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Effects of Taxation on Prosperity and Disparity: Pakistan - A Case in Point

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Abstract:

This study narrates the impact of increasing direct (income) tax and reducing indirect (sales) tax simultaneously on increasing the level of welfare and dwindling poverty and inequality in Pakistan. For this rationale, latest Social Accounting Matrix (SAM) 2010-11 of Pakistan is driven and Computable General Equilibrium (CGE) modeling technique is adopted to analyze the effects. To analyze the effects of increasing income tax while decreasing sales tax, two trials of simulations 5% and 10% are reported. The outcomes of the analysis present positive effects on welfare of selected major types of households and also positive effects on reducing income inequality as well as poverty in Pakistan. Finally, in light of the results, the analyses advocate that a mix-tax policy can be effective to attain economic stability.

Keywords: Income Tax, SalesTax, Computable General Equilibrium model, Social Accounting Matrix, Welfare, Inequality, Poverty, Economic Stability

I. Introduction

Tariff impacts trade, income inequality, consumption pattern, production, welfare, and poverty level in a country. Itproduces a block amongst the internal and external prices,inducing the demand for the commodities produced in the country domestically. Laird et al. 2003, Cernat et al., 2002, and Dessus et al., 1999analyzed that the most recent literature shows that potentialadvantages are significant fromthe dismantlement ofthe tariff blocks. Tariff abolition policy varies according to the structure as well asreforms of the economy. Today, the policy of abolition of tariffs impacts empirically not only the major economic indicators like; GDP, National income,

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Investment, Employment, Consumption, Savings, Exports, Imports, etc., rather it significantly favorably affects the country`s welfare level, inequality, and poverty, even though it is not an easy task to find. This step makes a web of direct as well as indirectvicissitudes thatcreates itextremely difficult to track down the influence upon different categories of the households.The countries like Pakistan must fervidly implicate multilateral tariff liberalization to attain sufficient benefits along with an entry into international markets of the manufacturing economies. Moreover, through this policy, an increase in economic activities occurs and households` real income increases which increases consumption, saving, investment, and settling the trade balance. Eventually, all this improves welfare on average, and hence reduces inequality as well as poverty.

Abolition of tariffsreduces the prices of imports, which affects all other prices of the goods and services because of interrelationships, which not only induces the exporters to produce more but also switches to importing in large quantities. It results in a prominent change in the structure of production, that ultimately results in a change in the institution`s income. Similarly, the rate of households` income and prices of the factors increases, although varying. Due to tariff abolition, compensating variation of the households as well as economy-wide both results in upward tendency, which means an increase in welfare as well as a decrease in inter-, and intra-group inequality and poverty. Abolition of import tax also results in correcting the balance of trade.

The key goal of this study is to discover the solid implications of the abolition of import tax by simulation tryouts that to what extent the households of different types get rid of the poverty, to what degree the inequality can be reduced by adopting this policy, and finally to what level the welfare can be boosted by this policy step in Pakistan. For this purpose, we pondered Dorosh et al`s Social Accounting Matrix (SAM) of Pakistan for the year 2010-11 prepared in 2015. This statistical information table contains 172 rows showing Pakistan`s income side and the same number of columns revealing the expenditure part with 100% balanced data. This study utilizesthe Computable General Equilibrium Modelling technique. Reducing twin deficit, poverty, and inequality, and increasing macroeconomic indicators and welfare, it is essential to attain a sustainable economic growth rate and economic developmentthrough suitable adjustments in different fiscal reforms. Abolition of tariffs is one of these, as the present analysis presents. Through this instrument, this investigation focuses on the objectives mentioned above.

II. Literature Review

The literature shows that tariff abolition's impact on inequality, and/ or poverty, and/ or welfare has been extensively investigated in different countries. This policy influences the living pattern of households, their earnings, spending, saving, investing, and above all economic development and growth rate. It is equally important to achieve these goals for the economy of Pakistan.

Neo-classical believes that direct or indirect taxation affects the growth continuously, Bleaney et al. (2000). Reducing the taxes on commodities results in improving the real income of the households, which increases their consumption as well as saving power, ultimately an investment in all the sectors of the economy, employment of factors of production, and employment of resources increases. The breach between affluents and the poor shrinks, which resultantly leads to increased welfare and economic

stability. The capital-output ratio also changes, which results in a change in the production path and steady-state rate accordingly, Barro et al. (1991). Paulson and Kaplan (2008) found a negative impact of considering direct tax and top marginal tax rates for the US economy. Whereas, Papageogiou (2012) examined the effect of changes in tax-payment mix and deb absorption policies for the Greek economy and realized a positive impact on welfare and growth. For Turkey, Arisoy and Unlukaplan (2010) examined the impact of both direct and indirect taxes on growth and clinched that the direct taxes` share must be more than the share of indirect taxes.

For Indonesia, Amir et al. (2013) investigated the effect of income tax reforms on the economy`s key macroeconomic variables, income distribution, and poverty. The analysis determined that both personal income tax and corporate income tax result ina positive impact on economic growth under the hypothesis of a balanced budget. The outcomes reveal a minor decrease in poverty but an increase in income inequality, as tax cut promotes the households belonging to the high-income group. Along the same lines, Lustig et al. (2014) examined that in Argentina, Brazil, and Uruguay, the effect of direct tax and transfers resulted in a decrease in poverty and inequality, while in Bolivia, Mexico, and Pero, this action impacted a very minor. They argue that except in Bolivia, cash transfers are progressive, where the policies are aimed to keep households` income at least at a reasonable level. Further, their study noticed that direct taxes are progressive with less redistributive impact. The reason they claim that direct taxes share in GDP is low generally. Their investigation also opens that in Brazil and Bolivia, indirect taxes offset the poverty reaction impact of transfers. Similarly, Iranian researchers Dehghan and Nonejad (2015) examined the effect of indirect taxes, taxes on business, and corporate for the period 1981 to 2010 by employing the least square method and found a negative effect on growth. For South Asia, Phiri (2016) investigated the effect of taxes on growth, and noticed the adverse effect of direct taxes, while the favorable effect of indirect tax on economic growth. Likewise, Rossignolo (2017) analyzed tax and spending policy's effect on income distribution and poverty in the Argentinian economy taking into account the income and expenditure data from National Household Survey 2012-13. The study obtained that the fiscalmeasures are effective in decreasing income inequality as well as poverty, although government spending may cause unsustainability in the policy.

Nmesirionye, et al. (2019) investigated the effect of VAT, Customs duty, and Excise duty on the Real GDP of the Nigerian Economy for the period 1994 to 2017 through the ex-post-facto technique and realized a favorable impact.

For Pakistan, Mashkoor et al. (2010) evaluated data from 1973 to 2008 by using the ARDL procedure and discovered direct taxes as a major cause of real GDP growth. Further, Naqvi (2011) observed the effect of insinuating agricultural income tax, lessening sales tax rates, and ended that welfare of the households increases. In 2015, Iqbal et al. assessed Pakistan`s economic data from 1979 to 2010 and deduced the positiveeffect of taxation on growth.Similarly, For Pakistan,Bhatti et al. (2015) examined the effect of taxes and transfer payments on income inequality by employing two sets of simulations and closed that transfer payment or indirect taxes alone can affect the distribution of income even if this step condenses the budget deficit of the same year. Similarly, the same team for the same period in another study analyzed that fiscal policy can directly as well as indirectly obliterate the gap between rich and poor. Fiscal policy tools influence households` disposable income directly while earning capacities

indirectly.Furthermore, Shahzad et al, (2018) analyzed the association involvingindirect taxes and growth using Pakistan`stime series data for the period 1974 to 2010 and suggested indirect taxes to decrease while direct taxes to increase for developing the rate of growth. At present, indirect taxes are recorded as over 63% of the entire sum tax revenue. As a consequence, it should be reversed.

Aydin and Esen (2019) estimated the burden of taxes on different countries and concluded that in countries with different levels of economic development and growth, the tax burden level varies considerably. In developed countries, the tax burden is noted at 23%, whereas, in developing countries, it is noticed at 18.5%.Ay and Haydanlı (2020) investigated that the tax efficacy and international tax lumber of the economies are low around the globe, whereas tax techniques in underdeveloped economies are effective but partially. Hence, governments cannot collect adequate tax revenue to finance economic development and economic growth.

Stoilova and Patonov (2020), examined Bulgarian annual data for 1995-2018 and concluded that revenue from value-added tax affected economic growth positively, while decreasing the corporate tax rates convalesce economic operation. The study has also confirmed on the other hand that personal income tax impacts economic growth adversely. Hakim (2020) analyzed the effect of direct as well as indirect taxes on growth and tax revenue in 51 economies utilizing annual data (1992-2016) by applying the technique of dynamic panel generalized moments. The study concluded the negative but significant impact of direct taxes while the positive but insignificant effect of indirect taxes. Moreover, the impact of direct taxes was realized more positively as compared to indirect taxes on income.

In another study, for Pakistan, Moeen et al. (2020) analyzed the impact of free trade on macroeconomic variables, welfare, inequality, and poverty by employing the CGE Model and observed a positive impact except fora few indicators. The study suggests that tariff abolition should be implemented gradually for increasing the welfare of the households and reducing inequality and poverty. Employing the CGE modeling system, Moeen et al. (2020) investigated the effect of income tax on macro-variables of the economy of Pakistan.The studyended the favorableimpact of increasing the income tax on Gross Domestic Product, Consumption, Utility of all the households, investment, exports& imports, and welfare level. In another analysis, the same investigators analyzed the impact of free trade on the same indicators by using the same technique for a small open economy and concluded positive effects. G. Moeen ud Din et al. (2020) researched the influence of reducing the sales tax on the economy of Pakistan, income inequality, poverty, and welfare of the households. The study summedup the positive results. Moeen et al. (2021) examined the Pakistani exports` potential impact on the country by using the CGE Model and closed positive remarks on all the macroeconomic indicatorscomprising a decrease in poverty &inequality andanincrease in the welfare of all types of households.

III. Methodology

Tariff abolition effect on welfare, inequality, and poverty in Pakistan is estimated by employing the Computable General Equilibrium Model. Which presentsa stable and comprehensive algebraic matrix formed numerical data of input-output about main sectors like households, commodities, institutions, factors, and other main accounts of the country, which is in concord with the composition of static archetypal produced by

Lofgren et al. (2002). Present evaluation encases the impact on all macroeconomic variables in solo-environment modeling, matched with Naqvi (2010). Dorosh et al. (2015) developed a Social Accounting Matrix of major sectors of Pakistan`s economy for the period 2010-11, which is viewed as a measure. The matrix consists of 172 columns as well as rows, which consists of sixty-four different activities, sixty tree commodities, twelve factors of production, sixteen groups of households, and seventeen other accounts. The columns of the SAM reveal expenditures of the different sectors of the economy while rows represent the incomes of these sectors. To see the impact of tariff abolition, in this analysis this SAM is condensed into the size of 47X47. That is, sixty-four activities and sixty-three commodities are segregated into nine each, twelve factors into three, other seventeen accounts into ten, except the households because it is the key concern to see the impact of households` welfare, inequality, and poverty. The software, General Algebraic Modeling System (GAMS) is operated. The problems are determined by the sets of general equations for CGE conducting. The equations approve the estimation satiety concerning production and factor markets, savings and investments, and current accounts balances. The analysis is standard static ordertherefore it does not use the variations of the second time. Hence, the equations created in this study express inter-relationship among all the sectors. The SAM 2010-11 shows real summations for the coefficients. This SAM is treated for initial equilibrium and thenceforward by amending the values of the exogenously chosen variables. Later, solved once again. Lastly, numerical conclusions are tallied with the source time equilibrium values. In this way, the effect of exogenous shocks is measured.

The 47×47, segregated SAM consists of nine activities, nine commodities, three factors, sixteen sorts of households, and ten other accounts. Nine Activities and Commodities included in the SAM are agriculture, minerals, food manufacturing, lint and yarn, textile, leather, other manufacturing, energy, and services. All activities are symbolically denoted by A-AGRI, A-FMAN, A-MINE, A-YARN, A-LEAT, A-TEXT,A-ENRG, A-MANF, and A-SER, while commodities are emblematically signified by C-AGRI, C-FMAN, C-MINE, C-YARN, C-LEAT, C-TEXT, C-ENRG, C-MANF, and C-SER, respectively. The production factors in the SAM are labor, land, and capital, which are symbolized by LAB, LND, and CAP. The categories of households are classified into rural small, and medium farmers, rural landless, farmworkers, non-farm, and urban. Which are indicated by H-RS, H-RM, H-RL, H-RW, H-RN, and H-U, correspondingly and signaled separately by quartiles 1234. Pakistan`s other important accounts in this SAM considered are transaction, enterprise, government, subsidies, sales tax, import duty, rebate, direct tax, saving-investment, and rest of the world, which are designated by TRC, ENT, GOV, SUB, STAX, MTAX, ETAX, DTAX, S-I, and ROW in turn.

A. The Block of Equations

The blocks covered in the model are price block, production and commodity block, institution block, and system constraint block. Each block encompasses equations` sets (A set of the equations can be provided on demand).

Price Block

Endogenous, as well as exogenous prices, are incorporated into the set of equations in this block of the model. It includes non-price indicators. Activity producer price including taxesin the course ofthe production process is indicated by PX. Taxes on

exports as well as on imports is also added to export and import prices i.e., PE and MP. Similarly, sales tax is included in the final price of the product PQ too.

Production & Commodity Block

All the activities are aimed at profit maximization. Profit maximization is subject not only to the output function, commutability, and static coefficient but also to constant returns to scale. Producers select the factors of production and other inputs on constant elasticity of substitution basis. Constant elasticity of substitution (CES)permits the manufacturers to reply to the relative variations of inputyields. The equilibrium between marginal revenue (MR) and marginal cost (MC) determines the factor`s rewards, which are set on the nub of the endogenous relative prices.

The computable General Equilibrium Model supposes that only a single product can be produced by each activity. Leontief rule is employed in the model to determine the method of production therefore factors of production have coalesced in a fixed proportion. Production and commodity block account for the employment of domestic inputs and output, allocation of output in domestic and foreign markets, and also the total domestic market supply. To attain the relationship between activities and inputs, the Cobb-Douglas production function is operated.

Institutions Block

The key institutions of the model are the households, enterprises, and government. Factors of production are owned by the households. Land and labor get rewards in the form of rent and wages, whereas enterprises and governments enjoy interest on capital as a share of the primary endowment.

Taxes on factors and transfers from abroad are the main sources of government revenue, while consumption and transfers to foreign are the major items of government expenditure. Similarly, enterprises' source of income returns on income, through which the enterprises handle the payments and transfers. It is believed that the enterprises do not spend their money on buying the commodities. The government`s balanced budget reveals equality between public revenue and public spending. If there is a budget deficit, it can only be financed by borrowing from the capital market of the country. CGEM-Pk respects the government as a consumer with constant spending. The transfers of the government are CPI indexed, that is, constant in nominal terms.

System Constraint Block

In this model, the system constraint block represents behavioral equations. These equations are formed under some precincts which correspond to the formation where the decided variables are attuned for triumphing the objectives of economic stability. Supply of the factors of production should be according to their demand in the activities of the economy. Likewise, for the rest of the world`s current account balance income must be equal to spending. Furthermore, to achieve a saving-investment balance a flexible scaler about non-government institutions is multiplied by savings rates.

Price Normalization

The price normalization equation is modeled to verify an exclusive result. Which improves the measures of consumer priceindex, Computable general Equilibrium Model is zero degrees homogeneous.

B. Model Closure

The computable General Equilibrium Model incorporates both types of variables exogenous as well as endogenous. The number of endogenous variables is equal to the numerals of equations at all times. That's why the effect of shocks is weighed as an outcome of exogenous variable`s change while running the model. The only flexible exchange rate is doctoredfor the balance of the current account because foreign savings are taken as constant.The saving-Investment account in this model is verified by assuming saving-driven-investment.Therefore, the investment can be adjusted through variable factors and not by these savings. The active factor of this model is capital, therefore by keeping constant prices of the capital and changing the prices of other factors capital market can be cleared.

IV. Data and Sources

A matrix for Pakistan social accounting is used in this analysis. This matrix consists of 172 square data of income (row-wise) and expenditure (column-wise) about the key sectors of Pakistan's economy. This study is segregated into 47 square data. This statistical data was developed in 2015 by Dorosh et al. It is for the period 2010-11. It consists of 64 activities, 63 commodities, 12 factors, 16 types of households, and 17 other miscellaneous accounts. Which are segregated into 9 activities, 9 commodities, 3 factors, and 10 other accounts, except households.

A. Pattern of the SAM

The SAM illustrates row-wise income and column-wise expenditure statistical data of Pakistan`s various important sectors during the year 2010-11.SAM presents the relationship between consumption, investment, and production. Expenditure and income both are shown column and row-wise respectively. The matrix comprises 47×47 accounts. Titles of the accounts are activities, commodities, factors, households, and others as transaction costs, enterprises, government, subsidies, sales tax, import tax, direct tax, saving-investment, and rest of the world. Symbolically, activities are indicated by [A1, A2, A3,….., A9], commodities by [C1, C2, C3, ……., C9], factors by [F1, F2, F3], households by [H1, H2, H3, …….., H16], and similarly other accounts transaction cost by [TRC], Enterprises by[ENT], Government by[GOV], Subsidies by[SUB], Sales Tax by[STAX], Import Tax by[MTAX], Direct Tax by[DTAX], Saving-Investment by[S-I], and Rest of the World by[ROW]. In SAM, the only product is Energy, which can be domestically produced and consumed, and it is denoted by [ENRG].

The columns GOV, S-I, and ROW against the row commodities i.e., C1, C2, C3, ……, C9, represent indirect taxes, investment spending on goods, and exports of Pakistan. Factors account F1, F2, and F3 reveal rewards, sources, and distribution among the sectors like households, enterprises, institutions, and government. Households H1, H2, H3, …….., H12 are arrayed as per their land-owning status while H13, H14, H15, and H16 are set according to urban region.

Savings and transfers to institutions depict the expenditures of enterprises. Enterprises` gross profit is possible only on capital account. Government savings, and expenses on consumption as well as transfers are shown by the column GOV, whereas her revenue for taxes (direct and indirect) and transfers are titled by the same in a row. Savings finance investment, which is indicated by capital account. Foreign trade is signaled by the ROW beside columns C1, C2, C3, ……., and C9 (income from the

world). The current account balance is shown by column S-I by foreign savings which shows equality of income and expenditure of the rest of the world.

B. Trade Elasticities

To measure the substitution degree of the products produced domestically with the rest of the world`s products, this study used Armington Elasticity. Higher the elasticity, high the reliability of imported products as substitutes for domestically produced commodities and vice versa.

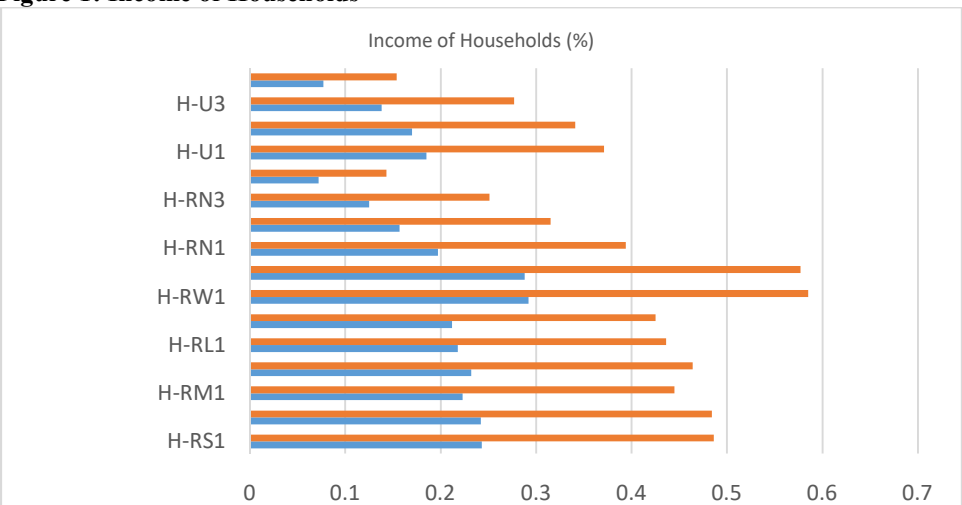
V. Results of the Experiments

In this study, two experiments are performed to reckon the impact of the increase in direct tax and decrease in indirect taxby 5% and 10% on welfare, inequality, and poverty in Pakistan. The sector-wise results are noticed as under.

A. Income of Households

The household types supposed in this analysis are benefitted from the simulations of the model. Direct tax increasefallouts into a reduction in the households` real income,while a decrease in sale tax boosted the real income. It exposes that when the government increases income tax and simultaneously decreases a tax on sales at anequal rate, the households` real income increases. As a result, consumption power increases, consequently, households` welfare improves.

Figure 1: Income of Households



	H-RS1	H-RS234	H-RM1	H-RM234	H-RL1	H-RL234	H-RW1	H-RW234	H-RN1	H-RN2	H-RN3	H-RN4	H-U1	H-U2	H-U3	H-U4
Simulation-II (10%)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.3	0.3	0.2	0.1	0.3	0.3	0.2	0.1
Simulation-I (5%)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.0

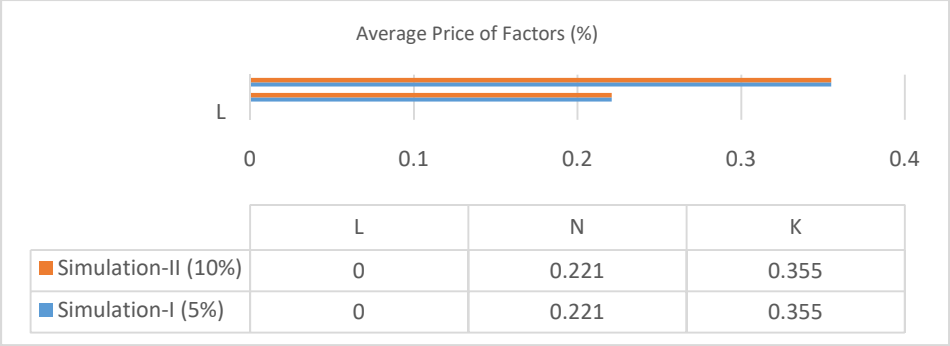
Source: Simulation Results

All the types of rural as well as urban households` income shows increase when 5% increase in tax on income and 5% decrease in tax on sales in Simulation-I, and later 10% similar change in Simulation-II is tested. Category-wise recorded increase in income depicts H-RS1 (rural small farm quartile-1) by 0.243% and 0.486%, H-RS234 (rural small farm quartiles 2,3, and 4) by 0.242% and 0.484%, H-RM1(rural medium farm quartile-1) by 0.223% and 0.445%, H-RM234 (rural medium farm quartiles 2,3, and 4) by 0.232% and 0.464%, H-RL1 (rural large farm quartile-1) by 0.218% and 0.436%, H-RL234 (rural large farm quartiles 2, 3, and 4) by 0.212% and 0.425%, H-RW1 (rural farm workers quartile-1) by 0.292% and 0.585%, while H-RW234 (rural farm workers quartiles 2, 3, and 4) by 0.288% and 0.577%. Likewise, increase in real income of the other types of households is noted as: H-RN1 (rural non-farm quartile-1) by 0.197% and 0.394%, H-RN2 (rural non-farm quartile-2) by 0.157% and 0.315%, H-RN3 (rural non-farm quartile-3) by 0.125% and 0.251%, and H-RN4 (rural non-farm quartile-4) by 0.072% and 0.143% respectively. Further, the same positive impact is noticed on urban types like; H-U1 (urban quartile-1) by 0.185% and 0.371%, H-U2 (urban quartile-2) by 0.170% and 0.341%, H-U3 (urban quartile-3) by 0.138% and 0.277%, and H-U4 (urban quartile-4) by 0.077% and 0.154%. (see, Table/ Figure 1).

B. Average Price of Factors

The policy mix trial`s effectisencouraging onaverage prices of the factors. A higher rise in the capital priceis noted as compared to theland`s price. In Test-I, for land,it is noted as0.221%,butfor capital, it is recordedas 0.355%. In Test-II, theincrease in pricefor land is observed by 0.442%whereas 0.711% for capital, (see Figure 2).The factor`s average price increasedenotes the welfare increase of the factor`s owners (i.e., households)accompanied by poverty reduction.

Figure 2: Average Price of Factors



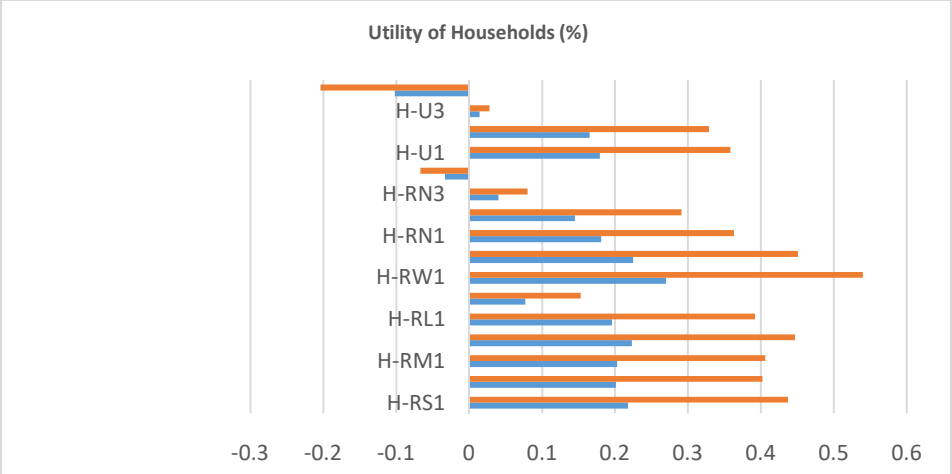
	L	N	K
Simulation-II (10%)	0	0.221	0.355
Simulation-I (5%)	0	0.221	0.355

Source: Simulation Results

C. The welfare of the Households

Mix policy experiment showsa positive impact on all the selected households except H-RN4 (rural non-farm) and H-U4 (urban). Rural small farm (H-RS1, H-RS234), Rural medium and large farm (H-Rm1, H-RM234), and Rural farm Worker (H-RW1, H-RW234) seemshighly benefitted, while less benefitted households noticed are Rural Non-farm (H-RN1,2, 3,and 4) and Urban (H-U1, 2, 3, and 4) (see Figure 3). The same trend is revealed in the consumption expenditure of these categories of the households (see Figure 4). The rising proclivity in the household`s consumption signals an increase in welfare.

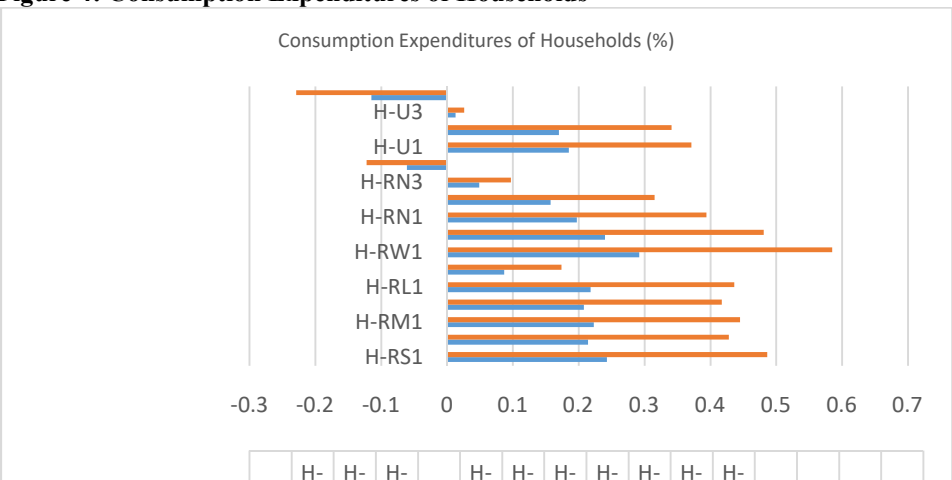
Figure 3: Utility of Households



	H-RS1	H-RS234	H-RM1	H-RM234	H-RL1	H-RL234	H-RW1	H-RW234	H-RN1	H-RN2	H-RN3	H-RN4	H-U1	H-U2	H-U3	H-U4
Simulation-II (10%)	0.4	0.4	0.4	0.4	0.3	0.1	0.5	0.4	0.3	0.2	0.0	-0.	0.3	0.3	0.0	-0.
Simulation-I (5%)	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.1	0.1	0.0	-0	0.1	0.1	0.0	-0.

Source: Simulation Results

Figure 4: Consumption Expenditures of Households



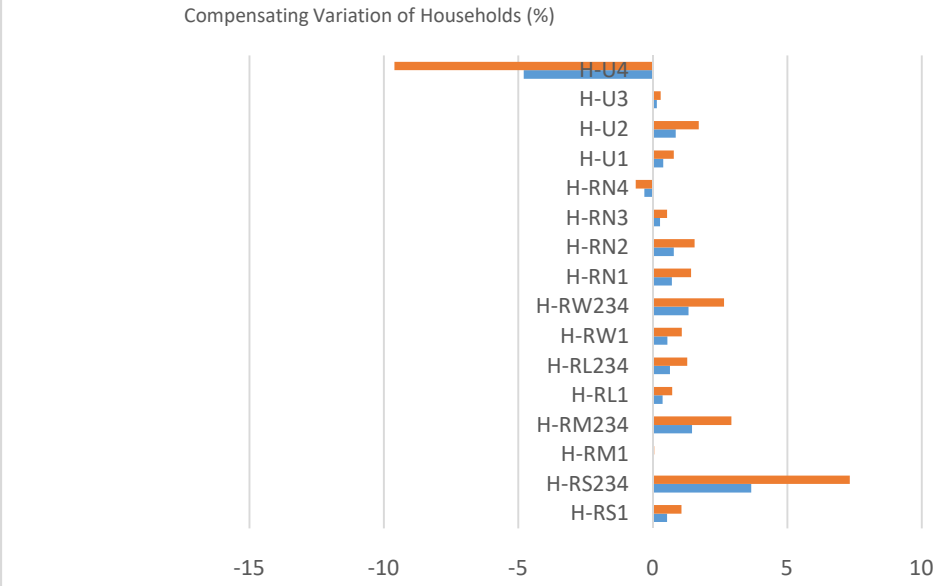
	H-RS1	H-RS234	H-RM1	H-RM234	H-RL1	H-RL234	H-RW1	H-RW234	H-RN1	H-RN2	H-RN3	H-RN4	H-U1	H-U2	H-U3	H-U4
Simulation-II (10%)	0.4	0.4	0.4	0.4	0.4	0.1	0.5	0.4	0.3	0.3	0.1	-0.	0.3	0.3	0.0	-0.
Simulation-I (5%)	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.1	0.0	-0.	0.1	0.1	0.0	-0.

Source: Simulation Results

The households` compensating variation (CV) confirmed the risingeffect on fourteentypesexcept two. The maximum CVrecorded isfor H-RS234 (rural small farm). In Simulation-I, it is 3.659%, while 7.326% in simulation-II, it appeared 7.326%. The reason behind this is the rise in the land`saverage price. While anexaltedadverse effect is noted forH-U4 (urban quantile-4), it is 4.804%, and 9.613% in two tests respectively. Except for H-RN4 (rural non-farm quartile-4), allother categories are noticed with welfareincrease,which is dropped by 0.316% and 0.632% in sim-I and sim-II respectively. The compensating variation (CV) of all the other types of householdsdeveloped in both the tests.

Welfare increasenoticed for the rural small farmtype of the households (H-RS1) by 0.532% and 1.066%, for rural medium farm (H-RM1) by 0.027% and 0.055%, for rural medium farm (H-RM234) by 1.460% and 2.924%, for rural large farm (H-RL1, H-RL234) by 0.360% and 0.638% and for rural farm worker (H-RW1, H-RW234) by 0.720%, 1.275%, for rural non-farm (H-RW1, H-RW234) by 0.538%, 1.321% and 1.079%, 2.645%, for rural non-farm (H-RN1, H-RN2, H-RN3) by 0.711%, 0.777%, 0.262% and 1.423%, 1.557%, 0.524%, for urban(H-U1, H-U2, H-U3) by 0.390%, 0.850%, 0.144% and 0.780%, 1.702%, 0.288% (see Figure 5).

Figure 5: Compensating Variation of Households

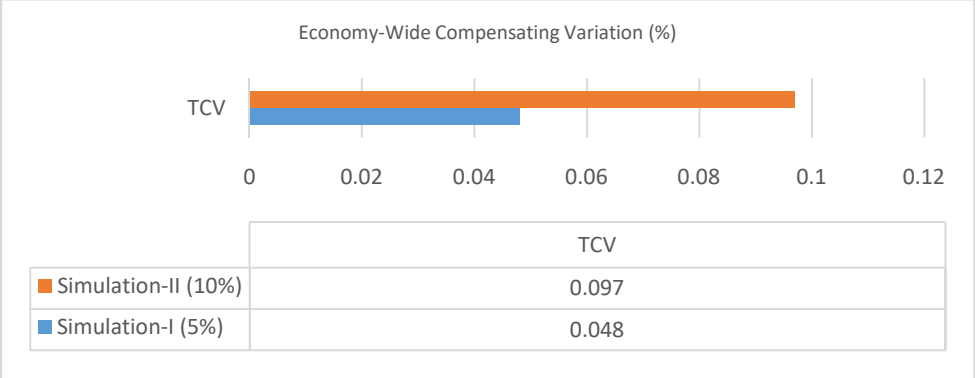


	H-RS1	H-RS234	H-RM1	H-RM234	H-RL1	H-RL234	H-RW1	H-RW234	H-RN1	H-RN2	H-RN3	H-RN4	H-U1	H-U2	H-U3	H-U4
Simulation-II (10%)	1.0	7.3	0.0	2.9	0.7	1.2	1.0	2.6	1.4	1.5	0.5	-0.	0.7	1.7	0.2	-9.
Simulation-I (5%)	0.5	3.6	0.0	1.4	0.3	0.6	0.5	1.3	0.7	0.7	0.2	-0.	0.3	0.8	0.1	-4.

Source: Simulation Results

Respectively, the economy`s compensating variation also confirmspositive results. Growth ofcompensating variation is noticedby 0.084% in test-I and 0.097% in testII (see Figure 6).

Figure 6: Economy-Wide Compensating Variation



Source: Simulation Results

Households` welfare increase expressedabove parallels with a risein average prices is infecting the rise in their real income. Growth confirmed in the simulation-I is 0.221% and 0.442% in sim-II is 0.442% for land (N), and for capital (k) it is 0.355%, and 0.711% in simulation-I and simulation-II (see Figure 2).

D. Balance of Trade

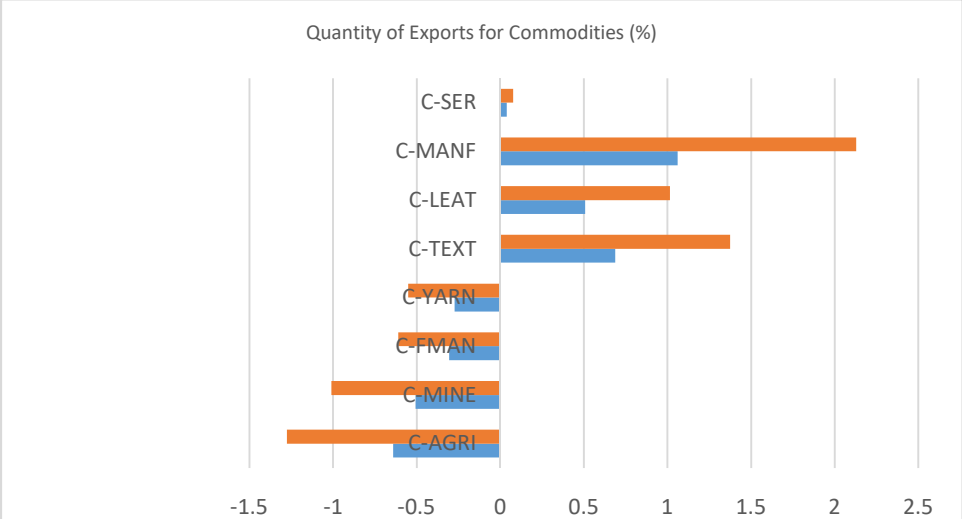
The mix policy experiment resulted ina negativeeffect in both the tests on 4 commodities-export. A decrease in exportsisnoted such as agriculture (C-AGRI)by 0.640% in Test-I and 1.276% in Test-II, mining (C-MINE) by 0.506% in Test-I and 1.011% in Test-II, food Manufacturing (C-FMAN) by 0.305% in Test-I and 0.610% in Test-II, and cotton lint/ yarn (C-YARN) by 0.274% in Test-Iand 0.550% in Test-II. Contrariwise,the same commodities` import is noticed as in agriculture (C-AGRI) by 0.606% in experiment-I and 1.215% in experiment-II, in mining (C-MINE) by 0.858% in experiment-I and 1.723% in experiment-II, in cotton yarn (C-YARN) by 0.400% in experiment-I and 0.802% in experiment-II.Eventually, thisresults in a fall in receipts from abroad, and a rise in payments to the rest of the world (see Figure 7 and Figure 8).

Conversely, a positiveimpact is noticed on the export of other selected 4-commodities like textile (C-TEXT)by 0.688% in Simulation-I and 1.374% in Simulation-II, leather (C-LEAT)by 0.507% in Test-I and 1.1014% in Test-II, other manufacturing (C-MANF) by 1.060% in experiment-I and 2.129% in experiment-II, and services (C-SER) by 0.039% in Trial-I and 0.077% in Trial-II. While, the import of the same commodities decreased is registered as textile (C-TEXT) by 0.123% in Test-I and 0.248% in Test-II, leather (C-LERAT) by 0.036% in Sim-I and 0.071% in Sim-II, manufacturing (C-MANF) by0.094% in Sim-I and 0.188% in Sim-II. Import of services (C-SER) isrecorded by 0.198% in Simulation-I and 0.397% in Simulation-II, more than its exports (see Figure 7 and Figure 8).

Export growth is documentedas higher as compared to imports` growthina few sectors like textile, and other manufacturing, which develops into a favorableeffect onthe

balance of trade (BOT). The inclusive conclusion shows that the consumption level of the households is increased after this test, which shows a rise in the general welfare level of the households.

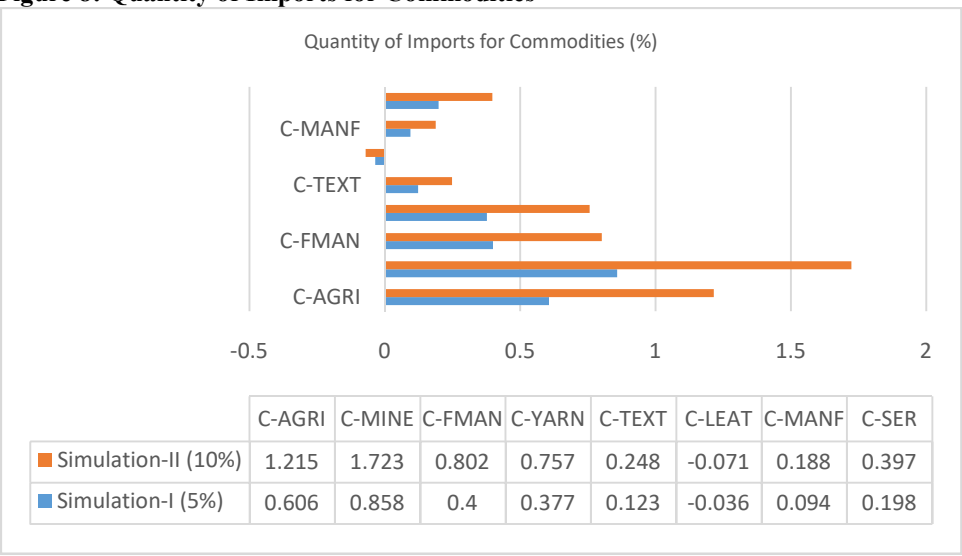
Figure 7: Quantity of Exports for Commodities



	C-AGRI	C-MINE	C-FMAN	C-YARN	C-TEXT	C-LEAT	C-MANF	C-SER
Simulation-II (10%)	-1.276	-1.011	-0.61	-0.55	1.374	1.014	2.129	0.077
Simulation-I (5%)	-0.64	-0.506	-0.305	-0.274	0.688	0.507	1.06	0.039

Source: Simulation Results

Figure 8: Quantity of Imports for Commodities



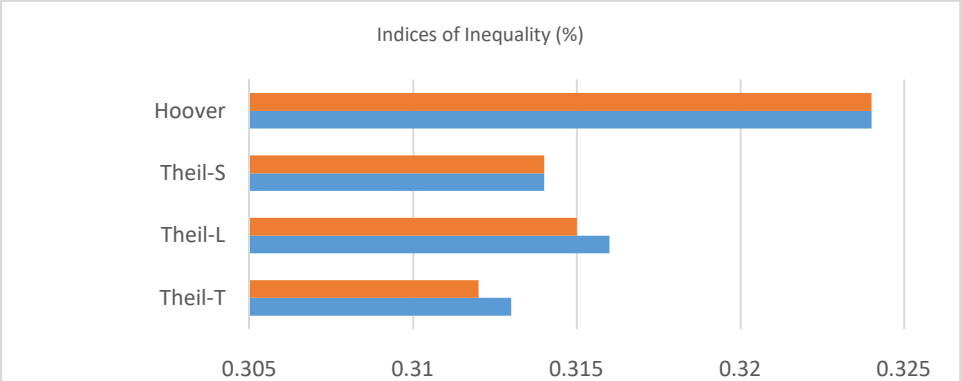
	C-AGRI	C-MINE	C-FMAN	C-YARN	C-TEXT	C-LEAT	C-MANF	C-SER
Simulation-II (10%)	1.215	1.723	0.802	0.757	0.248	-0.071	0.188	0.397
Simulation-I (5%)	0.606	0.858	0.4	0.377	0.123	-0.036	0.094	0.198

Source: Simulation Results

E. Inequality Indices

The inequality is measured by Theil Indices and Hoover Index. Household categoriesare the end of data constraints. In both the tests, the results ofthe tax mix policy show that by the shock of 5%, the inequality outcomes of Theil T and L, and Hoover`s stayed unaffected, while TheilS awards a smalldecrease from 0.315% to 0.314%. Likewise, in shock 10%, TheilT, TheilL, and TheilS all presentdecrease from 0.313% to 0.312%, from 0.316% to 0.315%, and from 0.315% to 0.314% respectively, although Hoover presents zero change, (see Figure 9).

Figure 9: Indices of Inequality



	Theil-T	Theil-L	Theil-S	Hoover
Simulation-II (10%)	0.312	0.315	0.314	0.324
Simulation-I (5%)	0.313	0.316	0.314	0.324

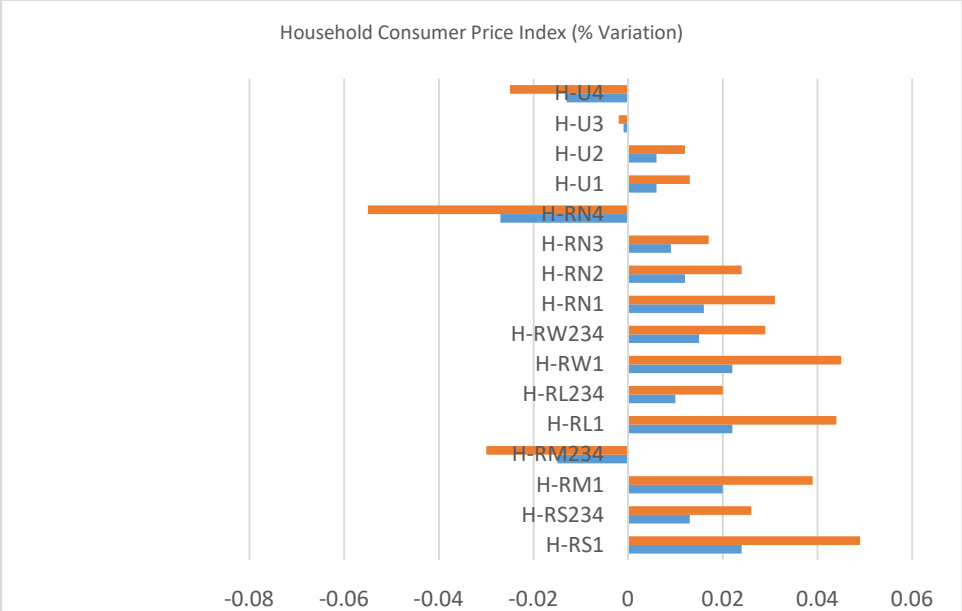
Source: Simulation Results

F. Impact of Price on inequality, welfare, and poverty

The policy of Tax mix showsthe favorableinfluence of household consumer price index on varioushouseholds` groups except a few,as;rural medium farmer (H-RM234) by 0.015% in experiment-I and 0.030% in experiment-II, rural non-farm (H-RN4) by 0.027% in Simulation-I and 0.055% in Simulation-II, urban (H-U3) by 0.001% in Sim-I and 0.002% in Sim-II, whileurban (H-U4) by 0.013% in Test-I and 0.025% in Test-II. However, all other results are positive. Therefore, welfare generally increased and inequality and poverty decreased (see Figure 10).

The Exchange Rate indicatesa positive result as well, it is 0.040% in Sim-I and 0.081% in Sim-II, which implies a positive effect onthe welfare of the households (see, Table/ Figure 11). Another positive effect is registered in Activities Priceand Producer Price for Commodities except leather (A-LEAT, C-LEAT) by 0.021% in Sim-I and 0.042% in Sim-II, A-MANF, other manufacturing (C-MANF) by 0.099% in Sim-I and 0.198% in Sim-II, and energy (A-ENRG, C-ENRG) by 0.180% in Sim-I and 0.361% in Sim-II. The highest impact is noticed on mining(A-MINE, C-MINE), it is 0.248% in Sim-I and 0.497% in Sim-II (see Figure 12).

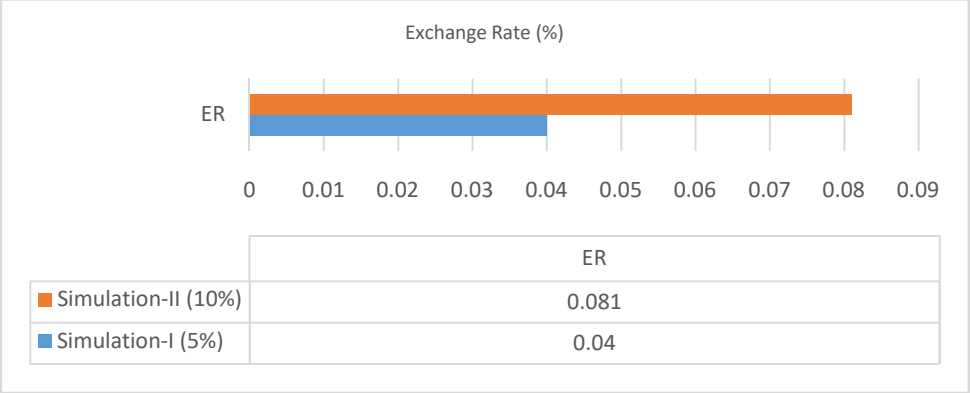
Figure 10: Household Consumer Price Index (% Variation)



	H-RS1	H-RS234	H-RM1	H-RM234	H-RL1	H-RL234	H-RW1	H-RW234	H-RN1	H-RN2	H-RN3	H-RN4	H-U1	H-U2	H-U3	H-U4
Simulation-II (10%)	0.0	0.0	0.0	-0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.	0.0	0.0	-0	-0
Simulation-I (5%)	0.0	0.0	0.0	-0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0	0.0	0.0	-0	-0

Source: Simulation Results

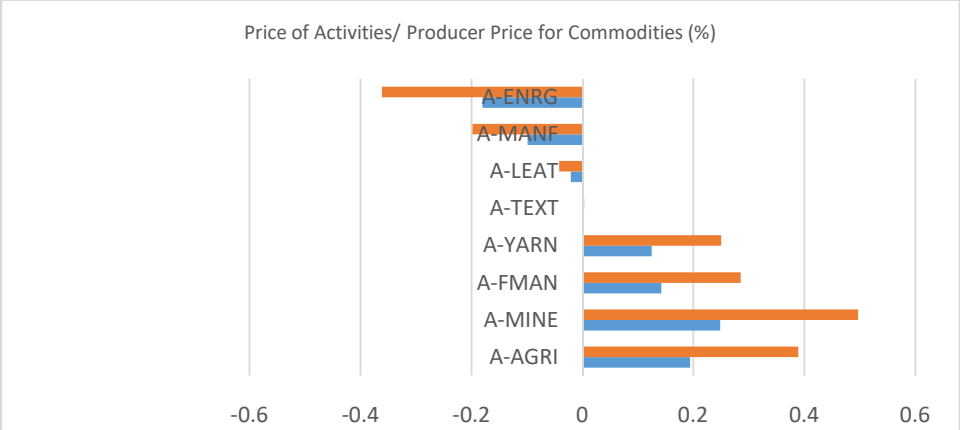
Figure 11: Exchange Rate
(Value of one unit of foreign currency in terms of domestic currency)



	ER
Simulation-II (10%)	0.081
Simulation-I (5%)	0.04

Source: Simulation Results

Figure 12: Price of Activities/ Producer Price for Commodities

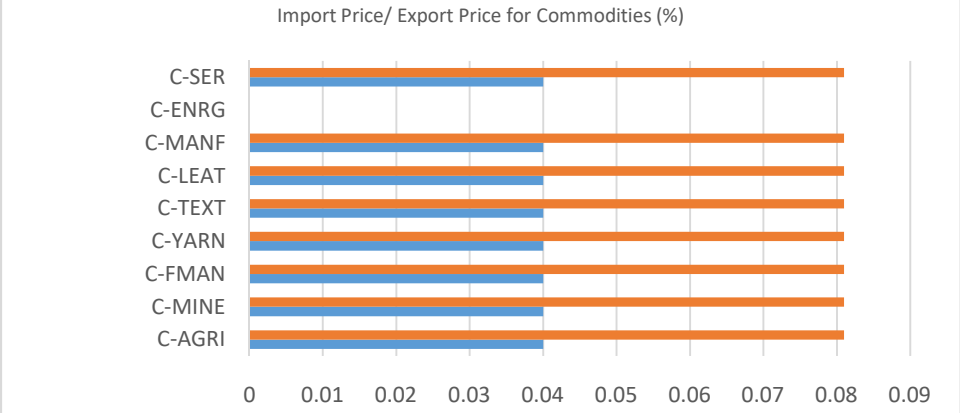


	A-AGRI	A-MINE	A-FMAN	A-YARN	A-TEXT	A-LEAT	A-MANF	A-ENRG
Simulation-II (10%)	0.389	0.497	0.285	0.25	0.003	-0.042	-0.198	-0.361
Simulation-I (5%)	0.194	0.248	0.142	0.125	0.001	-0.021	-0.099	-0.18

Source: Simulation Results

Correspondingly, Import and Export Prices for all the selectedcommodities in terms of domestic currencyshowa positive impact in the experiments (see Table 13).

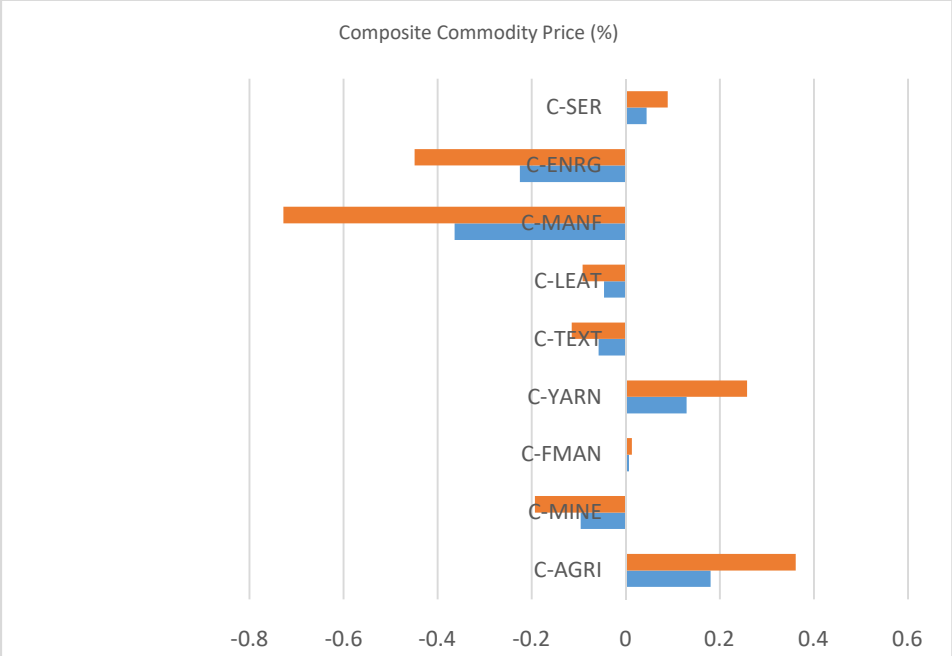
Figure 13: Import Price/ Export Price for Commodities (Domestic Currency)



	C-AGRI	C-MINE	C-FMAN	C-YARN	C-TEXT	C-LEAT	C-MANF	C-ENRG	C-SER
Simulation-II (10%)	0.081	0.081	0.081	0.081	0.081	0.081	0.081		0.081
Simulation-I (5%)	0.04	0.04	0.04	0.04	0.04	0.04	0.04		0.04

Source: Simulation Results

Figure 14: Composite Commodity Price



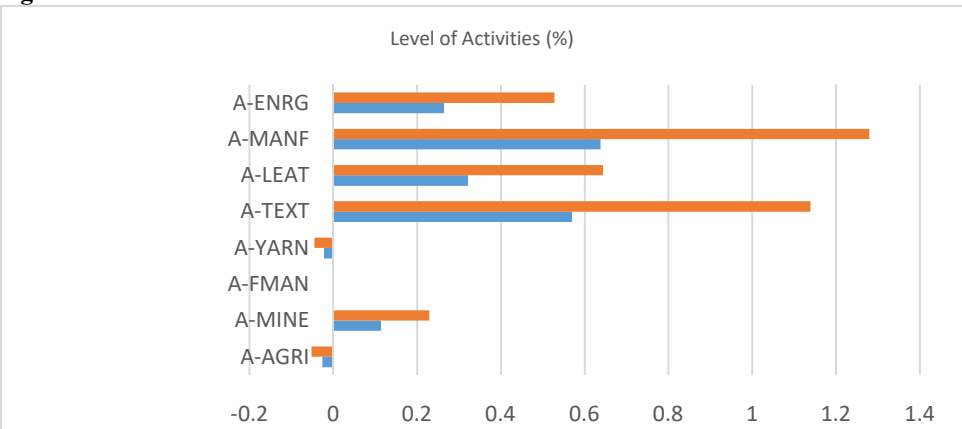
	C-AGRI	C-MINE	C-FMAN	C-YARN	C-TEXT	C-LEAT	C-MANF	C-ENRG	C-SER
Simulation-II (10%)	0.361	-0.193	0.013	0.258	-0.115	-0.092	-0.728	-0.449	0.089
Simulation-I (5%)	0.18	-0.096	0.007	0.129	-0.058	-0.046	-0.364	-0.225	0.044

Source: Simulation Results

Moreover, the policy of tax-mix denotes the negative effect on the Price of commodities likeC-MINE (mining) by 0.096% in Test-I and 0.193% in Test-II, C-TEXT (textile) by 0.058% in experiment-I and 0.0115% in experiment-II, C-LEAT (leather) by0.046% in Sim-I and 0.092% in Sim-II, C-MANF (other manufacturing) by 0.364% in Test-I and 0.728% in Test-II, andC-ENRG (energy) by 0.225% in Trial-I and 0.449% in trial-II (see Figure 14). Composite Commodity Price is positive in both the simulations for all other commodities.

The experimentalso explainsa favorable effect on 6-activities except 3, likeA-AGRI (agriculture) by 0.026% in Test-I and 0.052% in Test-II, A-FMAN (food manufacturing) by $5.75960e^{-4}$% in experiment-I and 0.001% in experiment-II, andA-YARN (cotton lint/ yarn) by 0.022% in Trial-I and 0.045% in Trial-II. The highest positiveimpact is narrated on A-LEAT (leather) by 0.322% in Sim-I and 0.644% in Sim-II (see Figure 15).

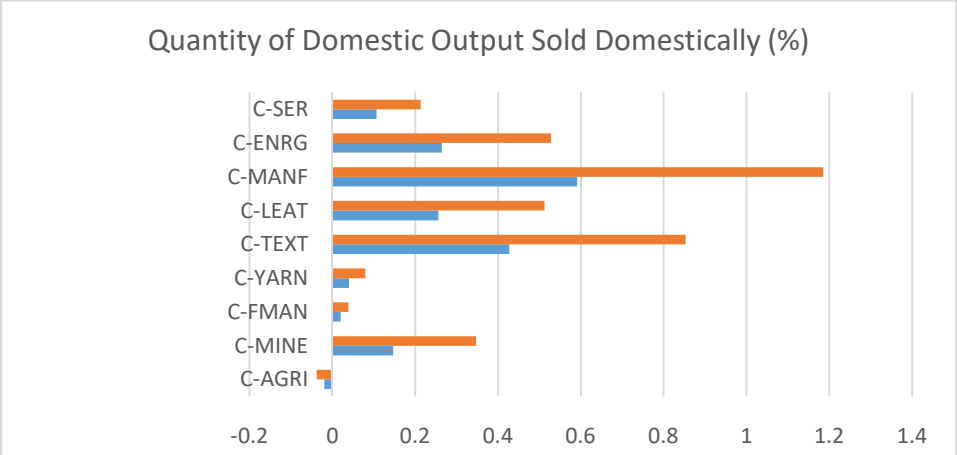
Figure 15: Level of Activities



	A-AGRI	A-MINE	A-FMAN	A-YARN	A-TEXT	A-LEAT	A-MANF	A-ENRG
Simulation-II (10%)	-0.052	0.229	-0.001	-0.045	1.139	0.644	1.279	0.528
Simulation-I (5%)	-0.026	0.114	-5.76E-0	-0.022	0.57	0.322	0.638	0.264

Source: Simulation Results

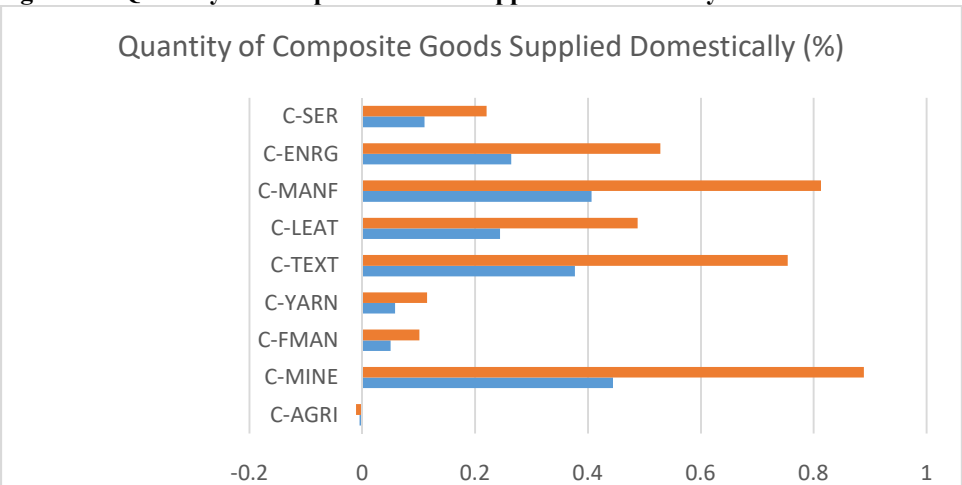
Figure 16: Quantity of Domestic Output Sold Domestically



	C-AGRI	C-MINE	C-FMAN	C-YARN	C-TEXT	C-LEAT	C-MANF	C-ENRG	C-SER
Simulation-II (10%)	-0.038	0.347	0.039	0.08	0.853	0.512	1.185	0.528	0.213
Simulation-I (5%)	-0.019	0.147	0.02	0.04	0.427	0.256	0.591	0.264	0.107

Source: Simulation Results

Figure 17: Quantity of Composite Goods Supplied Domestically

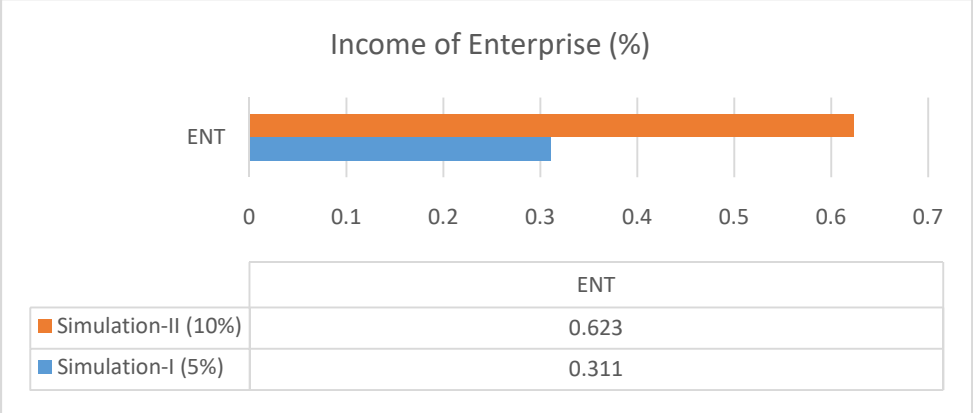


	C-AGRI	C-MINE	C-FMAN	C-YARN	C-TEXT	C-LEAT	C-MANF	C-ENRG	C-SER
Simulation-II (10%)	-0.011	0.889	0.101	0.115	0.754	0.488	0.813	0.528	0.22
Simulation-I (5%)	-0.005	0.444	0.05	0.058	0.377	0.244	0.406	0.264	0.11

Source: Simulation Results

The tax mix policyaffects positively the Domestic Output quantityTradedDomestically in addition to theComposite Goods quantity Domestically suppliedin both the tests except for only single commodity agriculture(A-AGRI), it is noted by 0.019% in Test-I and 0.038% in test-II (see Figure 16) and 0.005% in Sim-I and 0.011% in Sim-II (see Figure 17). The positive impact is recorded on the Income of the Enterprise also.It is 0.311% in experiment-I and 0.623% in -II (see Figure 18)

Figure 18: Income of Enterprise



	ENT
Simulation-II (10%)	0.623
Simulation-I (5%)	0.311

Source: Simulation Results

VI. Conclusions and Policy Implications

To investigatethe effect of income taxandsales tax simultaneously, on inequality, welfare, and poverty in Pakistan, Computable General Equilibrium Model and used Social Accounting Matrix for the period 2010-11are used for analysis. For thispoint, a couple of simulationsareexperimented with, that is, a 5% and 10%increase in direct (income) tax and a 5% and 10% decrease inindirect (sales) tax at the same time.The outcomes of this investigationshowthat commonly, this policyfiled acceptable effects ongrowing the welfare of households and diminishing inequalityincluding poverty in Pakistan.

According to all the above findings, this studyrecommends that increasingdirect(income) tax and decreasingindirect(sales) tax simultaneously,has a favorable impact on the welfare of all thecategories of households and diminishes poverty as well as inequality. Scorn, household groups living in rural areasdescribe a comparatively less increase over the urban.Positive effect on the balance of trade, exchange rate, household consumer price index, composite commodity prices, commodities` export and import prices, the quantity of domestic output sold in the domestic market, activities level, quantity of composite goods supplied domestically, enterprise income indicate favorable influence on welfare. All the macroeconomic variables are positively affected by imposing the suitable combination of direct and indirect tax. Accordingly, the empirical evidence recommends this manner of mix-tax policyforsustainability of Pakistan's economy.

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