Effects of Export Price Volatility on Ethiopia's Economy: Applied General Equilibrium Analysis

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Abstract

This study explored the economy-wide effects of export price volatility on Ethiopia's economy using Applied General Equilibrium model calibrated through 2009/10 Social Accounting Matrix of Ethiopia. Two simulations were developed to capture price volatilities, increase and decrease in export in price. The study revealed that increase in export price appreciates the domestic currency, raises import demand, but it reduces export demand which together worsened the trade balance. The increase in export price also weakens investment demand, government income and saving and the growth of the economy. However, it raises factors return, household income and welfare. Conversely, decrease in export price depreciates domestic currency, which lead to low import and high export demand, which in turn improved the trade balance. It also increases investment demand, government income and saving, and overall economic growth. But, fall in export price results low factors return, household income and welfare. To reduce the negative impacts of export price volatility in the overall economy, it is suggested that: a) exchange rate policy of the country should be managed-floating type, b) diversification and industrialization of export sector through integrating commodity policies into the country overall development strategy, and c) harness the income gains from commodity prices to facilitate wider-economic transformations and reduction of dependence on primary commodities export.

Keywords: Ethiopia, Export price Volatilities, General Equilibrium Model, and Social Accounting Matrix.

1. Introduction

The growing integration of countries into the global economy brought a paradigm shift in the global economy. It promotes specialization, rise productivity, economies of scale and accessibility of technologies which enhance economic growth and poverty reduction (UNCTAD, 2008). Conversely, it brought risks related to external economic shocks through trade and capital flow that increase trade imbalance, financial market volatility and less usefulness of domestic policy (IMF2008; SIDA2007).

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The impacts of external economic shocks differ between countries depending on the degree of their openness.[1] Most developing countries, including SSA are small open economies which make them price taker in the global market (WB, 2008). Thus, its impact is strong in open, smaller and less varied economies than advanced countries (UNOHR, 2014).The export structure of LDCs is dominated by semi-processed or unprocessed commodities (Agenor and Montiel, 2008). Moreover, they exhibitthat trade shock is the sourcesof macroeconomic instability and variabilityof export pricein these countries. Also, UN (2014) revealexport and import price volatility of LDCs causes variabilityofincome due to large share ofimport and export in domestic economic activities. The impacts of external economic shocks can transmit through FDI, aid, trade, remittance, capital market and banking sectors(Ho, 2016). Trade is animportant transmission mechanism of external economicshocksin vis-à-vis Ethiopia (Getnet, 2010).The value o Ethiopia export isnot increase or decrease constantly, ratherit changes inline with global economic conditions. ATPC (2006)showed that Ethiopia export items are primary commodities characterized by high price volatility which worsen its vulnerability to external shocks. Given this Ethiopia is plan to become lower middle-income country by 2025 with poverty reduction, narrowing of fiscal and trade imbalance and structural transformation of the economy. Therefore, a study which examines the impacts of export price shocks has importance to harmonize domestic economic objectives with global economic conditions. Studies undertaken in Ethiopian regarding the impacts of export price shocks using CGE method are limited. Previous studies focus on the determinants of export growth, role of export to economic growth and poverty reduction using PEA that cannot show the direct and indirect impacts of shocks.[2] Besides, as per the researcher knowledge, most studies focus on supply side of export shock by overlooking the demand side. The only study carried out using CGE method is by (Lulit, 2014; Robinson *et al*., 2010), focus on the impacts of increase export price, which is not always the case for LDCs export price. That implies earlier studies fail to show the impacts of 2007-2009 economic crisis that cuts the price of primary commodity. As a result, this study combines both the increase and decrease in export price to investigate its economy-wide effects, which is vital to illustrate the situation of LDCs. To that end, an attempt is made to address the following research questions:

     1. How the macroeconomic indicators respond to export price volatilities?
     2. Do export price volatilities affect the trade balance of Ethiopia?
     3. What are the effects of export price volatilities on household income and welfare?

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[1] The measure of openness is trade share (sum of exports and imports to GDP ratio). By this measure, developing nations tends to be more open than major industrial countries (See: Agenor and Montiel, 2008).

[2] Partial Equilibrium Analysis is based on ceteris paribus assumption which is used to analyze the impact of policy shocks on a particular industry where linkage with other industries is ignored (see: J. Bandara, 1998).

2. Research Methodology

The study employed secondary data collected from various institutions. The SAM databases obtained from IFPRI; data related to economic growth, inflation, government saving and expenditure are collected from NBE. Moreover, population and labor force growth data are accessed from WDI website, and data related to export and import are collected from NBE and accessed from IFM annual report on Ethiopia economy. The main data of the study is 2009/10 SAM of Ethiopia built by IFPRI in collaboration with EDRI and University of Sussex. The initial SAM of Ethiopia is recalibrated to base run using updating mechanisms to reflect the current state of Ethiopian economy without changing its structure.

To realize that, growth rate of population assumes 3%, government consumption 9.4 %, depreciation rate of capital 6%, direct tax3 %, foreign saving 6 %, government saving 5 %, household and enterprise propensity to save4 %.Moreover, labor productivity and TFP growth are sector specific but, average growth rate is given by 2.7 and 5.4 %, respectively. Finally, economy is expected to grow following base run economic paths from 2010-2022fiscal years.

The use of CGE modeling is a suitable method to analyze the economy-wide impacts of exogenous changes. It is also vital to show the interactions of various economic agents and systems in a structured manner (Ermias *et al*., 2011; Hosoe *et al.*, 2010). In this study recursive dynamic CGE model is used which is an extension of IFPRI static CGE model, developed by Lofgren *et al*. (2002). Recursive dynamic CGE model is used based on the assumption that economic agents in Ethiopia have adaptive expectation. The model specification used in this study is taken from Lofgren *et al*.(2002).

Considering the structure of the Ethiopia economy, Leontief technology is used at top of technology nest for the present study. It is known that at the lower level of technology nest, while value added of each activity is specified as a CES function of factors, intermediate demand of each production activity is specified as a Leontief technology of each activities value added. Domestically sold and exported output has an imperfect transformability captured by the constant elasticity of transformation (CET).Similarly, imports from the ROW and output sold in domestic markets are imperfect substitutes captured by CES aggregation function. Therefore, Armington (composite supply) function shows the CES between import and domestic output. System constraint equation shows the mechanism show equilibrium can achieve in goods and factor markets.CGE model closure rules are needed to be satisfied by economic system which includes government, external and saving-investment balance (IMF, 2008). The study assumes factor supply is fixed and free mobility across activities while its economy-wide wage is flexible which equalize demand and supply of factors.

Since, Dynamic CGE model covered from medium to long term time period, in this case factors are assumed fully employed and mobile across sectors.

Considering the study objective, it is assumed that flexible exchange rate and fixed foreign saving. Because, change in export price allowed the exchange rate to vary so. This implies, exchange rate is equilibrating variable of external balance. Considering the fiscal stance of Ethiopia, the study assumes flexible government saving and fixed direct tax rate. In this study'investment-driven' saving closure is chosen where investment adjustment factor is equilibrating variable, whereas domestic no-government and foreign institutions saving rate is fixed. The equations in between period CGE model update exogenous variables which includes rate of capital accumulation, investment, labor, land, TFP, and other exogenous variables because, as documented in Thurlow (2008), across the path of time several policy independent changes will occur. Therefore, to examine the effects of exogenous variables in relation to factors growth and productivity changes, the static CGE model must update to recursive DCGE model (Lofgren and Bonilla, 2006).Labor supply is exogenously determined by population growth rate capital accumulation is endogenously determined through the interaction of saving and investment. The decision to use either CV or EV as appropriate measures of welfares depends on the situations being involved (Wambugu, 2012).CV is appropriate if the modeler is interested to design compensation schemes with new prices. However, EV is used if the modeler is interested to measure the WTP of societies for price changes. As a result, in this study EV is chosen to measure households 'welfare loss or gain from world export price changes. Moreover, positive and negative EV is assumed as welfare gain and loss, respectively.

3. Results and Discussions

Export price is chosen as exogenous variable to design simulation; because, relative to export volume export price is likely to respond quickly to external economic shocks. In addition, export volume can't respond quickly to external shocks due to fixed supply assumption in the short run. The baseline assumes business persists as usual with extension of historical growth from 2010-2022. Two export price simulations are designed based on IMF forecast and GTP-II target of government regarding Ethiopia export. Assuming the target export value in GTP-II is resulting from export price rise, the first simulation, denoted by EXPR1 assumes 29% rise in export price. The second simulation, which is denoted by EXPR2assume low export price growth based on IMF projection of Ethiopia export price. EXPR2 is assumed as negative export price shock;

hence, the price is low relative to base run scenario (5.2%).[3] Thus, EXPR2 is simulated by a3% decrease in export price.

Then, the succeeding section investigates the effect of export price changes on macro economy and industry variables of Ethiopia based on the following assumptions. (a) The unit of measurement in the SAM is billions of ETBs. (b) Initial value presented in table denotes both value and quantity recorded in 2009/10 SAM. (c) The base run show actual performance of the economy that would occur in the absence of external shocks if growth rate of exogenous variables is extension of current growth paths. (d) EXPR1 and EXPR2representssimulation scenarios to increase and decrease in export price, respectively.

3.1 Impacts on Macroeconomic Indicators

The impacts of export price on macroeconomic indicators of Ethiopia are presented in table 1.[4] Comparing initial value with base run, most macroeconomic indicators exhibit improvement in the base run. This indicates, the overall performance of the economy rises relative to the initial value if the economy is growing by base run scenario. However, government saving declines in base run relative to initial value suggesting that government income is less than its spending. Similarly, real exchange rate appreciates in base run relative to the initial level. Likewise, export and import demand increases in base run compared to the initial level. As a result, in the base scenario, the gap between import and export demand is widen relative to the initial level. But, while export price shocks are introduced into, the base value of all macroeconomic indicators turns into new value. Accordingly, deviation from the base run value is the impact of export price changes.

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[3] Base run export price in the study is computed by taking average export price of Ethiopia from 2010-2107 based on IMF projection data.

[4] Absorption is sum of spending made by households, enterprise and government for commodities within a country. Adding net export to absorption gives GDP at market price, and subtracting net indirect taxes from GDP at market price gives GDP at factor cost.

Table 1: Impacts on macroeconomic indicators (% change from initial value)

Indicator	Initial Value	BASE	EXPR1	EXPR2
Absorption	457.74	9.9	16.31	9.58
Private Consumption	338.61	10.18	19.63	9.73
Gross capital Formation	85.49	9.86	1.68	9.19
Government Consumption	31.82	7.45	9.4	9.4
Export demand	52.14	25.1	23.85	24.24
Import demand	-126.51	17.66	38.03	16.36
GDP at Market price	383.36	9.68	8.14	9.65
GDP at Factor cost	354.95	10.02	9.72	9.93
Real exchange rate	90.85	-6.59	-17.21	-5.70
Nominal exchange rate	100	-7.07	-24.65	-6.04
GDP Growth	100	10	9.7	9.9
Government income	67.78	3.66	-2.23	4.14
Foreign Saving	21.7	4.8	6.0	6.0
Government Saving	35.49	-5.02	-13.21	-3.70

Source, Author simulation using DCGE Model

Aggregate private consumption demand rises relative to base run in response to 29% increase in export price. It is apparent that households are main producers of commodities in many developing countries including in Ethiopia. Thus, increase in export price enlarges household income which in turn raises aggregate household consumption demand to commodities. On the other hand, decrease in export priceless ensaggregate household consumption demand caused by the fall in income. In general, the result is in line with the findings of Bazhenova (2016), Rattso and Torvik (1998), Carniero and Arabache (2002), and Blake *et al*. (2001) where increase in export price increase household consumption demand while decrease in export price lessens household consumption demand. Regarding government spending, it rises relative to base run (near by 2 percentage point) in response to both simulations, itcould due to the closure role chosen in the study.

Concerning investment demand, it declines in response to 29% increase in export price compared to base run. This indicates increase in export price is not impulse to investment growth in Ethiopia, due to one of the resulting reasons. First, increase in export price reduces government saving, which reduces saving pool available for investment and leads to decline in investment.

Second, investment sector needs intermediate input in its production, but, due to the increase in export price the cost of intermediate input rises, which results in failure in investment demand. However, decrease in export price rises investment demand caused by low intermediate input cost and rise government saving but, less than base run. Generally, the result is in line with the findings of Bazhenova (2016), Abdelbag *et al*. (2010), and Carniero and Arabache (2002). Adding private and government consumption, and gross capital formation give absorption. The net effect of export price changes on absorption depends on its effect on private consumption. Because, the impacts of export price changes on private consumption outweighs its impact on investment demand in all scenarios. Accordingly, increase in export price results rise absorption while decrease in export price results in decline in absorption relative to the base run.

The demand for Ethiopia's export declines due the increase in export price relative to base run. Nonetheless, export demand rises due to the decrease in export price compared to EXPR1, but it is less than the base run. The negative effect of increase in export price on export demand is prompted by appreciation of exchange rate which leads to decrease in Ethiopia export demand. Conversely, decrease in export price upsurges the demand for export but, less than the base run through exchange rate depreciation. Concerning import, increase in export price lead to rise in import demand through appreciation of the exchange rate; however, decrease in export price reduces import demand via depreciation of the exchange rate. The result is consistent with the findings of Szeto *et al*. (2003) and Dorosh *et al*. (2009), which shows export price is inversely related to export demand but, positively related to import demand. In a nutshell, two possible statements can clarify the inverse relationship between export price and trade balances. First, increase in export price leads to appreciation of domestic currency, which raises import, but reduces export demand. Second, increase in export price raises household income, which in turn increases import demand. As a result, the net effect of income and price together worsen trade balance of Ethiopia. Similarly, decrease in export price leads to depreciation of the domestic currency, which rises export, but reduce import demand. Moreover, decrease in export price leads to fall in household income which in turn reduces import demand. Therefore, the overall impact of decrease in export price is improvement of the trade balance of Ethiopia.

It is obvious that adding net export on absorption gives GDP at market price. Therefore, increase in export price reduces GDP at market price relative to the base run, and decrease in export price reverts GDP at market price to its base run. Lastly, deducting indirect tax from GDP at market price gives GDP at factor cost, which is also affected by export price changes as shown in table 1.The growth rate of the overall economy is fall by 0.3 percentage point in response to the increase in export price, but it returns to its base run rate in response to the decrease in export price scenario with 0.1 percentage

point deviation from the base run. The negative impacts of increase in export price on GDP and its growth rate is partly explained by the rise in import demand and the fall in investment demand. Regarding exchange rate, increase in export price appreciates both the nominal and real exchange rate of Ethiopia relative to the base run. On the other hand, decrease in export price depreciates both the nominal and real exchange rate of relative to the base run. The result regarding exchange rate is comparable to the findings of Daza *et, al.*(2014), which reveal increase in export price appreciates exchange rate, while decrease in export price depreciates the exchange rate.

Government income is also affected by export price changes; because the price change affected the various sources of government revenue. The increase in export price reduces government revenue substantially compared to the base run. On the other hand, decrease in export price raises government revenue relative to the base run. The result is conflicting to numerous empirical studies which reveal increase in export price raises government revenue, while decrease in export price reduces government revenue due to one of the following reasons. Firstly, as noted earlier, increase in export price raises institution income, yet direct tax rate is assumed fixed, which reduces government revenue collected from the growing institution income. Secondly, the fall in investment demand and production due to the increase in export price reduce income of government collected from activities tax. Thirdly, export tax in Ethiopia is trivial, excluding of semi-processed leathers, as a result, increase in export price inspire producers to sell their product at foreign market, which leads to decline in domestic sales tax. Finally, if the above three descriptions can't elucidate, increase in export price may reduce government tax collection effort through the "Dutch Disease Effect" while enjoying revenue from booming commodity price. The result is consistent with the findings of Carniero and Arabache (2002), who exhibit that increase in export price reduces government saving and taxes. The reverse is true for decrease in export price. Regarding government saving, the residual of government expenditure less of government income is also affected by export price changes. Accordingly, increase in export price reduces government saving while decrease in export price raises government saving relative to the base run. Alternatively, its movement is in line with government revenue. Finally, relative to the initial level, foreign saving rises in the base run by 4.8%. Similarly, foreign saving rises by 1.2 percentage point for all simulation scenarios from the base run.

3.2 Impacts on Export Volume

To make analysis simple, Ethiopia's exports are grouped into agriculture, industry, and service based on the SAM aggregation as presented on appendix A. Concerning agricultural, apart from flower, vegetable and fruits, export volume rises in the base relative to the initial level. Similarly, export volume of industry rises nearly by 50% in the base compared to initial level except leather products. Regarding service its

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export volume upsurges in the base relative to initial for all commodities. However, once the price of export changes, its impact on export volume deviates from the base run level. Importantly, the impacts of export price changes on export volume are commodity specific. The volume of agricultural export declines as export price increase more than the base, except flower, vegetables and fruits. Similarly, decrease in export price doesn't improve the volume of agricultural export. However, export volume of vegetables and fruits rises in response to the rise in export price but, decline in response to the decline in export price. Moreover, export volume of flower declines in all price scenarios relative to the base. Consistent with economic theories, the result implies, export volume of most agricultural commodity is unresponsive to price changes. On average, export of agricultural commodity is not determined by price elasticity of commodities.

Regarding industry, increase in export price has mixed impacts on export apart from leather products. The volume of other industry export declines if the price of export increases and, it rises if price of export decrease. The volume of leather products export declines in response to all price scenarios perhaps owing to weak linkages with local rawhide providers or the presence of quality leather product exporters compared to Ethiopia. Industry export volume is not highly swinging similar to agriculture in response to world price changes, since the price elasticity of demand for industrial commodity is more elastic compared to agriculture. The service export volume witnesses a mixed result similar to the industry sector. For instance, private service, real estate, communication, transport, and trade subsectors export volume declines in response to the increase in export price, and decline in response to the decrease in export price. Conversely, export volume of hotels and catering rises in response to the increase in export price and its volume falls due the decrease in export price. Similarly, it is observed that the increase in export price deteriorates financial and business services export volume, and decrease in export price results raises export volume. In summary, export volume of most agricultural commodities is inelastic to export price changes apart from few commodities. Moreover, export volume of agricultural commodity moves pro-cyclical to price but the movements are commodity specific. Industry export volume is not as volatile as agriculture. Most industry commodity export decline if the price of export increases and vice versa.

The impact of export price change on service sector is pro-cyclical to export price, but its impacts is commodity specific.

3.4 Impacts on Import Volume

The volume of import rises in the base relative to the initial level. The price of import declines in base relative to initial level, which in turn raises import demand. For most commodities, increase in export price raises import demand compared to base.

Two effects arise from export price rises, price and income effects. The price effect is the result of decline in import price via appreciation of ETB, which results import cheaper and induces import demand. The second effect is income effect through rising households' income as export price increases. However, increase in export price is not results rise in import demand for all commodity; some commodities import demand decline such as machineries, fertilizer, and other mining. However, decline in export price fallouts in decline in import of majority commodity relative to base except fertilizer, machinery and other mining. Because, decrease in export price depreciates ETB which make import expensive and reduces households' income; as a result, price and income effect together reduces import volume. The result show, increase and decrease in export price largely rises and reduces import volume, respectively through price and income effects (see appendix B).

3.3 Impacts on Factors Return

It is evident that factors income and demand are expected to be affected by export price changes through factor demand and supply as well as output prices adjustment. The various factors that exist in the SAM are aggregated into capital, land, livestock and labor groups for the sake of brevity. Comparing initial and base run, all factors income is improved in the base run relative to initial level of income. Conversely, if export price changes are introduced, the income of all factors deviates from the base run as summarized in table 3.

Table 3 Impacts on factors return (% change from the initial)

Factors	INITIAL	BASE	EXPR1	EXPR2
Skilled labour	20.5	11.6	23.5	12.9
Semiskilled labour	57.1	8.3	18.6	7.8
Unskilled labour	39.4	10.3	13.7	10.2
Agriculture labour	57.1	10.5	10.4	10.4
Capital	110.3	12.6	20.3	12.0
Land	39.8	10.7	11.2	10.5
Livestock	30.9	12.8	12.1	12.7

Source, Author simulation using DCGE Model

The immediate impact of export price changes is on factor price via adjustment of factor demand. The increase in export prices raises factors price and decrease in export price reduces factors prices except income for livestock. Livestock income and price are negatively related to export price. Capital in Ethiopia is more of imported goods hence its volume increase if the price of export rises and vice versa. As a result, high export price could cause substitution of livestock by capital which in turn reduces

income and price of livestock. Conversely, weakening of export price discourages producers to import capital goods which in turn raise the demand and price of livestock. The return for labor and land is in line with others factors income because most of the time, labor and land are used compliment with other factors.

3.5 Impacts on Households Income

It is obvious that commodity export is the main sources of income for households in developing countries. Therefore, increase in export price improves household income while decline in export price reduce income. Table 4 reveals the impacts of export price change on income of various household groups. So far, empirical studies show that the impacts of export price on household income work through changes on relative price, wage and employment. In the base, all household real income is increased compared to the initial level. Conversely, changes in export price from the base run deviates the real income of institutions.

Table 4 Impacts on household income (% change from initial value)

| Households	INITIAL	BASE	EXPR1	EXPR2
Rural Poor Household	73.93	10.14	13.26	9.96
Rural Nonpoor Household	261.08	10.62	16.21	10.38
Urban Poor Household	3.83	9.89	16.83	9.71
Urban Nonpoor Household	35.54	9.77	17.46	9.92

Source, Author simulation using DCGE Model

As shown in table 4, rise in export price improve households' income, however, decline in export price reduces household income relative to base except urban non-poor household. Because, the main source of income to urban non-poor household is skilled and semiskilled labor, employed in service sector. Conversely, income of households employed in agriculture and industry sector is affected by export price variation. As noted earlier, the main source of household income is factors return. Accordingly, increase in export price leads to increase factors income and households will divide the income based on their initial factors' income share. On the contrary, decline in export price reduces factors income which in turn reduces household income. The difference between households' income is the result of variation on initial factor income share.

Impacts on Households Expenditure

It is evident that changes that affect household income can also affect expenditure. As a result, export price changes would affect household expenditures labeled in figure1. Comparing the initial and base, the real expenditure of household increases in the base which is the direct effects of the increase income. However, the percentage change rise in urban household real consumption is bigger than rural households relative to their initial level.

Figure 1 Impacts on Households Expenditure (%change)
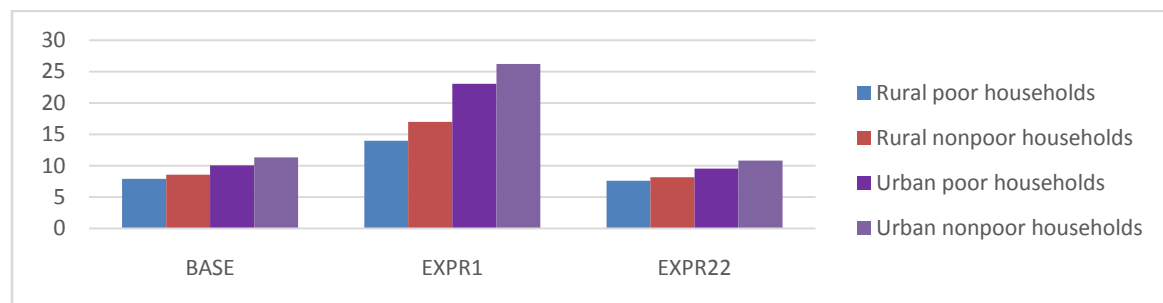
Source, Author simulation using DCGE Model

As shown on figure1, rise in export price lead to an increase in household real expenditure nearly by 50% from the base. This implies, the increase expenditure is allied with income through product and factors price adjustment mechanisms. On the other hand, decrease in export price reduces real expenditure of all households relative to the base.

3.6 Impacts on Households Welfare

The section explores the impacts of export price on the well-being of households. Accordingly, Equivalent Variation (EV) is chosen as a measure of household welfare. If the value of EV is positive for a given price change, it is assumed as welfare gains for household. Conversely, if the value of EV is negative, it is assumed as welfare loss to household. Therefore, table 5illustrates the impacts of export price changes on various household welfare. Comparing the initial and base EV, the welfare of all household rises in the base relative to initial level. However, comparing the percentage changes, rural poor and noon-poor households have low level of welfare gains than urban and rural non-poor household.

Table 5 Impacts on household welfare using EV (% change from Initial)

Household	INITIAL	BASE	EXPR1	EXPR2
Rural Poor Household	14.036	10.934	19.41	10.472
Rural Nonpoor Household	47.592	11.976	24.776	11.364
Urban Poor Household	3.43	11.74	30.86	11.08
Urban Nonpoor Household	27.04	13.41	36.08	12.74

Source, Author simulation using DCGE Model

As revealed in table 5, rise in export price noticeably improves the welfare of all household more than base scenarios. However, fall in export price reduces the welfare of all household relative to the base run. Welfare is improved due to growth in income and expenditure resulting from the increase in export price. In a nutshell, increase in export price is beneficial to all household welfare while decline in export price is detrimental to all household welfare.

4. Conclusions and Policy Implications

Studies show that export price volatilities have implications on macro and microeconomic variables yet mixed results are existing. Moreover, various study result show that the impacts of export price shock depend on the extents of the shocks introduced. In Ethiopia, increase in export price of leads to appreciation of the domestic currency which rises import demand but, reduce export demand. As a result, the interaction of the two effects worsens the trade balance of the country. However, the impact of increase in export price on export and import demand is commodity specific. An increase in the price of export weakens investment demand through raising the cost of investment. Similarly, high export price reduces government income and saving. Government revenue may decline due the fall in investment demand or tax collection effort of government while enjoying commodity price boom. Relative to the base, government spending and foreign saving are improved by same percentage point to all simulation. Economic growth slightly declines due to rise in export price through its negative effect on investment and export demand. The increase in price of export also affects the supply of tradable commodities sold in domestic market, yet the results are mixed. Thus, some commodity such as coffee, hotel and catering, real estate services and wholesale and retail trade domestic supply are increased while others commodity supply is declined. Moreover, the increase in export price raises factors return via adjustment of factor price which in turn improve income and expenditure of household. Finally, the increase in export price results welfare gains to all household groups.

However, decline in export price depreciate domestic currency. However, depreciation of ETB reduces import demand but it rises export demand. By and large, decrease in export price improves trade balance of Ethiopia. Moreover, decrease in

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export price improves investment demand and it rises government saving. Similarly, decrease in export price sensibly raises economic growth through its impacts on investment and export demand. It also increases the supply of tradable commodity sold in the domestic market though the results are commodity specific. Conversely, supply of some tradable commodity declines while others commodity supply raises. Finally, decline in export price reduces factors return which cuts income and expenditure of households. As a result, wellbeing of households degrade due to the cut in export price.

In a nutshell, changes in export price have advantages and disadvantages. Some of the results are contradictory to policy objectives while others are not. For instance, increase in export price cannot stimulate economic growth, investment; and it cannot improve trade balance and government revenue. Besides, increase in export price rise factors and households' income, and it improves their welfare. On the other hand, decrease in export price increase investment, economic growth, government revenue and improve the trade balance. However, it reduces factors and households' income and their welfare. Thus, to harmonize the benefits and drawbacks of export price changes, appropriate policy tools are necessitated. Considering the simulation result and empirical reviews, the study identifies the next recommendation as mediating strategies of export price changes. Exchange rate is main transmission mechanisms of export price shocks. The exchange rate policy is more likely to be at the center of the policy response together with other policies. As a result, the government of Ethiopia should stick to the current exchange rate policy, managed-floating. If price of export rises, the exchange rate should be devaluated which helps to maintain trade balance, economic growth, investment, and government balance. However, households' income and welfare lose should be remunerated via 'growth trickle down' and increasing investment from high commodity revenue. Similarly, if export price decrease, the exchange rate should be revaluated which will improve trade balance, investment, economic growth and government revenue. Conversely, it will reduce households' income and welfare but, through 'growth trickle down' and investment expansion households' income will be maintained. Diversification and industrialization of commodity export is vital to reduce the adverse impacts of export price shocks. Ethiopia's export price is highly volatile that depends on the state of global economic condition. Thus, it needs diversification or broadening of export base of the country than relying on few and less diversified commodities. What is desirable for competitiveness in the international market is the volume of real export which in turn has tendency to increases specialization and innovation of Ethiopia. Adding value on export commodities and transforming from entirely agriculture to industry dependent economy over time is the best option to resolve the impacts of export price shocks. Because, industry export price is more or less stable relative to agricultural commodities. It can be achieved by integrating commodity policies into the country's overall development strategy and plans. It is also better to harness the income gains

from commodity exports to facilitate wider economic transformations and reduction of dependence on primary commodity export. Finally, get ready for the possibility of price fall or rise and its major impact on households 'income, government revenue, trade balance, and overall economy.

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