020, COVID-19 had spread to 19 countries with 106 confirmed cases.

By Mid February 2020, the WHO has reported 68,584 COVID-19 cases and 1666 confirmed death in China. The spread of the disease went up to 26 countries in the world, where WHO report on February 16 recorded 355 COVID-19 cases outside China with no death report. By 28 February, 2020, COVID-19 affected countries mount to 50; with global COVID-19 cases were 83,631, with 2858 deaths recorded.

The spread of the disease even mounting day on day, and on March 11, 2020 WHO declared the disease a global pandemic. By March 31, 2020 WHO reported 693,224 confirmed COVID-19 cases and 33,106 deaths across the world. On the turn of April, on April 2, 2020 global COVID-19 cases top one million, with death tolls surge 51,000. As of April 5, 2020 COVID-19 cases tally 1.22 million and 65,711 death tolls reported worldwide.

2.2.COVID-19 PANDEMIC - AN ECONOMIC PANDEMIC?

As a matter of fact, the nature of the disease extremely detrimental on human life, with its toll on the economic and psycho-social lives of people is severe. This is because containment measures required the disruption to work processes, the limitations on meetings and travel. Bloomberg economics, in its March issue, dubbed COVID-19 an economic pandemic, to signify counting the cost of the cure is getting dear than the problem itself. A glimpse into the world economic order in the past six months has been telling that COVID-19 is a global economic pandemic.

The crisis caused by the coronavirus pandemic is plunging the world economy to depths unknown since the Second World War, adding to the woes of an economy that was already struggling to recover from the pre-2008 crisis. Beyond its impact on human health (materialized by morbidity and mortality), COVID-19 is disrupting an interconnected world economy through global value chains, which account for nearly half of global trade, abrupt falls in commodity prices, fiscal revenues, foreign exchange receipts, foreign financial flows, travel restrictions, declining of tourism and hotels, frozen labor market, etc.

In the European Union, where tourism accounts for some 4% of GDP, the number of people travelling by plane fell from 5m to 50,000; on April 19th less than 5% of hotel rooms in Italy and Spain were occupied. In USA, businesses in all sectors have lost substantial revenue. Restaurants, bars and recreational businesses have been badly hit: revenues have declined some two-thirds since March 15th. Travel and tourism may suffer the worst losses.

According to calculations made on behalf of *The Economist* by Now-Casting Economics, a research firm that provides high-frequency economic forecasts to institutional investors, the world economy shrank by 1.3% year-on-year in the first quarter of 2020, driven by a 6.8% year-on-year decline in China's GDP[6].

The United Nations African Union Economic Commission for Africa (UN-ECA) has identified the major economic challenges attributed to COVID-19 in Africa as endogenous and exogenous[7]. The ***exogenous effects*** come from direct trade links between affected partner

[6] The Economist Magazine, *The 90% Economy that Lockdowns will leave Behind*, April 30, 2020.

[7] African Union (AU), Impact of The Coronavirus (COVID-19) on the African Economy, March 2020

continents such as Asia, Europe and the United States; tourism; the decline in remittances from African Diaspora; Foreign Direct Investment and Official Development Assistance; illicit financing flows and domestic financial market tightening, etc. The ***endogenous effects*** occur as a result of the rapid spread of the virus in many African countries.

Ethiopia announced the first case of coronavirus on March 13 2020. Since then Coronavirus has taken the single most topic grabbing the dialogue among the Ethiopian society. The possible impact of COVID-19 has been the topic of discussions, researchers and print and digital media reportages. The government of Ethiopia has also considered the issue a number one national agenda, where a number of measures and actions taken to fight the spread of the disease.

In a bid to curb the spread of the disease thereby limiting the movement of people, the government announced for schools & universities to shut-down; also large portion of personnel in the public service were set to stay home. Despites those steps, many still fear Ethiopia is yet to count the cost of this global pandemic.

This chapter tries to shade light to readers on the overall picture of Ethiopia, with an aim to emphasize on state of nature of the economic, demographic and socioeconomic contexts of the country. The intent is to evoke readers imagine the breadth and depth of COVID-19 impacts on Ethiopians across the board from the life of an average citizen to private businesses to the government sector in general.

OECD estimated the economic cost of Covid-19 to the world to be close 2.7 trillion USD, a size of GDP of Britain. Reports on world stoke exchange markets depicted the three weeks of damages of covid-19 is even worse than the three years of great depression of 1930`s, and the 2008 financial crisis (later economic crisis).

While those costs are incurred at the starting days of the outbreak, one can imagine how the cost would count as corona-days count.

2.3.ETHIOPIA`S PREPAREDENESS TO WITHSTAND COVID-19 SHOCK

Ethiopia is facing one of its biggest hurdles in the economic front, the COVID-19 pandemic shock. And, it takes to review on the country`s overall performance and states of affairs before trying to estimate the impact of the pandemic on its economy. Hence, this chapter puts forward the overall economic, social, political and demographic reality of Ethiopia in the past couple of years. Doing so, it tries to shade light on how better/ill prepared the country is to facing the negative outcomes of the COVID-19 pandemic.

2.3.1. COVID-19 Info-graphic Note on Ethiopia (March 2020- July 2020)

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By April 5, 2020, Ethiopia has recorded the first COVID-19 deaths (two deaths), and the total cases in the country reached 43. With the tally of COVID-19 cases incessantly increasing, the problem is likely to surge and last longer. And the government of Ethiopia already told its people to remain at home & protect themselves from the virus, sending clear message to Ethiopians across the board to prepare for the worst.

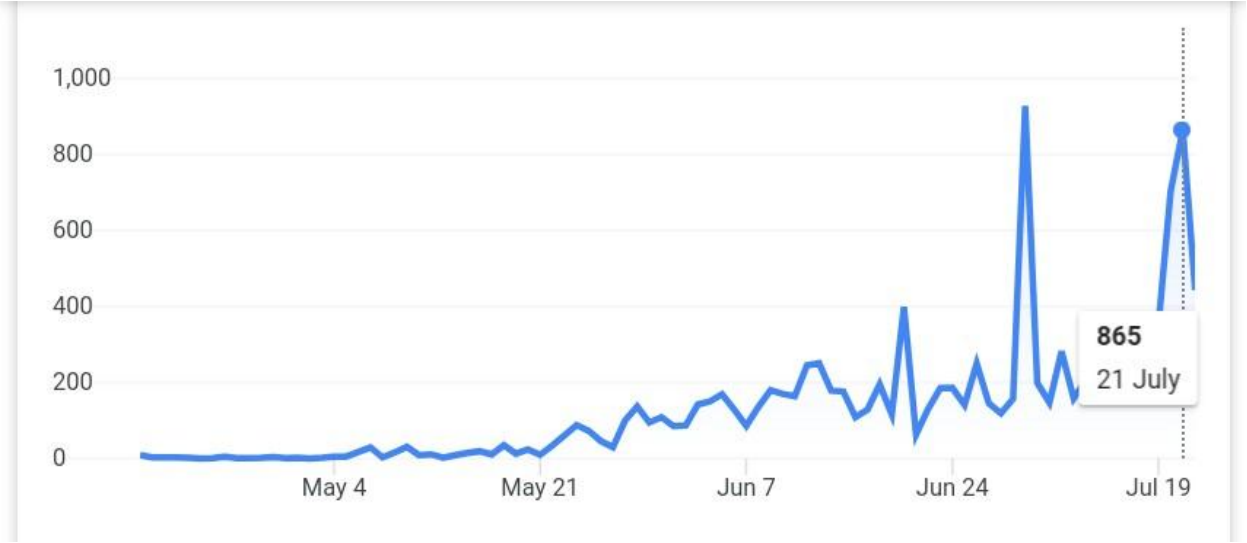

Figure 1: Trend of COVID-19 New Cases in Ethiopia (April 18-July 22, 2020)

(Source: Based on Data from Wikipedia)

2.3.2. How Prepared Ethiopia to Withstand COVID-19 Shock Effect:?

2.3.2.1.Political Context

For the past more than 15 years, Ethiopia has been on growth trajectory, where the annual economic growth rate averaged at 10%. Throughout this period, the country is able to extricate … million populations from poverty. Pertaining to its fast growing economy, the country has been praised a growth model in the realm of developing world.

Despite the step forward in the economic arena, the case in the political development has been otherwise. The government of Ethiopia has been widely condemned for its suppressions of opposition voices, the media and civil society groups.

A dominant feature of Ethiopian political system is polarized interests on the stream, giving political shocks key variables determining the performance of the economy. In the decade preceding the outbreak of COVID-19, the EPRDF led government has been trying to contain those political shocks not to 'disrupt' the economic progress. The containment, however, faded away starting the year 2015, when political unrest began raging Ethiopia. Consequent public rallies gave EPRDF led government undertake massive political reforms, where Abiy Ahmed (PhD came to the apex of state leadership. As package of reforms was widening the political space.

Given polarized interests featuring the political spectrum of the country, the newer development has given political shocks to reappear again to twist and turn the whole fabrics of Ethiopian society, including the economy.

The economic outlook in the pre-COVID-19 years is a showcase how political shocks downplayed the economic performance of the country. Since the political upheaval began in 2015, investment massively affected; youth unemployment in its spike;' foreign debt made the economy a headache; staggering decline of remittance flows; decline in export.

According to International Monetary Fund (IMF) report in 2018, political factors coupled with external shocks[8] explains the slowdown of the economy from the normal trend of double digit

[8] Decline in commodity prices in international markets for which Ethiopian economy is highly dependent in export earnings

growth for years to slow down to 7.7 percent in 2017/18 due to political headwinds and external shocks (IMF, 2018)

It is amidst those political contexts and consequent shocks posing economic uncertainty that COVID-19 shock appeared to affect the economy in the years ahead.

2.3.2.2.Macroeconomic Context

Though the past decade featured by a fast ride in the economic growth in Ethiopia, the economy has been poorly managed. Consequently, the country remained in difficulties to interpreting the its fast growing economy a blessing to majority of its people. The showcases in this regard involves the followings: rising national debt; mounting current account deficit; poor performance of export sector; rising prices, youth unemployment; unfair income distribution; geographic imbalances in terms of distribution of economic infrastructures/investments, among others.

Structural Problem: The Ethiopian economy is often dubbed a subsistence economy, for it is highly dependent on agriculture which depends on vagaries of nature. Agriculture accounts an average of 35% of the share of the country`s GDP in the years from 2015/16 to 2018/19. The sector is a mainstay for about 85% of Ethiopians. A bulk of foreign exchange Ethiopia earns from international trade comes from agriculture. For instance, the top five foreign exchange earnings of the country are from agriculture.

Though the share of agriculture is declining steadily in the past decade, since the last four years onwards, its place is grabbed by the incompetent & inefficient service sector. That even added to the structural problem the economy has been suffering from as the service sector is weakly interlinked with the industry and the agriculture sectors. The value addition of service sector to Ethiopian economy in terms of employment, foreign exchange earnings and technology transfer is subjected to quests by many economic analysts. As a matter of fact, the service sector rather has a huge connection with the foreign sector, dominated by importable merchandise trade, having negative impact on the current account balance of Ethiopia.

The industry sector on the other hand, though its share is rising, is still bottlenecked with a lot of hurdles. Frequent Power outages, limiting industrial & trade policy of Ethiopia coupled with lack of trained & disciplined labor forces is often raised as the limitations of the industrial sector.

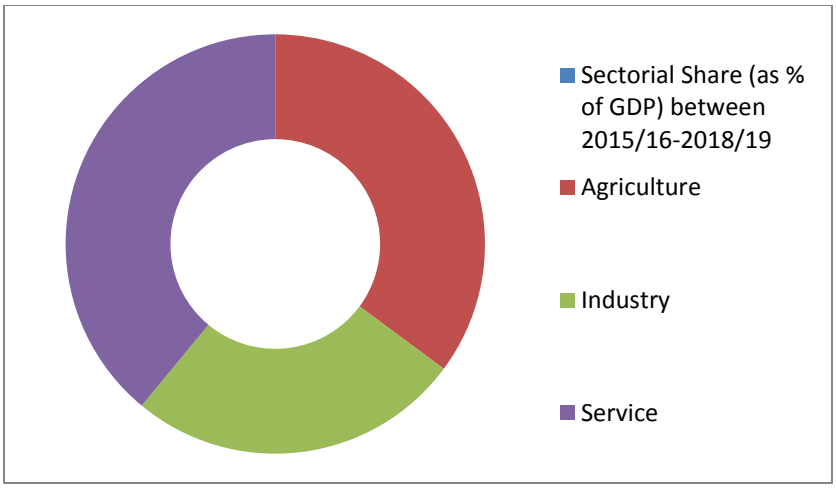

Figure 2: Sectorial Share of GDP (2015/16-2018/19)

As of recent years in particular, the Ethiopia economy experienced volatilities. That was pertaining to a number of shocks, which can be categorized as natural and human made. Natural shocks, which appeals to the agriculture sector, were drought in past three years in the country affecting agriculture yields.

As agriculture in Ethiopia is highly a rain fed, the sector is already exposed to natural shocks, where seasons of droughts almost comes and go roughly every five years. Those challenges were added up by a locust swarm affecting large tract of cultivations on the field as of last years and continuing this year too.

Recent Developments in Macroeconomic Management: Home Grown Economic Reform Plan.

The growth episode of Ethiopia is largely explained by massive public investment in infrastructural development. The state-led development model of the country though cannot be totally discredited, had a number of flaws. For one, servicing public investments was entirely on foreign debt. While the stock of the external debt growing fast, poor project execution along with disappointing export performance prompted the IMF and World Bank to rate Ethiopia's external debt burden as a high risk of distress. That greatly undermined the country's credit standing and borrowing ability.

Though the economy has been on a rise in the last decade, it was far less inclusive in a sense that the role of domestic private sector where crowd-out effect of public investment on the scene. The public sector failure is characterized by growing caps on the scope of economic growth where the public sector, the major driver of the economy, faced up with required financial and institutional/bureaucratic fallouts.

As a reflection of the aforementioned macroeconomic distortions, sovereign debt rose to an estimated 58% of GDP; government budget deficit of 3.7% of GDP; trade deficit of 12.4% of GDP and a current account deficit of 4.5% of GDP in 2018.

In light of addressing those macroeconomic problems, a new leadership installed in 2018, which is led by Abiy Ahmed Ali (PhD) enacted stringent fiscal and/or financial measures, where the monetary policy tightened and public sector credit policies were introduced. According to IMF (2018), those tight macroeconomic policy directions and reforms being made to open up the economy by Ethiopian government may have slowing down effect on the growth of the economy, but enables to control inflation, enhance the optimal usage of foreign currency.

Those policy reforms of the newer government in Ethiopia were complemented by a recently introduced ***Home Grown Economic Reform Plan***. The home grown economic reform plan is set to tackle the cumulated problems of Ethiopian economy in the past plus decade years. A three years plan commencing 2019, this reform plan costs the country 10 billion USD.

According to IMF (2018), those recent policy developments in Ethiopian economy sustains the economy by helping fix key structural bottlenecks that hamper the economic growth in the medium to long term period.by spurring private investment and productivity gains and reduce external and domestic vulnerabilities. In addition, the proposed policies would substantially reduce the risk of sudden financial and real economic disruptions— hence fostering domestic private sector development and FDI (IMF, 2018)

However, the COVID-19 appeared at this critical time where Ethiopia has started implementing those hosts of policy reforms aimed at healing the cumulated fractures of the economy in the past decade or so.

Indeed, the COVID-19 pandemic inevitably poses bleak future, even adding to the woes of Ethiopian economy, let alone realizing the reform plan

2.3.2.3.Socio-economic Context

The immediate requirements to endure in times of COVID-19 are worryingly low in Ethiopia. The larger segment of the population lives on a daily starving income level. A sizable portion of the population struggles with limited access to food, water and housing provisions. 58% of the population lack access to clean water, 89% live without safe toilets, and 55.7% survive without electricity and 48 million people live further than 2Km from all-weather road.

Moreover, the country`s health care system is too primitive and fragile to cope up the preventive methods prescribed by the World Health Organization (WHO). The per capita hospital bed is 3150. The nurse to population ratio is 1 to 1624.

Worse of all, the major segment of the population to the pandemic, the urbanites, are very ill prepared to fight the virus. In urban areas, provisions on basic amenities to prevent the disease like water is even below the national average.

With the existing poor socio-economic status of the people, it would be far-fetched for Ethiopia to withstand tremendous shocks posed by COVID-19. .

Table 2: Major Indicators on Socio-economic Status of Ethiopians

Socio-economic Indicator	2011 E.C
Health Indicators	
People : Hospital Beds	3150:1
People : Nurse 1	1624:1
Access to Safe Drinking Water	
Country level (in %)	76
Urban population	66
Rural Population	79
Access to Housing	
Number of Rooms Per National Average Households size[9]	0.88
Based on NBE (2019) and CSA (2016)	

[9]Average National Household Size in Ethiopia

2.3.2.4.Demographic Context

Ethiopia is the second largest country in Africa, with population size estimated 120 million in the year 2020. Ethiopia can be regarded as a country of youths. The fertility rate in the country is about 3.45 children per woman (mother). And the natural rate of population increase[10] in 2018/19 was 2.07 per cent. The age structure shows that nearly 60% of Ethiopians are within the working age bracket, necessitating the country to look for absorbing this large section of society into productive means like provision of access to education and/or provide job.

Though Ethiopian society is much rural (with percentage of rural population to urban population is 79: 21), the urban population is fast growing pertaining to pushing and pulling factors which speed up the rural-urban migration. The influx of people into the urban centers is largely driven by pushing factors in the rural areas

In this regard, the major pushing factor is limited scope of rural economies to diversified livelihoods beyond farming/animal husbandry, leaving the ever rising youth without farm land. As a result, the rural youth is forced to destine to towns and cities in search of employment opportunities. Worse for rural migrants in cities is a dire working conditions is not just far below their expectations but also below the standards. Industrial employments are with a starving wage, and the working condition is too unsafe and undignified. That in turn pushes the rural-urban migrants to look for crossing borders of Ethiopia, often eying their destinations to be Arab states in the Gulf and the European countries.

The pain and stress of Ethiopian migrants to Arab countries has been reported by international and local agencies. Many youth remained sunken in seas and oceans. For those who crossed dangerous sea/ desert voyages and reached the host countries, life is far below their expectations. The tragic reality is that the working condition and payments for those crossed borders is next to slavery. This particularly appeals to Ethiopian economic migrants destined to Middle Eastern Arab countries.

A recent showcase on that is the grief of Ethiopians in Yemen, Saudi Arabia, Qatar, United Arab Emirates (UAE) and Lebanon. In connection to COVID-19 pandemic, Ethiopian migrants in

[10] Natural Rate of Population Increase is computed as crude death rate less crude birth rate

those countries, many of them dubbed 'illegal, have been left helpless on streets in bad days, while they have been exploited in good days (pre-corona days). Too many of them were set to live and get deported in this pandemic days, where too many of them were forced to survive in dangerous conditions that would exposed to COVID-19. This is a recent memory grabbing the international media to the disgrace of the country, Ethiopia.

Those tragic showcases of massive unemployment and youth migration are the tragedy of mismanaged socio-economic and political governance in Ethiopia in the past decades or so. Circumstantial evidences from the profile of the country in the past five years are boldly telling the price of those mismanagements. The youth movement that forced the incumbent EPRDF to undertake reforms, but it seems too little too late.

At this juncture at least, unresolved youth quests cannot be underestimated as socio-economic or political problems, but goes beyond risking the national security of the Ethiopia. For a country which is already trapped in economic and political woes, COVID-19 pandemic is only added on those complexities.

Table 3: Major Demographic Indicators on Ethiopia

Demographic Indicator		**2011 E.C**
Population (In Millions)		97.6
Working age Population		
	Urban	10.1
	Rural	49.8
	Total	59.9
Age Dependency Ratio		69
Natural Rate of Population Increase (in %)		2.07
Total Fertility Rate		3.45 Chil:W
Average Household Size		6.07

Based on NBE (2019) Chil: W refers an average children a mother gives birth

The intent of such analysis is not motivated by a blind judgment or pessimistic mindset of the author, but triggered by a pragmatic concern to investigate the breadth and width of the problem sparked by COVID-19 pandemic in Ethiopia.

3. METHODOLOGY OF THE STUDY

This part of the study locates on key methodological elements that the study used while making analysis and inferences pertaining to its objectives already defined under chapter one. The core aspects subject of discussions of this section would be the following two components of analysis and inferences:

- Data Sources, tools and Techniques of Data Collection
- Method of analysis and Inference

3.1.Data Types, Data Sources and Tools of Data Collection

The study relied on both primary and secondary data sources to making analysis and inferences. As the study encompasses both qualitative and quantitative elements, the data used to draw inferences were based on qualitative and quantitative data sources.

3.1.1. Primary Data

The primary sources will be expert analytics given for media outlets (both local & international) on the impact of Covid-19 on Ethiopian and the African economy. The author is also looking for in-depth interviews from senior economists at the helms of economic research and economic policy on Ethiopia.

3.1.2. Secondary Data Sources

The quantitative data relies from secondary data sources. The secondary sources of study are latest reports on Ethiopian economy from broader local and international sources: Like National Bank of Ethiopia (NBE), Ethiopian Development Research Institute, Ethiopian economics Association, Ministry of Finance and Economic Cooperation (MoFEC), Ethiopian Planning Commission, among others.

3.2.Conceptual Framework and Techniques of Analysis and Inferences

The study integrates both qualitative and quantitative techniques to analyze the data and make inferences. The whole set of analysis and inference made in this study relies on circular flow of economy. For this study, linkage in economic sectors/factors of productions/agents is based on

framework of World Bank Group that was used to construct the latest Input-output Matrix or SAM matrix for Ethiopia (Andualem et al, 2020)

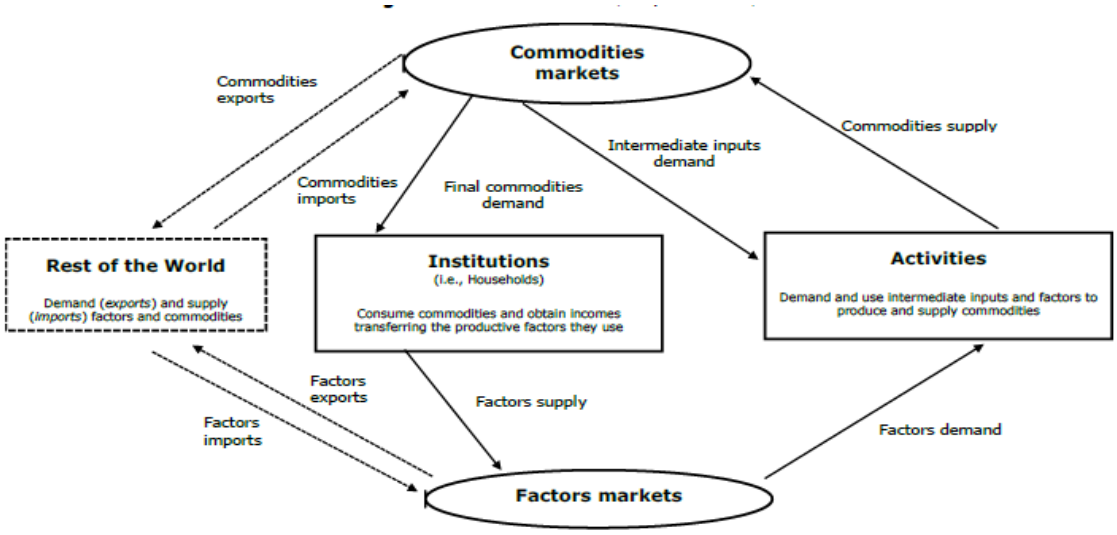

Figure 3: The Transmission Mechanism of COVID-19 Uncertainty shock

3.3. Techniques of Analysis and Inferences

The study employs both descriptive and econometrics techniques to analyze the data. The study relies on the essentials of macroeconomic policy approach to draw of inferences to best address the core objectives outlined. As such, narratives integrate positive and normative approach while making analysis and inferences. Positive approach of making analysis involves making a diagnostic look on the scale of damage of COVID-19 uncertainty shock on Ethiopian economy. The normative aspect of analysis is meant to propose a viable policy options to mitigate the macroeconomic instabilities as result of the pandemic shock effect.

By way of organizing and reporting the results of data analysis, the study adopted a framework proposed by UNCTAD (2020) and UN-ECA (2020) (UNCTD, 202). Accordingly, narratives on impact of COVID-19 on the Ethiopian economy are analyzed on three dimensions: *The Domestic Sector, The Foreign Sector and the policy circle.*

Econometrics Model

To estimate on the seize and dimensions of effect of COVID-19 shock on macroeconomic stability, the study relied on Dynamic stochastic general equilibrium models (DSGE) or Bayesian Vector Auto-regressions (BVAR).

Bayesian Vector Auto-regressions (VARs) are linear multivariate time-series models able to capture the joint dynamics of multiple time series (Miranda-Agrippin, S. and Ricco, G.; 2018) The earliest studies employing Bayesian VARs (BVARs) to macroeconomic forecasting are found in Letterman (1979) and Doan et al. (1984) Since then, VARs and BVARs have been a standard macro-econometric tool routinely used by scholars and policy makers for structural analysis, forecasting and scenario analysis in an ever growing number of applications.

Empirical evidences on the uncertainty shock effect of COVID-19 on macroeconomic stability increasingly suggest Dynamic stochastic general equilibrium models (DSGE) or BVAR produces produce sound results (For instance see Leduc and Liu (2020); Watanabe (2020); Ozili (2020) and PINSHI (2020); Alemayehu G. (2020); Kiku, Oscar (2020)

The BVAR model to be estimated in this study is defined as follows:

$$Xt = \sum_{t=1}^{44} (\beta_i x_{t-i} + \delta\zeta t + \mathcal{E})$$

Where:

Xt= Vector of Macroeconomic & Fiscal Policy Indicators and World Pandemic Uncertainty Index (WPUI**)**

$\mathcal{E}$ = Vector of residuals of reduced form at time t**.**

3.3.1. Definition of Model Variables

The COVID-19 first time shock and uncertainty shock is estimated and forecasted using data on core macroeconomic variables defined in the preceding section. Time series data set consists 46 quarters (Qs), where data on macroeconomic variables gathered spanning in the period between 2008/09 Q1 and 2019/20 Q2 was considered. In time series regressions, high frequency data set is preferred over low frequency data set is preferred because to remove seasonality of variables and to reduce the impact of high frequency measurement errors (Baker, Scott R. et al, 2020)

The BVAR model is structured by variables indicating all aspects of the economy: the aggregate demand, aggregate supply, Genera Price Level, current account balance, policy and economic uncertainty indicators.

- ***Aggregate Demand Indicators*:** Aggregate Investment Expenditure (domestic and foreign direct investments).
- ***Aggregate Supply Indicators:*** Employment
- ***General Price Level Indicators:*** Food Price Index (CPIF), Non-food Price Index (CPINF), Transport Interest Rate and Exchange Rate (of Birr against USD).
- ***Current Account Indicators:*** Export earnings and Import expenditures
- ***Fiscal Policy Indicator:*** Government Expenditure (sum total of recurrent & capital expenditures)
- ***COVID-19 Shock Indicator***: the uncertainty impact of COVID-19 is tapped by the World Pandemic Uncertainty Index on Ethiopia (WPUI) a proxy variable. The data on WPUI is accessed from ***www.worlduncertainityindex.com***, . The study employed the WPUI estimates from 2008 Q3 (2008/09 Q1 in E.F.Y) to 2020 Q1 (2019/20 Q3 in E.F.Y).

Table 4: Definition of Model Variables:

S/No	Variable	Definition	Measurement	Time Period (In Ethiopian Fiscal Year)	Number of Observations
1	World Pandemic Uncertainty Index (WPUI)	A Proxy Measure of CIVID-19 Uncertainty Shock Impact	The index is constructed by counting the number of times a word related to pandemics is mentioned in the Economist Intelligence Unit country reports. Specifically, the index is the percent of the words related to pandemic episodes in EIU country reports, multiplied by 1,000. A higher number means higher discussion about pandemics and vice versa.	2008/09 Q1-2019/20 Q2	Uncertainty is associated to total count of five pandemics namely: SARS, Avian Flu, Swine Flu, MERS, Bird Flu, Ebola and Coronavirus between 1996Q1 to 2020Q2
2	Import	Quarterly Value of Imports, by Major Commodity Groups	In Million USD	2008/09 Q1-2019/20 Q2	
3	Non-Food Price Indices (*COMMUNICATION;TRANSPORT; EDUCATION; HOTELREST*	Quarterly National Non-Food Consumer Price Index,	Indexed	2008/09 Q1-2019/20 Q2	Quarterly average price index for the following list of products: *Communication, Transport, Education, Health, Hotel & Restaurant*
4	Food Price Index (CPIF)	Quarterly National Food Consumer Price Index,	Indexed	2008/09 Q1-2019/20 Q2	Quarterly average price index for the following list of products: *Bread and Cereals; Meat; Fish & Sea Food; Milk, Cheese & Egg; Oils & Fats; Fruits; Vegetables; Sugar, Jam, Honey, Chocolate & Confectionery; Food Products; Non-Alcoholic Beverages*
5	Investment (INVST)	Investment Capital of Domestic and Foreign Projects Approved by agriculture, industry, and service Sectors in the quarter	In Million Birr	2008/09 Q1-2019/20 Q2	
6	Export	Quarterly Value of Exports, by Major Commodity Groups	In Million Birr	2008/09 Q1-2019/20 Q2	
7	Employment (EMPLOYPG)	Number of Employment (Permanent and Temporary) opportunities Created by Approved Domestic and Foreign Investment Projects with more than 250,000 birr registered capital in the quarter	In number Consumer Price Index	2008/09 Q1-2019/20 Q2	
9	Government Expenditure (GOVTEXPEND)	Quarterly Government expenditure (on recurrent & capital expenditures and regional transfers)	In Millions of Birr	2008/09 Q1-2019/20 Q2	

Harmonizing the Data Set

All quarterly dataset but World Pandemic Uncertainty Index (WPUI) was secured from the local sources. In Ethiopian context, there is difference between fiscal year and calendar year. The fiscal year starts in the month of July (HAMLE 1, in Ethiopian Calendar), while calendar year begins in month of September (MESKEREM 1). For obvious reason, fiscal year is considered in the time series dataset. The four quarters of the Ethiopian fiscal year are: ***Quarter One:*** July, August and September; ***Quarter Two:*** October, November and December; ***Quarter Three:*** January, February and March; ***Quarter Four:*** April, May and June

Quarterly data on WPUI is secured from foreign sources, based on Gregorian calendar. The months/quarters of the fiscal year as in Gregorian calendar are as follows: ***Quarter One*****:** January, February and March; ***Quarter Two****:* April, May and June; ***Quarter Three****:* July, August and September; and ***Quarter Four****:* October, November and December.

Hence, the first and last quarters of all data sets on WPUI was customized to Ethiopian fiscal year. As such, in the data used for regression on WPUI variable, observation in the third quarter of 2008 in the Gregorian calendar was taken to hold the first quarter (first observation) of start year for time series data i.e.2008/09. The data on WPUI from the source as i.e.2020 Q1 was taken as the last observation in the data set i.e. 2019/20 Q2 in Ethiopian fiscal year.

All observations on model variables except World Pandemic Uncertainty Index (WPUI) were transformed into logarithmic value before regression was made.

BVAR Statistical Tests

Before undertaking VAR estimation and prediction, each model variables were subjected to seasonality and Unit Root Tests.

Seasonality Test

When a time series data is measured for high frequency series, like monthly or quarterly, they may contain pronounced seasonal variations. The seasonal component in time series refers to patterns that are repeated over a period and that average out in the long run. The patterns that do not average out are included in the constant and the trend components of the model; whereas the

trend is of importance in the long term forecasting, the seasonal component is very important in short term forecasting as it is the main source of short run fluctuations.. In this study, all model variables are seasonally adjusted before estimation in VAR was made.

Unit Root Test

Spurious regression problem is common in time series regressions. Hence, setting the right order of integration of each time series data has to be made before VAR regression. The unit root test helps to set the order of selection, hence to detect and avoid spurious regression problem. To that end, the order of integration of each time series variable was made.

There are different Unit Root Test criteria. The most widely used selection criteria is Augmented Dickey-Fuller (ADF) test. Summary of Unit Root Test for model variables is depicted under table below

Table 5: Summary of Unit Root Test for model variables

S/No	Variable	Variable (Seasonally Adjusted and Log Transformed)	ADF, I(1)	1% (Critical Values)	5% (Critical Values)	10% (Critical Values)
1	Import	LNIMPORT*	-7.973821	-3.5889	-2.9303	-2.6030
2	Export	LNEXPORT**	-7.530118	-3.5930	-2.9320	-2.6039
3	Food Price Index	LNCPIF*	-3.634257	-3.5889	-2.9303	-2.6030
4	Communication Price Index	LNCOMMUNICATION*	--6.224109	-3.5889	-2.9303	-2.6030
5	Education Price Index	LNEDUCATION*	-3.617568	-3.5889	-2.9303	-2.6030
6	Employment	LNEMPLOYG*	-6.375550	-3.5889	-2.9303	-2.6030
7	Government Expenditure	LNGOVTEXPEND*	-4.967246	-3.5889	-2.9303	-2.6030
8	Health Price Index	LNHEALTH*	-5.328321	-3.5889	-2.9303	-2.6030
9	Transport Price Index	LNTRANSPORT*	-4.741770	-3.5889	-2.9303	-2.6030
10	Hotel & Restaurant Price Index	LNHOTELREST**	-5.839783	-3.5930	-2.9320	-2.6039
11	Investment	LNINVST*	-5.396353	-3.5889	-2.9303	-2.6030

12	World Pandemic Uncertainty Index	WPUI***	-2.701929	-3.5850	-2.9286	-2.6021

*Variable Qualify for Regression with first Order of Integration, I(1) with 1% level of significance
**Variable Qualify for Regression with second Order of Integration, I(1) with 1% level of significance
***Variable Qualify for Regression at level Order, I(0) with 10% level of significance

The ADF test shows that the order of integration for all model variables except World Pandemic Uncertainty Index (WPUI) is one i.e. I (1). The result on ADF Test shows that all variables qualifies for regression at order one I(1); and the WPUI qualifies at level i.e. I (0).

Ordering of Model Variables

A Cholesky decomposition requires the variables to be ordered in a particular fashion, where variables placed higher in the ordering have contemporaneous impact on the variables which are lower in the ordering, but the variables lower in the ordering do not have contemporaneous impact on the variables those are higher in the ordering.

In essence, ordering of variables in VAR model estimation dictated by theoretical and/or empirical evidences on the subject of analysis. Contextual factors are also key aspect of ordering of model variables. In this study, both theoretical/empirical and contextual factors pertaining the COVID-19 shock and particular feature of Ethiopian economy were integrated to conceptualize the ordering of model variables.

As a matter of fact, COVID-19 uncertainty shook is an exogenous variable, and its effect on the economy, at least in the short run, is interpreted in its effect on macroeconomic stability. In essence, COVID-19 shock direct and immediate effect on the economy is via distorting the supply chain. Supply chain distortion effect in return spills over in to the domestic economy by distorting import sector. Distortions in import quickly transmitted into the economy by affecting transport/logistics sectors. As Ethiopian domestic supply chain is largely dependent on importable for consumption and investment goods, COVID-19 impact on macroeconomic stability of Ethiopia is felt at the earliest via import and transport/logistics shocks.

The effect of the pandemic via supply chain shocks is quickly transmitted into disturbing the aggregate demand.

As such, both aspects of aggregate demand i.e. consumption and investment demands (expenditures) affected by supply chain distortions. In this regard, while prices on basic consumption items (like food and medical/pharmaceuticals) are expected to sky rocketed as people rush to hold for uncertain future. On the other hand, demand for investment goods is expected to decline, whose effect would be in dwindling down prices on investment goods. Supply chain distortions also have upward pressures on the cost of doing businesses by soaring key inputs (soft and hard inputs) in investment undertakings. While supply chain shock effect is translated into demand side shocks via consumption & investment expenditures price volatilities

is expected in the process. As Ethiopian investment sector is growing to be export oriented, the effect of the pandemic on investment is quickly translated into affecting export earnings (performance of export sector).

The combined effects of supply chain and demand distortions takes its toll into the economy by affecting real variables mainly the employment creation capacity of the economy.

To mitigate the COVID-19 pandemic shock effect on the pillars of the economy, government interventions in the economy is expected to grow. Indeed, one of the legacies of COVID-19, as depicted in many studies so far, is reminding for the crucial role of government sector. In Ethiopian context too, as depicted in COVID-19 recovery package, the government is set to intervene to mitigate the effect of virus by indulging in massive fiscal stimulus plan.

In lieu of the illustrations made in the previous paragraphs, the order of variables in the VAR estimation in this study assumes the following:

WPUI ➡ IMPORT ➡ TRANSPORT ➡ FOOD & NON-FOOD PRICES ➡ INVESTMENT ➡ EXPORT EMPLOYMENT ➡ GOVERNMENT EXPENDITURE (FISCAL POLICY)

Predicting COVID-19 Shock Impact Using BVAR Model: Impulse Response Function (IRF)

Impulse response functions can be used to produce the time path of the dependent variables in the VAR, to shocks from all the explanatory variables. If the system of equations is stable any shock should decline to zero, an unstable system would produce an explosive time path.

In this study, COVID-19 uncertainty shock impact is estimated instrumenting World Pandemic Uncertainty Index on Ethiopia (WPUI) over macroeconomic indicators integrated in BVAR model. Hence, the Impulse Response Function (IRF) is generated from BVAR estimation. The result on Impulse Response Function (IRF) of each endogenous variables of the model in response to one standard deviations of WPUI is presented in graphs.

The span of prediction period is set to be ***14 quarters*** or ***Three years and two months since January 2020 (or MEGABIT, 2012 E.C)***

The COVID-19 Shock Transmission Mechanism into the Economy Using BVAR

To depict on the transmission mechanism of the pandemic uncertainty shock, the BVAR Variance Decomposition was estimated. Variance Decomposition is an alternative method to the impulse response functions for examining the effects of shocks to the dependent variables. This technique determines how much of the forecast error variance for any variable in a system, is explained by innovations to each explanatory variable, over a series of time horizons. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system.

In this study, the result of Variance Decomposition on each endogenous variables of the model in response to one standard deviations of WPUI is made is presented in tables.

Investigating the Role of Fiscal Policy for Macroeconomic Stability

In this study, the role of fiscal policy to mitigate COVID-19 driven macroeconomic instability on Ethiopian economy is examined by instrumenting fiscal policy shocks against key macroeconomic variables integrated in VAR model used. Expansionary fiscal policy instruments examined in this study are increasing government expenditure and reducing import tariffs. By way of illustration, impulse response of key macroeconomic stability indicators to COVID-19 shock (the disturbance factor) and the expansionary fiscal policy shocks (counter disturbance factors) is presented.

4. RESULTS AND DISCUSSION

For over a decade, Ethiopian economy has been on a rise, with average growth rate 10.1% between 2003 and 2019, the country`s economy is still unable to put structural transformation that would withstand shocks attributed to natural and non-natural shocks. Rain fed agriculture is the major pillar of the economy in terms of employment, foreign trade and domestic supply chain.

It is amidst those prevailing real economic shocks that the country is faced with another more turbulent shock, this time COVID-19 pandemic shock. The effect of COVID-19 to Ethiopia further adds up to the woes of the mentioned structural problem and susceptibility of the shock.

But how deep would the COVID-19 pandemic be in the short run period? How would COVID-19 shock impact the Ethiopian economy? Where is the transmission mechanism of the economic pandemic? This chapter tries to address on those and related topics.

4.1.COVID-19 SHOCK EFFECT ON MACROECONOMIC STABILITY IN ETHIOPIA

The finding of the study reveals that the COVID-19 impact lasts at least three years to shake the economy of Ethiopia.

Essentially the COVID-19 immediate impact is on international transactions of the country, hence the supply chain distortions. As Ethiopia relies heavily on import to supply on basic items for consumption and investment demands, the immediate damage effect of COVID-19 would be distorting supply chain. The study result reveals that pandemic Shock on supply chain quickly transmitted into aggregate demand, where a slum in aggregate demand expected to prevail at least in the coming three years since 2020.

4.1. COVID-19 Uncertainty Shock Effect on Import Demand in Ethiopia (2013-2015 E.C)

The VAR estimate indicates that COVID-19 uncertainty shock results a massive rise in import in the second half of 2019/20 Ethiopian Fiscal Year (E.F.Y) or (2019/20 Q3 and Q4). In the period between months of January-June 2020 (TIR-SENE 2012 E.C), import demand is expected to grow by 4.17 billion birr. The finding in this regard is expected, as the pandemic triggers massive demand in food and pharmaceuticals, for which Ethiopia is import dependent on both items.

The magnitude & direction of COVID-19 shock effect on import demand in the last two quarters of 2019/20 E.F.Y is not the same. In the months from TIR-MEGABIT 2012 E.C. (i.e. the third quarter of 2019/20 E.F.Y) import demand will decline by 1.71 billion birr. This reduction is expectedly due to immediate restrictive measures taken by countries worldwide (including countries where Ethiopia depends for its imports) after World Health Organization declared COVID-19 outbreak a Public Health Emergency of International Concern on 30 January 2020.

However, the decline in import in the period TIR-MEGABIT 2012 E.C is expected to be off-settled by a massive increase in the next quarter i.e. MIAZIA-SENE 2020 E.C), where forecast estimate puts an increase of import demand by 5.89 billion birr in this period.

This overwhelming in import demand between the months of MIAZIA- SENE/ 2012 E.C may be attributed to two interrelated factors: the momentum effect and the inelasticity nature of Ethiopian import items.

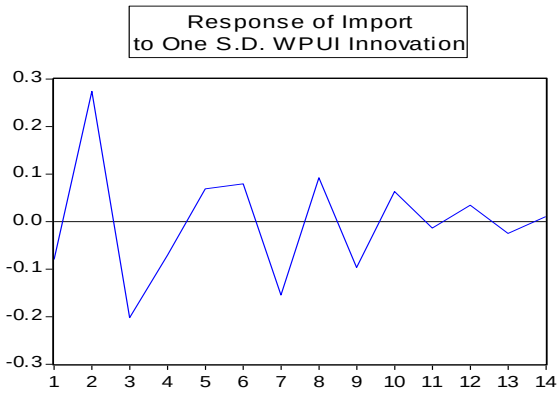

Figure 4: Dynamic Response of Import to COVID-Uncertainty Shock

The momentum effect captures the pressure of a reduction of import in the first quarter puts on import in the second quarter. COVID-19 triggered major import partner countries of Ethiopia to remain in shut down for over three months so. And a halt in import in the first quarter is expected to have momentum effect on the second quarter. On top of that, Ethiopia is net importer on two basic commodities required to deal with coronavirus pandemic days: pharmaceuticals and food items. That explains why import shows a rise in the second quarter of forecast period.

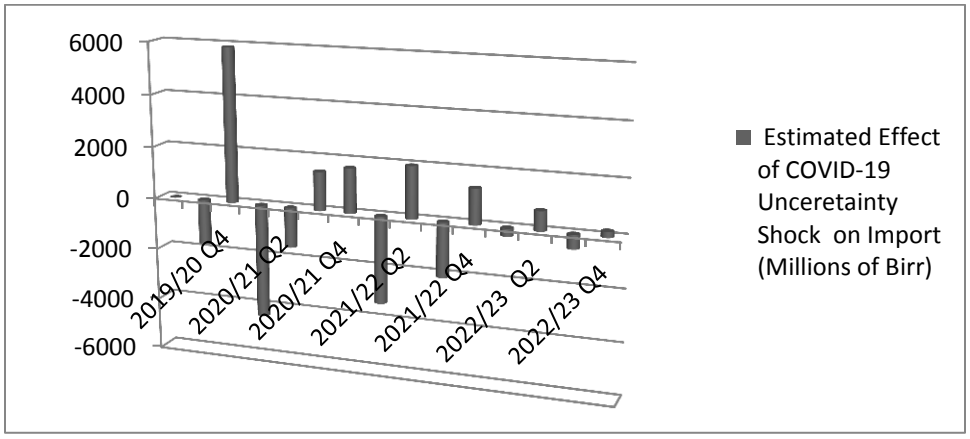

Figure 5: Estimated Effect of COVID-19 Uncertainty Shock on Import (Millions of Birr)

(Author`s Computation based on VAR Forecast via Impulse Response Function)

In the year 2013 E.C, as a result of COVID-19 uncertainty effect, import declines by 2.68 billion birr. Decline in import continues in 2014 E.C too, with an estimated decline in import values by 2.06 billion birr. A decline in imports in the successive years (2013-2014 E.C) is explained by

expected decline in consumption & investment expenditures, which are highly import dependent in the Ethiopian context, as result of the virus effect.

However, the decline in import ceases in 2015, where the pandemic uncertainty effect results an increase in import by 133 million. This marks s recovery of the economic recovery from COVID-19 tolls.

However, the decline in import ceases in 2015, where the pandemic uncertainty effect results an increase in import by 133 million. That perhaps signals recovery of Ethiopian economy from COVID-19 tolls.

4.1.1. COVID-19 Uncertainty Shock Transmission Mechanism on Import Volatility (2013-2015 E.C)

In the first four quarters ahead, the impact of COVID-19 uncertainty shock on import is transmitted to the economy via food prices. A rise in food prices in the immediate aftermaths of the pandemic is expected as Ethiopia is net importer of food and food supplements.

Since the fifth quarter of forecast period, COVID-19 triggered import volatility is much explained by volatilities in non-food prices. In this regard, education, hotel & restaurant and transport sectors would be the major channels through which the uncertainty shock transmitted into the economy.

4.2.Forecasting COVID-19 Uncertainty Shock Effect on Export Earnings (2013-2015)

The uncertainty impact of COVID-19 on export is another focus of inquiry of this study. The dynamic time path of forecast effect of COVID-19 on export earnings of Ethiopia is depicted in Impulse Response Graph below.

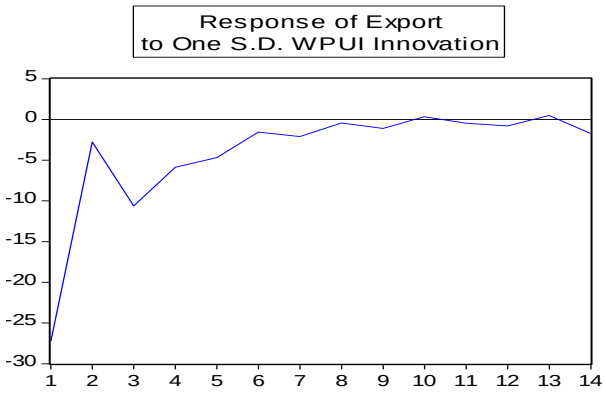

Figure 6: Dynamic Response of Export Earnings to COVID-Uncertainty Shock

As we learn from IRF graph, export thoroughly declines in all forecast periods. The loss in export earning is massive three months starting TIR- MEGABIT 2012 E.C, where export earnings declines by 5.85 Billion birr.

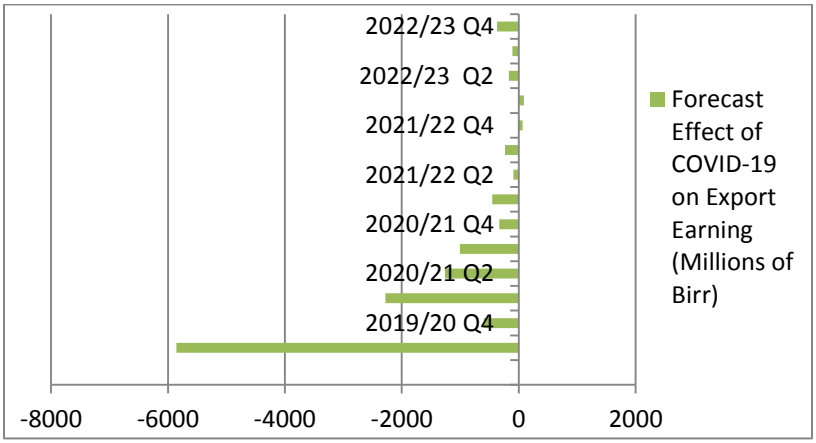

Figure 7: Forecast Effect of COVID-19 on Export Earning (Millions of Birr)

(Author`s Computation based on VAR Forecast via Impulse Response Function)

In the first six months since January 2020 (TIR/2012), an estimated 6.5 billion birr will be lost as a result of COVID-19 uncertainty shock effect. The study forecasts export to decline by 597.7

million birr April-June 2020 (MIAZIA-SENE 2012 E.C). This finding fits (only with forecast error of 3.5%) the forecast estimate made by Ministry of Finance of Ethiopia in April 2020,. According to Ministry of Finance of Ethiopia, export earnings are expected to fall by 30% (576 million birr) between March and June 2020 compared to earnings from exports in the same period in 2019 (which was 19.2 billion birr) (FDRE Ministry of Finance, 2020)

The decline in export keeps between July and September 2020 (HAMLE 2012-MESKEREM 2013 E.C).

In the year 2013, export loss due to COVID-19 shock is estimated to reach 4.8 billion birrs. The total loss in export in the first six months of 2013 E.C will be 3.5 billion birr. In next half year following, the predicted loss in export earnings in estimated at 1.34 billion birr. The impact of the pandemic on export earnings of Ethiopia shows a progressive decline in 2014 E.C. The total loss as a result of pandemic shock effect in 2014 E.C. is forecasted to reach 709.71 million birr. In the year 2015, the damage cost of COVID-19 on export earnings of Ethiopia is estimated at 557 million birr.

The pandemic uncertainty effect on export, though shows a steep decline, remains to be felt up until 2017 E.C.

4.2.1. COVID-19 Uncertainty Shock Transmission Mechanism on Export Expenditure Volatility (2013-2015 E.C)

The pandemic effect on export earnings of Ethiopia, at least in the coming three years, is largely explained by the duration of the pandemic period itself. As such, pandemic shock explains an average of 65.66% of variation (decline) in export earnings. A result from variance decomposition result also reveals that transport and investment shocks another mechanisms COVID-19 uncertainty effect transmitted into the export sector between the years 2012-2015 E.C.

4.3.Forecasting COVID-19 Uncertainty Shock Effect on Investment Expenditure

One of the impacts of COVID-19 is its toll in downsizing key components of aggregate demand, consumption and investment expenditures. In uncertain times like our days, both households and firms prefer to withhold their cash. Households would set aside cash in their hands for food and basic amenities. Firms too, refrain from spending to build-up their capital stock. Overall, both consumption and investment demands are expected to slump in the pandemic period.

In this study, the impacts of COVID-19 on the aggregate demand in Ethiopian economy is investigated through the pandemic`s effect on investment expenditure, one component of The study found out that COVID-19 driven investment volatility lasts three years. To examine on investment expenditure dynamics between TIR/2012 and SENE 2015, changes to Investment expenditure to one standard deviation of World Pandemic Uncertainty Index is generated using VAR Impulse Response Function (IRF).

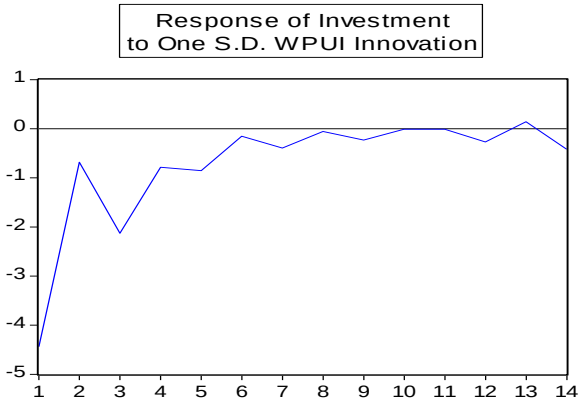

Figure 8: Dynamic Response of Employment to COVID-Uncertainty Shock

According to forecast estimate made, the total damage on investment expenditures from TIR 2012- SENE 2015 will be 1.9 billion birr (63.95 Million USD). The finding further reveals that, in the coming three years at least, investment performance is largely determined by the length of the pandemic period (pandemic uncertainty effect), explaining on average 56% of loss in investment expenditure. The result is in compatible with investment theories and empirics, where uncertainty what so ever is the major shock variable affecting investment. Next to pandemic uncertainty factor, transport and export sectors are also the major shock variables in 2012-2014

E.C. In 2015, investment is largely affected by hotel & restaurant prices and government expenditure shocks.

The size of investment expenditure losses and the dynamic impacts of major determinants of investment performances vary across different quarters/years in the prediction period (in the next three years). Investment expenditure steeply declines in the upcoming two years since TIR 2013. The biggest loss forecasted to hold between months of January (TIR) and (MEGABIT) 2012 E.C., where an estimated 443.82 million birr worth of investment expenditure decline is expected.

Overall, in the six months of 2012 E.C, COIVID-19 pandemic uncertainty shock results half a billion birr (512 Million birr). In this period, investment decline is largely attributed to Pandemic uncertainty shock (82.83%). Other than pandemic uncertainty, transport and export shocks takes a respective shares of 9.9% and 6.49% for a decline in investment in the period between TIR and NEHASE 2012.

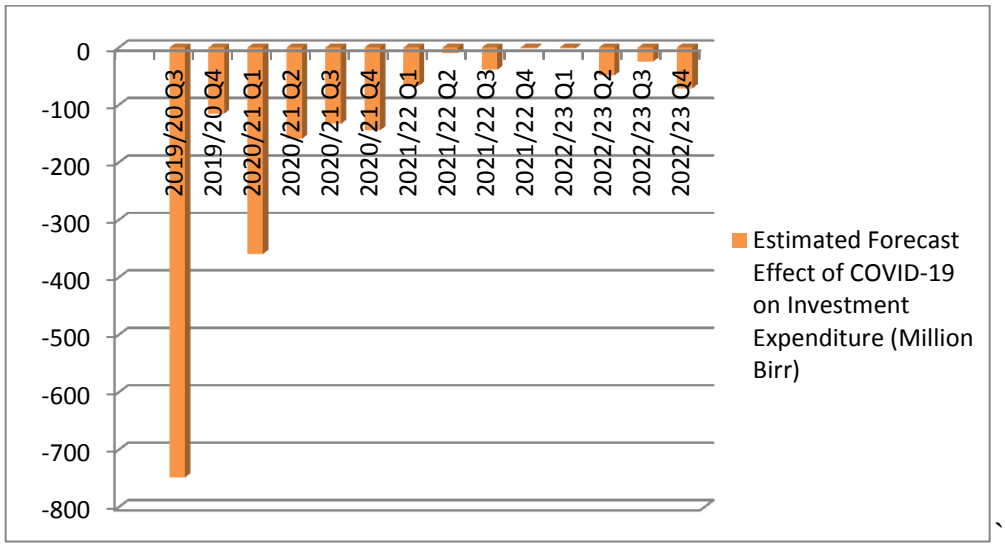

Figure 9: Forecast Estimate of Effect of COVID-19 Pandemic Uncertainty on Investment Expenditure in the Three years

(Author`s Computation based on VAR Forecast via Impulse Response Function)

In 2013 E.C too, the effect of the virus keeps on its damage on investment climate in Ethiopia. In this regard, the total cost of pandemic uncertainty is estimated to be 391.77 million birr. Though the pandemic uncertainty shock effect shows a progressive decline, it still remains the major factor determining the performance of investment sector in 2013, contributing on average for 62.32% of investment volatility. In the mentioned period, transport and export shocks remain on top spot of affecting investment performance, with respective the average shares in explaining investment expenditure is predicted to be 8.39% and 4.87%.

The effect of the pandemic on investment shows a relative decline in 2014 E.C, whose estimated effect on loss in the investment expenditure predicted at 68.7 Million birr. This is largely attributed to a decline in pandemic uncertainty shock, whose effect declines to 49.12%. Transport prices and export shocks remain major variables in 2014 where COVID-19 uncertainty shock effect takes its toll on investment performance in Ethiopia. The finding from VAR estimation shows transport price shocks are forecasted to explain 8.63% of volatilities in investment expenditure. In 2013 E.C the role of export performance in explaining investment volatilities is averaged at 4.12%.

In the year 2015 E.C, the damage of the pandemic on investment expenditure will be and 84.2 Million birr respectively. In this period, the relative importance of pandemic uncertainty, transport and export shocks progressively declines in affecting investment expenditures. In this regard, the share of each shock in affecting investment stability is predicted to be 43.1%, 7.96% and 3.79% respectively. On the other hand, the importance of hotel & restaurant and government expenditure shocks appeared on the scene to shake investment sector. The Impulse Response results from VAR estimation predicts that hotel & restaurant prices & government spending explain on average 7.14% and 6.01% of changes in investment expenditures respectively.

The forecast estimate on investment expenditure shows that investment declines by 747 million birr in the months of April, May and June of 2012 Ethiopian Calendar. The loss in investment as a result of the pandemic goes on in the next three months too (July & August/ 2012 and September/ 2013 E.C), where forecast estimates showing a loss in investment by 115 Million birr. The pandemic damage on investment expenditure continues in 2013 Ethiopian calendar too, where an estimated 559 Million birr worth of

investment expenditure is lost between October (TIKIMT) and December (TAHISAS) 2013(Quarter two of 2020/21 E.F.Y).

4.4. Forecasting COVID-19 Uncertainty Shock Effect on Price Stability (2013-2015 E.C)

The impact of COVID-19 on macroeconomic stability can be gauged by its effect on price volatility. Theoretical and empirical evidences tell price stability a signal about the health of the economy. For one, it can be rough gauge on the gap between the aggregate demand and supply. Moreover, price volatilities also implicate the shock level in the economy. The importance of looking the impact of COVID-19 is key from the two broader aspects of linkages between macroeconomic stability and price volatility.

4.4.1. Forecasting the Effect of COVID-9 on Food Prices

The VAR model result predicts that COVID-19 pandemic shock to have an upward pressure on food price index[11]. As shown from IRF graph below, food prices are predicted to show a rise in most of the forecast Two explanation can be given why food prices surge in the pandemic period. One, health preventive measures would give food market disruptions mainly creating transport & logistics service barriers, among other factors. Two, the pandemic uncertainty effect would raise households` precautionary demand for food, whose effects interpreted in pushing food prices up..

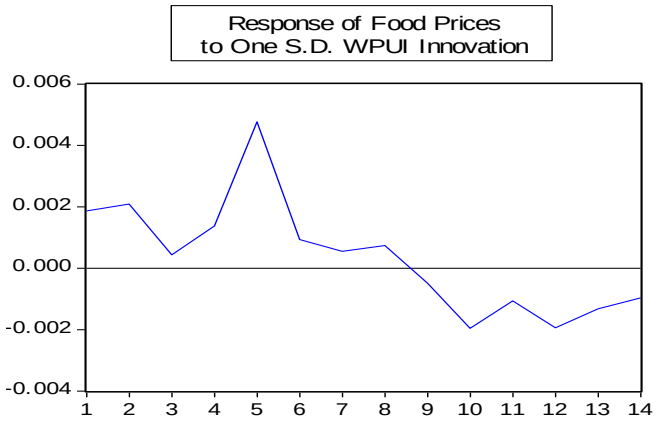

Figure 10: Dynamic Response of Food Prices to COVID-Uncertainty Shock

[11] The basket of goods/services in the estimation on food price index in Ethiopia involves the following items*: bread and Cereals; Meat; Fish & Sea Food; Milk, Cheese & Egg; Oils & Fats; Fruits; Vegetables; Sugar, Jam, Honey, Chocolate & Confectionery; Food Products; Non-Alcoholic Beverages.*

To infer on the channels through which food price volatility to be transmitted into the economy, variance decomposition of food prices shock was made. Accordingly, transport shock is forecasted to be the main channel through which COVID-19 uncertainty effect is impact is transmitted into food prices. On average 16.3 % of variances in price of food-price is explained by transport prices in the whole periods of forecast. As food inputs are highly reliant on transport & logistics services, it is natural that food prices to vary with transport prices.

Education price is another channel where COVID-19 uncertainty shock impact is transmitted to food price volatility in Ethiopia in the upcoming three years, whose shock effect on food price volatility is averaged at 14.9% in the prediction period. In a country like Ethiopia, where there are 26 million students attending classes as of 2020 or 2012 E.C[12], it is highly likely that education sector to affect food prices via effects on hotel & restaurant businesses. Indeed, a stay at home health measures affect hotels and restaurants drawing substantial customer base from getting services. That inevitably put downward pressure on food prices through the line of demand shortfalls. That may explain why the impact of education prices is expected to spill over into food prices.

Apart from education, the impact of COVID-19 on food prices are expected to pass through communication prices, particularly since the first four quarters of prediction period.

4.4.2. Forecasting the Effect of COVID-19 on Non-Food Prices

To see the dynamic response of non-food prices to COVID-19 uncertainty shock, the study consider major items in non-food price indexing in Ethiopia. Hence, the dynamic response of indicators of non-food price index to one standard deviation of COVID-19 uncertainty shock on transport, communication, education, health and hotel & restaurant prices is forecasted for the next fourteen quarters since 2019/20 Q3

As depicted in subsequent paragraphs, the forecast result reveals that the pandemic uncertainty impact is not the same across non-food goods/services indicators.

Transport Prices

[12] Report by Planning Commission of Ethiopia, July 2020

In the immediate aftermath of the pandemic outbreak, transport prices show upsurge, but only with a momentous effect as it lasts for few time. This can be explained by pressure on public mobility on the eve of stay at home measures likely be implemented on the wake of the coronavirus pandemic. People would rush at once to take themselves at home, raising transport demand and hence surge in the price index. Moreover, the future is uncertain with more restrictive measures (including lockdowns) may hold. Therefore, precautionary demands for food / non-food items, which raise demand for transport services, leaving an upward pressure on transport prices.

Except for a momentous increase in prices of transport, the VAR model forecast transport prices fall in almost all quarters of forecast period. Given the pandemic triggered stay away measures, that would amount significant limitations on mobility of people and freight, all with dwindling down effect on transport prices. The impact of COVID-19 uncertainty shock on transport prices seemingly fades beginning 12th quarter of forecast.

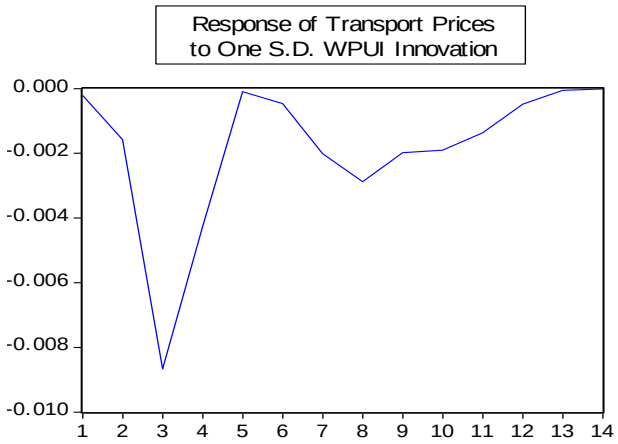

Figure 11: Dynamic Response of Transport Prices to COVID-Uncertainty Shock

Moreover, the pandemic uncertainty shock is transmitted to transport price volatility via education and food prices, also with investment. The result in this regard is expected as education, food supply chain and investment activities are highly reliant on transport services.

Communication Prices

Communication prices show a rise in the upcoming six quarters at least. The rise in price is also observed in the seventh and eighth quarters too before falling in the last two quarters of forecast.

The upward effect of COVID-19 pandemic on communication price index is understandable. For obvious reasons, the pandemic preventive measures required limited physical contact. and the only feasible way managing one`s business, whether economic or social, would be via telecommunications. That in turn results into surge in demand for communication devices/services, hence a rise in their prices too.

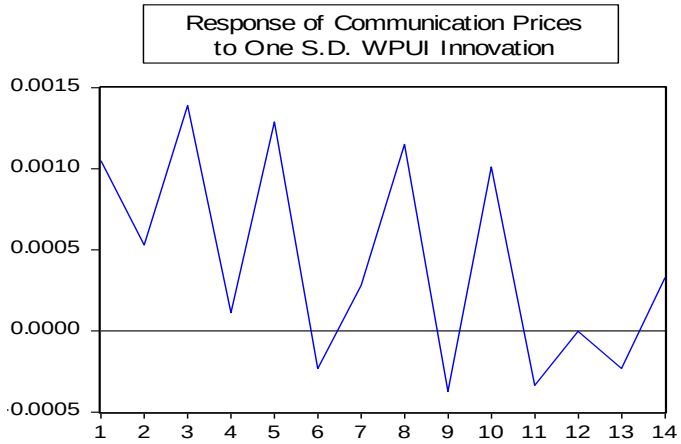

Figure 12: Dynamic Response of Communication Prices to COVID-Uncertainty Shock

Volatilities in communication prices are predicted to be explained via volatilities in prices in the health and food prices. Export sector is another channel where COVID-19 uncertainty shock evokes volatilities in the communication prices. The finding is consistent with the fact that all those sectors are largely dependent on communication devices to deliver/function their services.

Education Prices

Education prices show a fall in the next three forecast period, but begins a steady rise that lasts for the next five quarters. The finding is in compatible with the stringent measures to be taken in the aftermath of the pandemic, one of which is closure of education centers.

As education remains in closure for months, demand for education services and education materials would be low. And the impact is interpreted with a fall in education prices. That explains why education price index shows a decline in the months following COVID-19 pandemic.

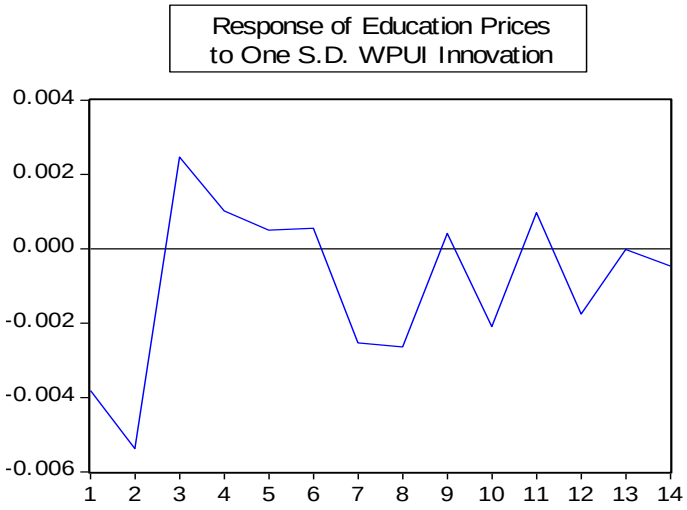

Figure 13: Dynamic Response of Education Prices to COVID-Uncertainty Shock

As forecasted in the VAR variance decomposition, the transmission channel of the pandemic effect on education sector is most felt through transport and food price shocks. The duration of pandemic uncertainty time is also another factor affecting the stability of education prices in the next couple of years in Ethiopia. Since the beginning of the fourth quarter of forecast, communication price shocks will affect stability of education prices.

Health Price Index

Health prices show a rise in the first two quarters of forecast. Given the pandemic result a public health measures to step up, the prediction is as expected. However, for the next three quarters, health prices show a decline. The impact of COVID-19 uncertainty shock on health prices culminates beginning the seventh quarter.

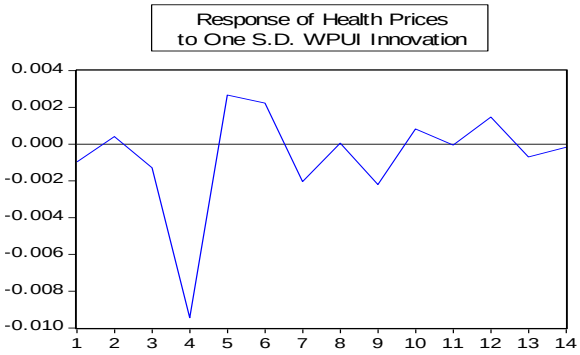

Figure 14: Dynamic Response of Health Prices to COVID-Uncertainty Shock

The transmission channel of uncertainty effect on health price stability is most explained by communication, transport & food price shocks. Import and hotel & restaurant prices are also found to be another transmission mechanism of COVID-19 uncertainty shock on variations in health price in the forecast period.

Hotel & Restaurant Prices

Hotel & restaurant prices increase roughly in all periods of forecast except the fourth and fifth quarters. Given that public health measures required hotels & restaurant business to put in place changes in their service delivery to complying customer safety that inevitably interpreted in making cost of production costlier. The in part explains the upward pressures on hotel & restaurant prices expected in the first four quarters at least.

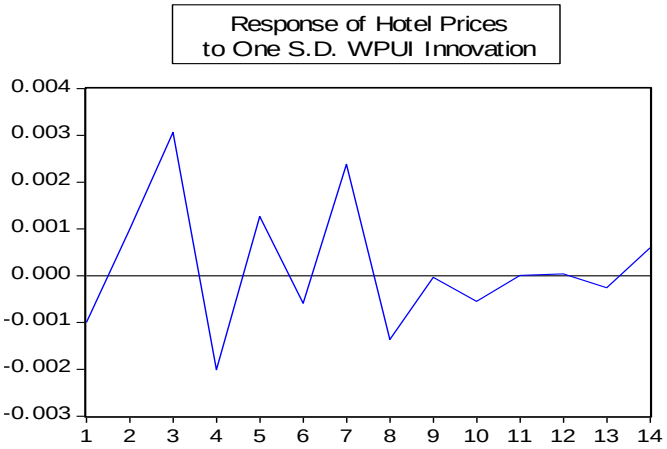

Figure 15: Dynamic Response of Hotel & Restaurant Prices to COVID-Uncertainty Shock

The impact of COVID-19 pandemic takes its biggest toll in the hotel & restaurant business via education and food price volatilities. As food items are major inputs/outputs of hoteling business, and students are the major customers of hotel & restaurant services, the finding is expected. Non-food prices like communication and transport are also important lines of uncertainty shock transmission lines resulting volatilities in the hotel & restaurant prices.

4.5.Forecasting COVID-19 Uncertainty Shock Effect on the Pattern of Public Expenditure in Ethiopia (2013-2015 E.C)

The pandemic shock effect has a negative impact on government expenditure in the next four quarters of pandemic period. As the forecast estimation considers policy factors intact, one reason why reduction of public spending is because a reduction in government earnings due to tax and tariff falls as result of the pandemic.

An increase in government expenditure is forecasted in the first quarter of prediction period. Government spending shows a decline in the last quarter of 2019/20 fiscal year and the first quarter of 2020/21 fiscal year. In the remaining three quarters of the 2020/21 fiscal year, however, a slight increase in government expenditure is expected. The pattern of government expenditure change appears to be cyclical in the next quarters of forecast.

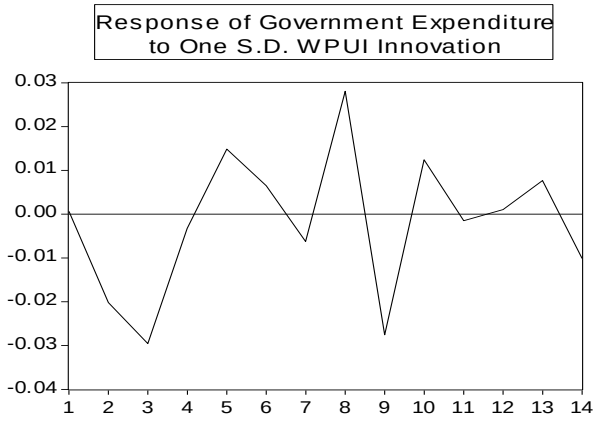

Figure 16: Dynamic Response of Government Expenditure to COVID-Uncertainty Shock

4.5.1. COVID-19 Uncertainty Shock Transmission Mechanism on Public Expenditure (2013-2015 E.C)

To see the effect COVID-19 uncertainty shock on macroeconomic stability in Ethiopia, the study examined the transmission mechanism of Government Expenditure volatility. To that end, variance decomposition on government expenditure variable is estimated in the VAR model.

The result of estimation shows that volatilities in government expenditure transmitted into the economy by affecting prices, both food and non-food prices. In this regard, food and

communication prices appear to be main channels through which COVID-19 shock transmitted into government expenditure volatility.

As variance decomposition result shows, communication prices shocks are the main transmission channel of COVID-19 uncertainty shock on government expenditure, explaining 15.74% of public expenditure volatilities in the forecast period (the coming three years). The explanation goes to structural/contextual factor pertaining to the public sector in Ethiopia. The role of communication sector in determining the pattern of government expenditure is apparent as direct and indirect source of government revenues.

In Ethiopian context, communication sector is entirely owned by the government sector, with the state monopolizes the telecom business to fetch ransom to service its expenditure. Moreover, the effect of communication shock on government expenditure may be through its potential impact on the tax revenue.

The study further identified that COVID-19 uncertainty effect is transmitted into government expenditure via hotel & restaurant shock. This can be explained by two. For one, hotel & restaurant business is key source of tax revenue for the government. Moreover, as a result of the pandemic takes its biggest toll on hotel &restaurant businesses, tax revenue from the sector is expected to face a decline in the next couple of years. On top of that, given that the hotel & restaurant sector is receiving major tax concessions from the government, the downward effect on tax revenue that could have been received from the sector.

4.6.Forecasting COVID-19 Uncertainty Shock Effect on Investment Induced Employment in Ethiopia (2013-2015 E.C)

As we learn from the dynamic response graph below, uncertainty shock sparked by coronavirus pandemic affect aggregate employment (temporary & permanent employment) negatively in the first two quarters of forecast period (between TIR and SENE 2012 E.C). Between TIR-MEGABIT 2012 E.C), COVID-19 uncertainty shock will result a 65% decline in employment level compared to the previous quarter (2019/20 Q2).

Dynamics of COVID-19 Uncertainty Shock Effect on Employment in the Forecast period is depicted in the Impulse Response Function (graphed) below

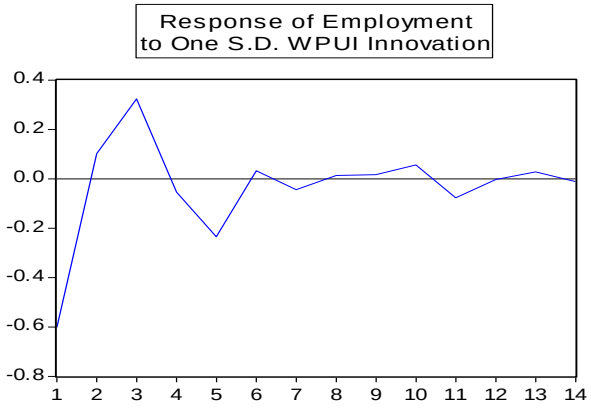

Figure 17: Dynamic Response of Employment to COVID-Uncertainty Shock

The effect of the pandemic on employment is expected to come through investment, the length of the pandemic period (uncertainty effect) and export shocks. The finding is real as the employment data used in the study is investment induced employment; and investment and export sector are largely affected by the length of pandemic period (see sections 4.2 and 4.3)

Indeed, as VAR forecast estimate show, the impact of COVID-19 uncertainty effect is much felt through investment channels in the whole period of prediction period (three years). In the first six months of 2012 E.C for instance, changes in investment expenditures explain 37.89% of volatilities in employment. In the first four quarters of forecast period, though permanent employees are not totally immune from the pandemic shocks, temporary employment will bear the cost of the pandemic more than permanent employment. There are solid reason why so.

For one, COVID-19 triggers stringent public health measures to prevent the spread of the disease restrict the growth of ongoing investments, whose effect interpreted in downsizing additional. Moreover, pandemic uncertainty erodes the confidence of investors as the prospect for businesses expectedly gloomy curbing new investments from holding. In both cases, COVID-19 effect is interpreted in its massive effect on temporary employment.

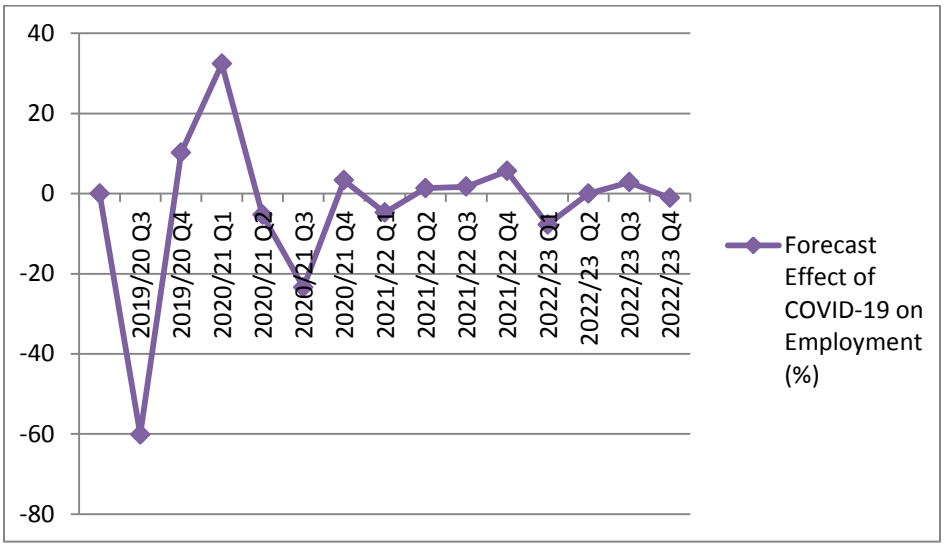

Figure 18: Forecast Effect of COVID-19 on Employment (%)

(Author`s Computation based on VAR Forecast via Impulse Response Function)

The effect of COVID-19 uncertainty on employment is however almost nil in the year 2014. This, in part, is explained by a rise in public spending to investment undertakings and existing businesses targeting employees (permanent/contract) from layoffs. As forecast prediction shows, the effect of the pandemic on employment culminates beginning the second half of 2013 E.C

4.7.The Role of Fiscal Policy to Mitigate the Uncertainty Shock Impact of COVID-19 Pandemic on Ethiopian Economy (2013-2015 E.C)

In this study, the role of fiscal policy to mitigate COVID-19 driven macroeconomic instability on Ethiopian economy is examined by instrumenting fiscal policy shocks against key macroeconomic variables integrated in VAR model used. Expansionary fiscal policy instruments examined in this study are increasing government expenditure and reducing import tariffs. By way of illustration, impulse response of key macroeconomic stability indicators to COVID-19 shock (the disturbance factor) and the expansionary fiscal policy shocks (counter disturbance factors) is presented.

4.7.1. The Role of Managed Rise in Public Expenditure to Stabilize the Economy

To examine the effect of expanding public expenditure in stabilizing the macroeconomic order, The Impulse Response Function (IRF) to one standard deviation of shock from Government Expenditure on investment, employment, food & non-food prices, import, export sector was investigated.

Evident from IRF graphs below, the particular role of an increase in government expenditure goes to stabilize general prices (both in the food and non-food prices)

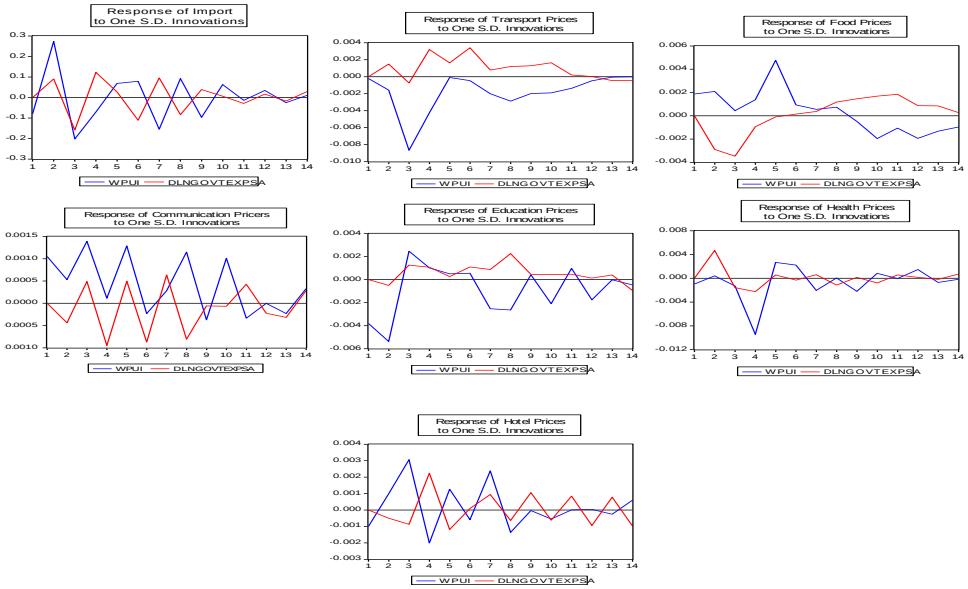

Figure 19: The Role of Expansionary Government Expenditure to Price Stability

Moreover, increasing government expenditures can heal the fractures of the economy due to pandemic uncertainty shock effect by stimulating investment, export and employment (see IRF graphs below).

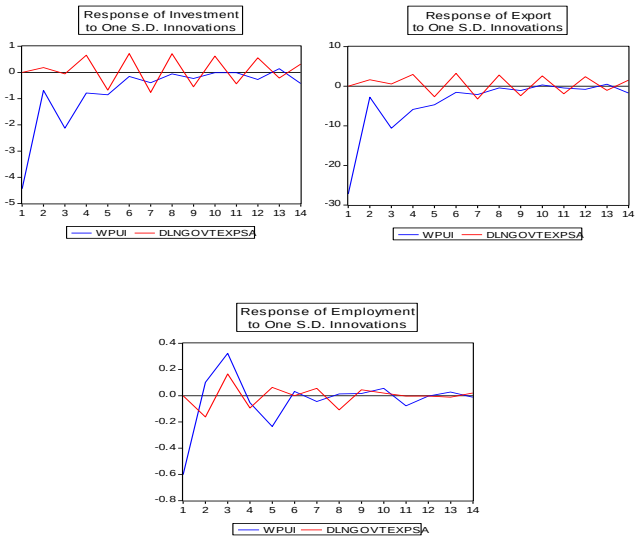

Figure 20: The Role of Expansionary Government Expenditure to Promote Investment, export and employment

4.7.2. The Role of Reducing Import Tariffs (Import Policy) on Macroeconomic Stability

To enhance the potency expansionary fiscal policy intervention to stabilize the economy, increased public expenditure has to be complemented by import policies/regulations/procedures. An important instrument of expansionary fiscal policy in this regard is reducing import tariffs. Reduction of tariff should be directed toward key ventures in the supply chain in the import supply of consumption and investment goods.

The role of import policies to complement fiscal policy measures can be explained in to two. For one, by reducing the transaction cost in import sector, complementary import policies would have positive spillover effect in final prices thereby mitigating inflation. On the other hand, complementary import policies would help facilitate importing consumption and investment goods, hence mitigate the inflationary effects of expansionary fiscal policy by keeping the balance of aggregate demand and supply.

The role of import policy to stabilize prices is depicted in the IRF graphs below

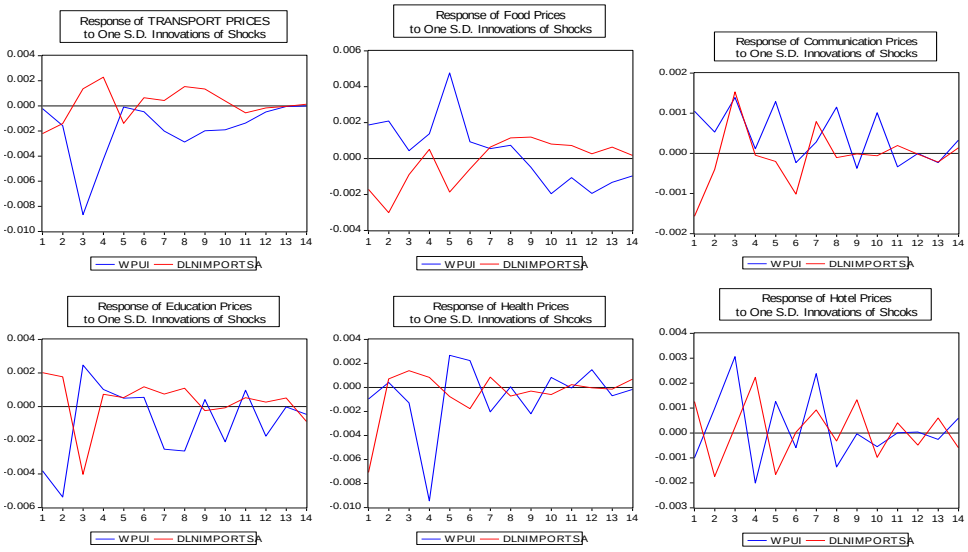

Figure 21: The Role of Import Policies to stabilize prices (both food and non-food Prices)

Beyond its price stabilization outcomes, a managed and viable import policy can also have positive outcome in spurring investment and export, hence widening employment opportunities in the economy (see IRF graphs below).

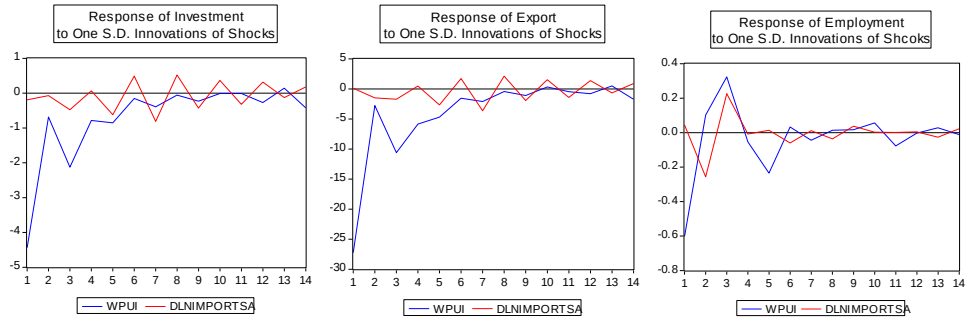

Figure 22: The Role of Import Policies to Promote Investment, export and employment

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study investigated the impact of COVID-19 pandemic uncertainty shock on the macroeconomic stability of Ethiopia. The World Pandemic Uncertainty Index (WPUI) was used a proxy variable to measure COVID-19 Uncertainty shock effect. The pandemic effect on core macroeconomic variables like investment, employment, prices (both food & non-food prices), import, export and fiscal policy indicators was estimated and forecasted. The role of fiscal policy in mitigating the shock effect of coronavirus pandemic on macroeconomic stability is also investigated.

5.1.Conclusion

The finding of the study reveals that the COVID-19 impact lasts at least three years to shake the economy of Ethiopia.

Essentially the COVID-19 immediate impact was on international transactions, and in the Ethiopian context, where the country relies heavily on import for the service of consumption and investment demands. Hence, the impact is expected to take its toll via import channel in the immediate aftermath of the outbreak of the pandemic.

The VAR estimate indicates that COVID-19 uncertainty shock results a massive rise in import in the six months following the outbreak of the pandemic. The finding in this regard is expected, as the pandemic triggers massive demand in food and pharmaceuticals, for which Ethiopia is import dependent on both items. In the next two years, however, the import bill of Ethiopia shows a decline. Reduction in aggregate demand (both consumption & investment expenditures) is one explanation for decline in import size in 2013 and 2014 E.C.

The price dynamics as forecasted in the upcoming three years in Ethiopia tells the direction of impacts of COVID-19 uncertainty shock to shake the macroeconomic order. The findings in this regard revealed the structural breakups of Ethiopian economy, characterized by its inability to withstand shocks. As signaled in forecasted price dynamics on both food and non-food price indices, COVID-19 was a supply shock in its first time impact, but quickly trans-passes to demand shock. And in the next few years the demand shock outweighs the supply shock.

The results of estimations indicate that food prices to sky rocketed at least until the end of 2014 E.C (2021/22). On the other hand, except communication & hotel & restaurant prices, other components of non-food price indices show a slump. The decline in non-food price level is a clear showcase of under-consumption characterizes the economic order in Ethiopia in the coming three years.

COVID-19 uncertainty shock puts huge loss in the investment sector in Ethiopia at least in the coming two years 2013 and 2014 E.C (2020/21-2021/22). In this regard, the pandemic effect transmitted to shake investment expenditure via the length of the pandemic period itself and export performances, both of which are exogenous shocks.

Employment declines up until the sixth quarter, but shows a slight increase between the sixth and eighth quarter of forecast. The uncertainty impact of COVID-19 on employment dies-off after the tenth quarter. The finding of the study further reveals that price stabilization policies both in food and non-food markets are integral elements in promoting investment.

Findings from VAR estimation suggest that fiscal policy can help stabilize both food and non-food prices in the next three years at least. A particular role of government spending in stabilizing prices goes to food market and in the transport sector. Moreover, the study found out that price stabilization policies have spillover effects in boosting investment, promote export and enhancing the scope of the economy in terms of creating employment opportunities.

5.2.Policy Recommendations

The study identified that general under consumption features the Ethiopian economy in the next couple of years. Therefore, the government is expected to enact incentives/policy directions which can boost business confidence. In this regard, government expenditures on consumption and capital goods would heal the damage cost of COVID-19 uncertainty shocks on aggregate demand thereby promoting investment & consumption expenditures. The finding of the study suggests for a managed expansionary fiscal policy to promote investment induced employment and stabilize food & non-food prices.

Policies that aim to stabilize food price should focus in providing economic incentives to those agents in food supply chain thereby increasing their production capacity. Price stabilization

interventions in the food market can also be achieved through strategies that identify key agents in the supply chain most affected by the pandemic shock, and channel subsidies in those lines

Moreover, the government has to encourage merchandise imports to avoid inflationary effects of expansionary fiscal policy in basic consumption and investment goods as a result of supply shortfalls. In this regard, incentivizing the transport and logistics sector can help fix major fallouts of the economy as result of COVID-19 uncertainty shock effect on supply chain. Policy interventions can manage on that through combined legal, bureaucratic and financial policies/strategies/directives that helps facilitate for an efficient export-import trade, which is key to mitigate macroeconomic instability thereby narrowing the gap in aggregate demand and supplies on consumption and investment goods.

Finally, while servicing its rising expenditures, the government has to see viable options of financings. As such, financing public expenditures should be in a way that would not pressurize the prospect of the economy in medium and long run. As part of the broader interventions in the economy through divergent policy instruments, fiscal optimization should also be considered in a way retargeting or reprogramming possible on already running public projects/programs when the need arises.

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ANNEXES

1. Variance Decomposition of VAR Model Variables

Table: Variance Decomposition of Investment (DLNINVSTSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	96.72666	0.181694	0.180589	0.167224	0.037255	0.355380	0.303039	0.011469	2.036689	0.000000	0.000000	0.000000
2019/20 Q4	68.94993	0.143344	9.702423	1.195948	3.099077	2.087962	1.479534	1.956130	4.480078	6.494478	0.294956	0.116143
2020/21 Q1	69.27280	0.755810	8.582094	2.514877	2.543545	2.916416	1.749504	1.605789	4.031501	5.377904	0.545890	0.103874
2020/21 Q2	64.29357	0.695487	7.946416	2.362598	2.481892	2.646481	1.664354	2.214082	8.725586	5.086763	0.689938	1.192835
2020/21 Q3	59.71743	1.510778	8.719084	2.136823	2.948466	3.565874	2.204001	2.684801	9.108169	4.638701	0.642550	2.123325
2020/21 Q4	56.02121	1.933585	8.331613	3.144053	2.768690	3.644535	2.162966	3.175161	10.56944	4.437025	0.712548	3.099171
2021/22 Q1	52.71757	3.134248	9.129114	3.223287	2.752885	3.669733	2.711551	3.413406	10.28139	4.233128	0.670087	4.063596
2021/22 Q2	49.98476	3.488003	8.656034	3.124750	2.774954	3.980655	2.710864	4.178281	11.31062	4.108035	0.860957	4.822080
2021/22 Q3	47.90103	3.669959	8.564940	3.128241	2.678046	4.021194	3.325837	5.324464	11.17541	4.154721	0.897488	5.158669
2021/22 Q4	45.92849	3.751616	8.219462	3.000143	2.661243	3.930639	3.367493	6.180190	11.82540	3.994241	1.520627	5.620456
2022/23 Q1	44.44416	3.804044	8.149823	3.202670	2.976547	3.855276	3.954308	6.674138	11.64444	3.915139	1.620606	5.758846
2022/23 Q2	43.08816	3.843599	7.939893	3.096995	3.129917	3.727500	4.512297	7.162692	11.79624	3.785731	1.842956	6.074020
2022/23 Q3	42.57497	3.820925	7.891144	3.254205	3.171202	3.685523	4.767612	7.359603	11.73619	3.764810	1.902972	6.070847
2022/23 Q4	42.29762	3.822093	7.877432	3.244311	3.219499	3.639011	4.935012	7.379236	11.75952	3.722566	1.952142	6.151554

Table: Variance Decomposition of Employment (DLNEMPLOYGSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	32.81768	0.181431	2.374806	0.118384	7.358012	3.662168	0.360061	0.083929	37.70209	12.89473	2.446710	0.000000
2019/20 Q4	25.86378	4.720976	2.886617	1.460286	5.924564	3.813014	0.557741	5.619721	33.88483	11.35699	2.095295	1.816181
2020/21 Q1	25.54007	6.381157	3.382021	2.235328	4.708307	2.979930	2.079591	5.286313	26.92200	14.62950	2.979868	2.875910
2020/21 Q2	24.64569	6.124328	3.266507	2.651974	5.911067	3.395123	2.344434	5.075907	25.83460	14.21178	3.332996	3.205593
2020/21 Q3	24.80601	5.537587	3.152198	2.414565	5.684656	3.288320	2.123666	7.634908	25.11154	13.97821	3.185127	3.083216
2020/21 Q4	23.78852	5.460160	3.480560	2.480061	6.337815	3.741046	2.073923	8.374338	24.47864	13.55504	3.279080	2.950811
2021/22 Q1	23.27026	5.327558	3.556654	2.818198	6.820206	3.648578	2.051032	8.192899	24.28627	13.21885	3.795362	3.014135
2021/22 Q2	22.29765	5.157669	3.489187	2.830322	8.411309	3.554974	3.131268	7.954318	23.33344	12.83107	3.639761	3.369032
2021/22 Q3	22.01285	5.146196	3.458864	2.824873	8.425422	3.569450	3.686384	8.151428	23.06093	12.66092	3.594022	3.408666
2021/22 Q4	21.97770	5.107931	3.441733	2.893519	8.603263	3.696008	3.704383	8.097902	22.89493	12.59700	3.585408	3.400226
2022/23 Q1	22.01268	5.060714	3.427911	3.017141	8.883683	3.661961	3.679202	8.134353	22.71828	12.48277	3.552311	3.368997
2022/23 Q2	21.93385	5.043434	3.433905	3.006416	9.034208	3.657771	3.748844	8.113749	22.63687	12.46524	3.568672	3.357049
2022/23 Q3	21.89603	5.055199	3.436755	3.010099	9.190573	3.646275	3.742605	8.088771	22.59400	12.42555	3.562553	3.351591
2022/23 Q4	21.82092	5.056375	3.439906	3.004664	9.250233	3.652730	3.789803	8.139501	22.52849	12.41140	3.549553	3.356426

Table: Variance Decomposition of Food Prices (DLNCPIFSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	1.484696	1.251321	20.97722	76.28677	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2019/20 Q4	2.023406	3.084078	20.16925	67.69093	3.689483	0.448324	0.004534	0.031035	0.222257	0.016126	0.471635	2.148946
2020/21 Q1	1.464611	2.325667	18.24300	53.99235	2.711727	14.13150	1.471988	1.231774	0.229802	0.105091	0.387595	3.704895
2020/21 Q2	1.491999	1.956365	16.80880	44.88635	6.341650	17.71915	5.725991	1.016431	0.334444	0.212177	0.319558	3.187088
2020/21 Q3	4.241488	2.145813	16.82190	39.99442	6.505751	17.60914	7.286821	0.887670	0.761083	0.236747	0.747106	2.762057
2020/21 Q4	4.100636	2.061495	16.45907	38.93783	6.183357	17.57612	7.415059	0.856240	2.062781	0.359105	1.384657	2.603651
2021/22 Q1	3.955083	2.018058	15.93549	38.32525	6.066235	18.32140	7.100376	1.037834	2.392059	0.646648	1.697215	2.504363
2021/22 Q2	3.859745	2.086552	15.30774	37.75723	5.992122	18.20128	6.915047	1.019466	2.488387	1.521661	2.289569	2.561194
2021/22 Q3	3.788950	2.190558	15.02449	37.67110	5.951339	17.75766	6.744151	1.051722	2.871464	1.913570	2.304618	2.730381
2021/22 Q4	4.103301	2.206445	14.72371	37.55592	5.908297	17.43247	6.675515	1.190304	3.061783	1.915427	2.259817	2.967007
2022/23 Q1	4.162663	2.231056	14.54681	37.39129	5.872530	17.38542	6.654859	1.215390	3.136757	1.891440	2.229002	3.282782
2022/23 Q2	4.513992	2.216872	14.48824	37.11430	5.821427	17.44642	6.662009	1.203615	3.114693	1.876568	2.211775	3.330081
2022/23 Q3	4.651703	2.237885	14.49007	36.82220	5.890879	17.43318	6.702034	1.252034	3.085828	1.860728	2.201272	3.372192
2022/23 Q4	4.710170	2.223250	14.54104	36.55183	5.865435	17.48896	6.748573	1.242173	3.144232	1.855481	2.275822	3.353035

Table: Variance Decomposition of Transport Prices (DLNTRANSPOSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	0.015146	1.590285	98.39457	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2019/20 Q4	0.469260	1.266030	78.05321	5.657559	0.115308	2.403753	1.313027	1.645225	6.938632	0.893681	0.832776	0.411544
2020/21 Q1	9.077793	1.019017	50.09429	3.675606	1.267940	22.42032	2.930794	1.272207	5.471548	1.520532	0.926534	0.323415
2020/21 Q2	9.263305	1.348262	41.64728	6.612315	1.714855	24.65908	2.538844	1.287657	6.862110	1.481228	1.329823	1.255239
2020/21 Q3	8.260395	1.368367	37.14357	11.79312	3.777651	22.16630	3.440743	1.176215	6.719316	1.507309	1.300737	1.346276
2020/21 Q4	7.965973	1.352309	35.74275	12.33580	3.805997	21.57270	3.446856	1.161856	7.109158	1.501427	1.744496	2.260682
2021/22 Q1	8.070112	1.329598	34.75613	12.17988	5.263641	21.10792	3.541170	1.169582	6.964048	1.587902	1.782295	2.247723
2021/22 Q2	8.478729	1.476317	33.87043	11.86849	5.949270	20.48400	3.969668	1.345672	6.804377	1.730572	1.729579	2.292898
2021/22 Q3	8.654483	1.593740	33.67931	11.86138	5.866336	20.20729	4.059269	1.428375	6.721972	1.733089	1.808444	2.386312
2021/22 Q4	8.739889	1.570507	33.24744	11.62375	6.331864	20.31842	4.028657	1.438334	6.613079	1.723522	1.826223	2.538314
2022/23 Q1	8.795600	1.578096	32.94959	11.52275	6.311386	20.70282	4.004345	1.424617	6.554207	1.790950	1.848526	2.517108
2022/23 Q2	8.760483	1.570726	32.76348	11.50168	6.427471	20.70096	4.039709	1.422534	6.611892	1.827335	1.871542	2.502182
2022/23 Q3	8.709439	1.561612	32.61346	11.48192	6.518379	20.66002	4.115031	1.416185	6.696017	1.839703	1.885363	2.502866
2022/23 Q4	8.677728	1.557231	32.55929	11.54139	6.494985	20.60073	4.120923	1.412137	6.743343	1.847021	1.935705	2.509519

Table: Variance Decomposition of Communication Prices (DLNCOMMUNISA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	1.306594	2.913768	1.553042	1.223781	93.00281	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2019/20 Q4	1.184220	2.243507	2.024281	1.011701	69.73485	0.663792	20.44030	0.049664	0.166179	1.976667	0.340701	0.164133
2020/21 Q1	2.220124	3.323953	3.085897	5.114490	65.48487	0.850507	16.12998	0.329310	0.177325	1.569151	1.426081	0.288317
2020/21 Q2	1.983036	2.958803	2.750410	6.234255	59.52906	0.801370	17.34591	0.634479	1.392619	3.876565	1.702911	0.790588
2020/21 Q3	2.741222	2.750946	2.847796	5.995844	57.18668	0.757964	16.01136	2.893542	1.514381	4.756366	1.679306	0.864596
2020/21 Q4	2.614767	3.130468	2.749199	6.096972	53.96524	0.879338	15.11440	3.439318	1.501137	6.573740	2.726610	1.208812
2021/22 Q1	2.524585	3.282507	2.887348	5.815515	53.90274	0.949155	15.44307	3.291714	1.433580	6.261979	2.859669	1.348134
2021/22 Q2	3.003762	3.108387	2.754757	5.652158	51.78330	1.106617	15.35482	4.571270	1.822806	6.561722	2.703409	1.576991
2021/22 Q3	3.006261	3.045418	2.780904	5.539998	51.38073	1.225121	15.07870	5.184763	1.931142	6.455179	2.825204	1.546581
2021/22 Q4	3.423033	3.003296	2.811742	5.843880	50.67320	1.213734	14.86927	5.131035	2.027922	6.495549	2.980941	1.526398
2022/23 Q1	3.389782	2.947321	2.797634	5.980022	50.96068	1.223957	14.83900	5.044529	1.987180	6.350273	2.910152	1.569470
2022/23 Q2	3.372079	2.932152	2.805675	5.973376	50.71527	1.218195	15.06904	5.027067	2.018696	6.357601	2.927635	1.583212
2022/23 Q3	3.366041	2.927463	2.802055	5.926168	50.78587	1.327561	14.98169	5.015501	2.037120	6.312294	2.905379	1.612856
2022/23 Q4	3.391563	2.917393	2.785596	6.013646	50.46844	1.333344	14.98523	5.234623	2.034782	6.301882	2.895063	1.638436

Table: Variance Decomposition of Education Prices (DLEDUCATISA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	3.262227	0.912424	12.28619	2.984353	0.815186	79.73962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2019/20 Q4	7.972524	1.323996	10.07189	2.624789	1.397171	68.59687	4.299221	0.187995	3.139038	0.136099	0.204560	0.045849
2020/21 Q1	7.414352	3.506517	8.834691	7.648257	3.314057	57.50959	3.545379	0.163341	4.735216	0.115693	2.938243	0.274661
2020/21 Q2	7.113784	3.371109	8.304176	7.658096	5.203923	54.04734	4.667698	0.723486	5.086413	0.108810	3.293112	0.422054
2020/21 Q3	6.835212	3.261976	8.289246	7.322635	5.490567	51.83910	4.465197	1.021443	4.864315	2.796261	3.401385	0.412662
2020/21 Q4	6.388654	3.204233	7.826407	7.537932	7.920920	48.20265	4.337926	3.095366	4.717277	2.717895	3.515472	0.535264
2021/22 Q1	7.015960	3.195139	7.725836	7.716876	7.737937	47.13788	4.308998	3.091878	4.774787	2.661118	4.017171	0.616425
2021/22 Q2	7.330583	3.113663	7.533150	7.702025	10.20102	44.03732	4.372675	3.289687	4.853477	2.488014	3.923177	1.155209
2021/22 Q3	7.250268	3.077720	7.438717	7.677712	10.09406	43.49970	4.792596	3.757879	4.789084	2.538808	3.920664	1.162789
2021/22 Q4	7.596041	3.020817	7.386105	7.587556	10.15653	43.14570	4.896665	3.925317	4.703923	2.491668	3.928364	1.161312
2022/23 Q1	7.593040	3.009090	7.294391	7.631096	10.57875	42.61593	4.974977	3.908828	4.697705	2.514530	4.012706	1.168956
2022/23 Q2	7.790007	2.965035	7.456205	7.595829	10.68590	42.04005	5.252290	3.859504	4.700350	2.480908	4.023175	1.150746
2022/23 Q3	7.764154	2.983224	7.514548	7.592500	10.66262	42.01209	5.237195	3.892142	4.692360	2.473965	4.010647	1.164565
2022/23 Q4	7.721316	3.039852	7.452781	7.581772	10.64125	41.70213	5.230215	4.001428	4.862523	2.459093	4.058848	1.248791

Table: Variance Decomposition of Hotel & Restaurant Prices (DLNHOTELRESA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	0.868584	1.388432	7.206950	31.77179	6.010263	18.93382	0.701398	33.11877	0.000000	0.000000	0.000000	0.000000
2019/20 Q4	1.128624	2.655650	6.219459	20.95713	4.239690	22.10467	3.463799	35.76765	2.465294	0.002671	0.852418	0.142947
2020/21 Q1	4.968094	2.045856	5.523081	17.87552	3.410059	25.67373	3.058949	28.10166	4.972472	0.028781	3.899861	0.441938
2020/21 Q2	5.290020	3.320743	6.529164	14.08376	10.86563	20.26430	5.395628	22.45639	4.737631	1.553635	3.433609	2.069488
2020/21 Q3	5.250009	3.840874	6.047045	14.05636	9.888232	18.65912	9.216429	21.22795	4.846618	1.501365	3.171416	2.294585
2020/21 Q4	5.236598	3.754940	5.961522	14.00095	9.978417	18.43529	9.359129	20.79442	5.005701	1.482941	3.744393	2.245695
2021/22 Q1	6.644358	3.836590	5.801501	13.58272	10.91376	17.73753	9.398977	19.88240	4.784649	1.433747	3.580689	2.403081
2021/22 Q2	7.038073	3.790454	5.871943	13.32509	11.00905	17.79106	9.482376	19.50073	4.734812	1.445221	3.540824	2.470383
2021/22 Q3	6.939787	4.230788	5.874554	13.14757	10.85803	17.54402	9.349655	19.58577	4.802013	1.425065	3.496174	2.746583
2021/22 Q4	6.924317	4.432332	5.793473	12.96166	10.71124	17.35935	9.235909	19.78140	5.026740	1.407610	3.552741	2.813227
2022/23 Q1	6.773747	4.380341	5.703375	12.68920	10.52236	17.27586	9.137166	20.20104	5.274321	1.537859	3.561317	2.943426
2022/23 Q2	6.612961	4.337451	5.586962	12.39456	10.33643	16.89179	9.017183	20.60390	5.777758	1.501291	3.833066	3.106649
2022/23 Q3	6.511943	4.353341	5.608501	12.27024	10.23095	16.63956	9.237411	20.72928	5.801279	1.478102	3.930801	3.208597
2022/23 Q4	6.487315	4.365207	5.543977	12.06661	10.32309	16.34684	9.411276	20.67590	5.907686	1.452309	4.030310	3.389489

Table: Variance Decomposition of Health Prices (DLNHEALTHSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	0.099439	5.337183	10.80450	3.911855	5.397821	0.125980	74.32322	0.000000	0.000000	0.000000	0.000000	0.000000
2019/20 Q4	0.100360	4.597233	9.397350	5.783985	6.847421	0.353427	65.85954	3.410723	0.386881	0.708213	0.558825	1.996040
2020/21 Q1	0.233290	4.435455	8.807536	6.076801	8.650755	1.008209	62.60289	3.432994	0.398048	1.676756	0.615293	2.061975
2020/21 Q2	6.837679	3.953781	8.539330	6.404976	8.395454	1.671852	55.13470	3.916483	0.463835	1.951354	0.542088	2.188470
2020/21 Q3	7.088695	3.844409	8.220855	6.306738	8.674146	1.626862	53.04190	4.108799	0.464309	2.889674	1.605733	2.127881
2020/21 Q4	7.299285	3.988936	8.073138	6.504449	8.624549	2.145044	52.04075	4.181471	0.566006	2.871453	1.611789	2.093130
2021/22 Q1	7.335799	3.904531	8.018009	6.768219	9.316447	2.449844	50.29527	4.731476	0.764093	2.811237	1.557702	2.047379
2021/22 Q2	7.110373	3.818379	8.695539	6.894107	9.171545	3.095453	49.01320	4.858088	0.852669	2.724810	1.695471	2.070366
2021/22 Q3	7.345834	3.782729	8.625114	6.869204	9.071913	3.292676	48.47714	4.897564	1.080099	2.715993	1.792556	2.049173
2021/22 Q4	7.306421	3.762596	8.580467	7.013254	8.970866	3.615466	48.23811	4.917053	1.070183	2.686499	1.773353	2.065729
2022/23 Q1	7.271938	3.748070	8.548152	6.987465	9.240450	3.642603	48.01448	4.895747	1.069705	2.686484	1.818709	2.076200
2022/23 Q2	7.379011	3.732412	8.540084	7.029736	9.226308	3.628591	47.85922	4.877179	1.096518	2.711867	1.849998	2.069076
2022/23 Q3	7.398841	3.728308	8.535813	7.020252	9.276733	3.638854	47.79160	4.877898	1.097147	2.715702	1.850539	2.068313
2022/23 Q4	7.382477	3.748560	8.514912	7.033068	9.258289	3.634602	47.69754	4.928176	1.137413	2.712030	1.856867	2.096071

Table: Variance Decomposition of Government Expenditure (DLNGOVTEXPSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	0.002606	0.370755	0.125376	17.26645	27.66770	0.511366	1.332295	4.042496	2.011381	0.058036	1.796103	44.81544
2019/20 Q4	1.807774	0.914530	0.853521	17.22624	21.98553	2.597692	1.876216	4.670101	2.197219	1.017678	2.800658	42.05284
2020/21 Q1	4.060669	3.884311	0.689954	15.83593	16.12067	5.425980	2.720049	6.511286	2.721395	7.633272	2.282911	32.11357
2020/21 Q2	3.479730	5.801657	0.977124	14.76073	14.89600	4.942023	4.824475	8.254005	2.948414	6.773361	3.458272	28.88420
2020/21 Q3	3.507089	5.105775	1.660696	12.87671	14.73469	4.516446	8.029699	8.502395	2.812365	6.268834	6.084804	25.90050
2020/21 Q4	3.253938	4.615082	1.655665	11.78174	13.66905	4.206176	10.00664	11.25893	3.012638	5.741880	6.808806	23.98945
2021/22 Q1	3.195578	4.422138	1.593255	11.30146	13.14378	4.235419	10.82038	12.46952	2.893403	5.768637	7.130468	23.02596
2021/22 Q2	4.580561	4.246556	1.684925	10.95744	14.00183	4.070778	10.57504	11.97621	2.939719	5.727953	7.125263	22.11372
2021/22 Q3	5.810222	4.096085	1.789017	11.02802	14.51164	3.973642	10.60861	11.64082	2.866151	5.532677	6.874421	21.26868
2021/22 Q4	6.036260	4.100878	1.806649	10.99404	14.37890	3.954830	10.66023	11.75409	2.869995	5.478269	6.893961	21.07190
2022/23 Q1	5.907866	4.122797	1.773153	10.92912	14.19643	3.960672	10.55135	12.40283	3.112456	5.412455	6.880224	20.75065
2022/23 Q2	5.764821	4.065011	1.735943	10.75401	13.85809	4.007401	10.43748	13.35496	3.362108	5.325440	6.987369	20.34737
2022/23 Q3	5.742432	4.035837	1.767700	10.52392	13.60638	4.046195	10.34537	13.89863	3.593457	5.212374	7.175441	20.05226
2022/23 Q4	5.801479	4.034560	1.824318	10.38474	13.71351	3.994545	10.38059	13.98101	3.729466	5.110871	7.259652	19.78526

Table: Variance Decomposition of Export (DLNEXPORTSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	99.96526	0.001656	0.001416	4.60E-05	0.000215	0.000611	0.011992	1.73E-05	0.005056	0.013733	0.000000	0.000000
2019/20 Q4	74.70264	0.225329	8.715148	2.210869	2.341179	2.183879	0.477018	1.543096	1.222187	5.311597	0.802815	0.264247
2020/21 Q1	75.03030	0.456795	7.769942	3.271313	2.044217	2.240516	0.815694	1.347447	1.203375	4.640664	0.921484	0.258250
2020/21 Q2	71.29304	0.436100	7.222232	3.077438	1.967484	2.047797	0.754828	1.923532	4.831325	4.522607	0.985888	0.937730
2020/21 Q3	68.11947	0.933024	8.016840	2.882397	2.175371	2.774535	1.234928	2.039247	5.274345	4.228164	0.919956	1.401723
2020/21 Q4	65.41283	1.103889	7.825029	3.662869	2.089915	2.801187	1.261134	2.298715	6.426030	4.110030	0.918546	2.089823
2021/22 Q1	62.97693	1.962239	8.472919	3.666241	2.041766	2.864294	1.681515	2.407625	6.354952	3.958853	0.900285	2.712386
2021/22 Q2	61.16318	2.202993	8.236165	3.674584	2.041428	3.220223	1.656306	2.720667	7.070500	3.896019	0.957567	3.160365
2021/22 Q3	59.61979	2.382802	8.242514	3.672570	2.002322	3.293025	2.026388	3.294861	7.114914	3.955419	0.949347	3.446053
2021/22 Q4	58.13579	2.469608	8.036879	3.581481	1.990729	3.302488	2.055810	3.832887	7.650596	3.859629	1.302645	3.781454
2022/23 Q1	56.98968	2.545402	8.002110	3.671908	2.106306	3.274193	2.463062	4.229902	7.609186	3.818729	1.356804	3.932720
2022/23 Q2	55.79609	2.604594	7.849104	3.594210	2.207720	3.208285	2.790579	4.631004	7.840507	3.736226	1.543817	4.197860
2022/23 Q3	55.26807	2.606312	7.819241	3.678535	2.252217	3.186137	2.997323	4.827813	7.833457	3.725194	1.583714	4.221983
2022/23 Q4	54.87044	2.626116	7.791079	3.652678	2.291204	3.153545	3.136755	4.909533	7.924932	3.691240	1.638509	4.313965

Table: Variance Decomposition of Import (DLNIMPORTSA)

Period	WPUI	DLNIMPORTSA	DLNTRANSPOSA	DLNCPIFSA	DLNCOMMUNISA	DLNEDUCATISA	DLNHEALTHSA	DDLNHOTELRESA	DLNINVSTSA	DLNEXPORTSA	DLNEMPLOYGSA	DLNGOVTEXPSA
2019/20 Q3	1.413923	98.58608	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2019/20 Q4	10.72404	72.88670	0.415412	6.631310	0.533876	1.926921	3.266005	0.121566	0.160990	1.397614	0.854051	1.081518
2020/21 Q1	11.16262	51.17584	2.794023	16.08950	1.607234	1.412162	5.687036	3.953404	1.123481	1.296195	0.657758	3.040745
2020/21 Q2	8.778418	40.11125	2.622166	13.56470	2.056388	7.281859	8.362920	8.653029	2.528302	1.516701	1.187679	3.336588
2020/21 Q3	6.979149	31.82571	2.049936	10.51924	3.381349	18.82230	7.002582	9.515807	4.057059	1.411655	1.836931	2.598291
2020/21 Q4	6.666524	29.21348	2.936035	9.654771	5.178472	18.49731	6.896755	10.00809	4.778771	1.320012	1.889730	2.960051
2021/22 Q1	7.351943	28.29524	3.022636	10.01983	4.879444	17.43388	8.058758	9.918608	4.582245	1.387935	1.851636	3.197852
2021/22 Q2	7.550702	27.95910	3.187923	10.06304	4.784255	17.01291	8.331897	9.739253	4.479473	1.443864	2.015219	3.432369
2021/22 Q3	7.806046	27.49415	3.244552	9.942242	5.575448	16.84769	8.175885	9.609432	4.399277	1.470487	2.005391	3.429400
2021/22 Q4	7.930973	27.34061	3.255466	9.925946	5.570843	16.75425	8.296819	9.669578	4.385291	1.464388	1.994948	3.410893
2022/23 Q1	7.915997	27.36835	3.269719	9.901258	5.554534	16.73952	8.282550	9.647216	4.372903	1.462489	2.048719	3.436739
2022/23 Q2	7.937480	27.35854	3.258556	9.864268	5.679714	16.73461	8.251796	9.616828	4.357587	1.457270	2.047319	3.436033
2022/23 Q3	7.944664	27.30027	3.253412	9.847755	5.675294	16.70769	8.278645	9.643269	4.385317	1.481217	2.042364	3.440097
2022/23 Q4	7.916484	27.21082	3.245966	9.815380	5.661446	16.64696	8.252188	9.756087	4.504417	1.476152	2.052638	3.461454

2. Estimated Data Set

ETHIOPIAN FISCAL YEAR, E.F.Y)	CPI-Food	CPI Health	CPI Transport	CPI-Communication	CPI-Education	CPI Restaurants and Hotels	Export	Import	. Investment Expenditure (domestic & Foreign)	Total Employment	WPUI	Gov`t Expend
2001 Q1	48.1						3,388,420,000.0	24,931,900,000.0	31,497,000,000	391,994	0.0	12,257,300,000.0
2001 Q2	44.1	37.1	48.2	107.4	47.5	30.5	2,670,722,000.0	19,682,800,000.0	28,510,000,000	240,960	0.0	12,361,600,000.0
2001 Q3	40.9	38	52.1	106.4	49	31.7	4,398,807,000.0	20,431,400,000.0	28,420,000,000	266,728	0.0	12,926,900,000.0
2001 Q4	41.3	38.8	46.5	105.3	49.6	32.8	4,748,720,000.0	19,631,100,000.0	142,250,000,000	266,489	0.0	20,228,500,000.0
2002 Q1	41.9	41.1	48.4	104.1	51.4	33.7	4,235,293,000.0	21,931,900,000.0	28,047,000,000	181,310	0.0	14,624,400,000.0
2002 Q2	41	42.5	55	103.4	53.9	35.2	4,661,167,000.0	29,280,300,000.0	21,213,410,000.00	170,630	0.0	16,279,000,000.0
2002 Q3	40.9	43.9	60.2	104.8	55.6	36.9	7,380,482,000.0	30,274,900,000.0	23,548,970,000.00	169,220	0.0	17,512,300,000.0
2002 Q4	41.1	46.4	62.4	103	57.3	37.8	9,838,364,000.0	27,469,200,000.0	23,785,400,000.00	179,657	0.0	22,919,100,000.0
2003 Q1	41.7	47.8	65.3	101.1	57.7	38.8	8,126,813,000.0	27,929,400,000.0	39,013,200,000.00	222,501	0.0	19,521,500,000.0
2003 Q2	43.7	47.9	65.7	100.4	61.3	39.6	9,067,751,000.0	36,215,600,000.0	12,087,200,000.00	98,890	0.0	19,048,400,000.0
2003 Q3	48	50.2	72.5	100.7	72.3	42.4	12,685,567,000	32,559,500,000.00	160,359,800,000.00	248,822	0.0	20,731,200,000.00
2003 Q4	57.4	51.5	83.8	100.3	72.3	43.9	14,645,434,000.0	32,988,900,000.0	17,933,900,000.00	137,004	0.0	34,530,200,000.0
2004 Q1	62.4	52.9	96.6	100	74.5	48.9	12,799,320,000.0	39,434,000,000.0	30,371,000,000	128,519	0.0	20,647,100,000.0
2004 Q2	65.4	54.2	97.2	99.5	77.8	53.1	10,196,362,000.0	45,452,000,000.0	31,959,000,000	86,842	0.0	27,946,300,000.0
2004 Q3	69.5	55.6	94.7	99.2	82.7	56.3	14,165,205,600	56,843,000,000.0	35,434,000,000	159,839	0.0	26,338,300,000.0
2004 Q4	75.4	56.8	96.9	99.1	82.6	59.6	16,980,993,120.0	49,121,000,000.0	12,976,000,000	65,627	0.0	29,855,300,000.0
2005 Q1	77.6	58	97.5	99.1	85.1	63.1	12,477,356,900.0	45,693,890,000.0	31,890,000,000	123,507	0.0	22,768,675,000.0
2005 Q2	76.3	59.4	97.1	99.1	84.1	66.2	12,944,326,600.0	59,269,417,000.0	23,007,000,000	68,901	0.0	22,768,675,000.0
2005 Q3	75.7	70.3	98.5	99.2	84.1	68.9	14,875,846,900	45,978,695,000.0	26,065,000,000	76,801	0.0	22,768,675,000.0
2005 Q4	77.5	71.1	95.6	99.1	85.3	70.6	15716795600	45,929,013,000	29,310,000,000	96,699	0.0	22768675000
2006 Q1	81.2	73.3	95	99.1	86.7	72.9	11,825,143,600.0	54,693,000,000.0	21,456,000,000	116,666	0.0	30,769,400,000.0
2006 Q2	81.4	72	94.6	99.1	86.7	76.1	12,905,388,400.0	66,084,000,000.0	50,236,500,000.00	88,174	0.0	41,515,600,000.0
2006 Q3	79.7	77.7	96.7	99.1	86.7	78.1	18,715,013,900.0	70,690,000,000.0	39,764,700,000.00	206,258	0.0	43,187,900,000.0
2006 Q4	82.9	80.2	98.5	99.1	86.7	78.8	18,797,453,600.0	70,370,000,000.0	14,137,000,000.00	138,999	0.0	69,998,800,000.0
2007 Q1	85.2	82.9	99.2	99.1	86.9	80.3	14,213,754,800.0	72,347,869,000.0	162300000	2,061	34.5	45,122,000,000.0
2007 Q2	85.3	82.5	99	99.3	87.7	81.3	12,777,498,800.0	87,639,117,000.0	73900000	1,281	0.0	54,825,700,000.0
2007 Q3	86.9	83.8	99.3	99.1	87	81.7	14,596,391,330.0	84,662,746,000.0	67500000	6,207	24.2	52,403,900,000.0
2007 Q4	92.1	86.7	96.3	99.6	87.1	83.3	14,460,828,720.0	86,144,501,000.0	608500000	7,665	14.5	72,403,900,000.0
2008 Q1	97.9	86.1	94.8	101.2	87.2	85.4	12,471,120,400.0	85,408,968,000.0	3,750,000,000.0	10,364	8.1	42,685,900,000.0
2008 Q2	96.9	87.6	96.5	103.9	91.4	88	10,598,336,690.0	87,288,459,000.0	54,300,000.0	1,133	0.0	66,670,500,000.0
2008 Q3	95.2	92	98.2	101.3	99.8	90.8	13,961,929,090.0	92,644,720,000.0	77,200,000.0	184	7.3	62,271,700,000.0
2008 Q4	98.7	93.8	97.2	100.3	99.8	92.6	15,331,192,670.0	87,671,709,000.0	1,752,700,000.0	4,336	0.0	101,302,000,000.0
2009 Q1	102.6	97.4	97	101.5	99.9	94.9	12,323,039,260.0	88,878,692,000.0	6181700000	7,811	0.0	51,957,800,000.0

2009 Q2	101.3	95.1	98.1	99.7	100	97.6	10,698,282,950.0	87,611,064,000	963,000,000.0	7,551	7.8	78,881,800,000.0
2009 Q3	103.0	98.8	99.3	99.9	100	99.1	14,634,359,880.0	84,013,849,000.0	864,500,000.0	510	8.0	79,414,900,000.0
2009 Q4	109.5	104.3	103.9	99.8	100	98.1	25,243,562,230.0	93,767,307,000.0	394,300,000.0	1,557	0.0	119,032,300,000.0
2010 Q1	113.9	113.4	104.7	102.1	99.4	101.6	13,216,142,280.0	92,760,976,000.0	668,500,000.0	2,642	0.0	67,926,700,000.0
2010 Q2	116.6	97	106.3	101.7	106	107.9	###############	105,774,738,000.0	612,500,000.00	1,804	0.0	71,685,900,000.00
2010 Q3	118.7	92.9	108.9	103.4	107.5	113.5	16,873,256,770.0	96,527,340,000.0	6,386,400,000.0	6,929	0.0	71,063,400,000.0
2010 Q4	123.1	99.9	111.4	105.9	109.2	114	19,985,363,740.0	99,238,631,000	12990700000	233,013	0.0	63,444,500,000.0
2011 Q1	128.2	101.3	113.2	107.2	110.4	118.6	16,748,621,860.0	100,982,482,000.0	5,886,800,000.0	17,680	0.0	66,651,800,000.0
2011 Q2	128.3	107.2	115.5	106.7	117.5	123.7	15,945,810,490.0	123,391,918,000.0	814,100,000.0	4,089	0.0	90,313,300,000.0
2011 Q3	132.0	110.6	119.7	101.1	125.8	128.1	19,220,672,250.0	100,774,956,000	250,000,000.0	2,437	0.0	99,070,400,000.0
2011 Q4	145.7	116	128.9	101.5	126.3	130.8	###############	98,244,794,000	898500000	6,654	0.0	157,070,300,000.00
2012 Q1	156.6	114.8	132.3	105.5	129.5	135.7	21,030,549,390.0	108,993,105,000	60,700,000.0	112	0.0	87,660,900,000.0
2012 Q2	158.5	120.2	136	105.6	132.6	145.9	18,486,498,200.0	115,423,297,000	99,700,000.0	1,047	0.0	195,048,900,000.0
						152						