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Welfare and Development Implication of Optimal Tax Combinations: Pakistan A Case-in-Point

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Abstract

This article reports the effect of increasing income tax and reducing sales tax simultaneously on increasing welfare and decreasing income inequality as well as poverty in Pakistan. For this purpose, Pakistan`s most recent Social Accounting Matrix (SAM) 2010-11 is focusedand Computable General Equilibrium (CGE) model is employed to assess the impacts. SAM was developed by Dorosh et al. in 2015, while the model is congruent with Naqvi.To assessthe impacttwo experiments of simulation-I (5%) and simulation-II (10%) are presented. The results of the study show favorable impacts on the increase in the welfare of all the households and positive effects on decreasing inequality of income as well as poverty in the economy of Pakistan. In the light of outcomes, the study recommends that a mix-tax strategy can be helpful to achieve economic stability.

Keywords:

Income Tax, SalesTax, Computable General Equilibrium Model, Social Accounting Matrix, Welfare, Inequality, Poverty, Economic Stability.

JEL Classification Codes: C15, C68, D02, E16, F63

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1. Introduction

Neo-classical economists claim that taxation influences growth perpetually (Bleaney et al. 2000). Indirect taxes end in an increase in consumption as well as savings due to an increase in real income, and thus increase in investment, employment of factors and resources and hence welfare, and reducing the gap between rich and poor, which eventually leads to economic stability. This changesthe capital-output ratio and accordingly production path and steady-state rate of growth (Barro et al. 1991).

A policy mix of increasing direct tax and decreasing indirect taxes can effectively result in reducing income inequality as well as poverty and increasing welfare. Through this strategy, the real income of the households improves, as a result, consumption power is encouraged, which ultimately increases welfare and reduces poverty. Especially, the low-income category of households getsan increase in their real wages and becomes able to save for their future. This saved money becomes part of the capital to invest in the future in one or another way. It generates employment opportunities and a path for economic development and growth. The main objective of this study is to find the concrete corollaries through simulation experiments that up to what degree the households of different categories get ridoftheir poverty. up to what extent does this step of the government reduce the gapamong high and low-income groups of the country, and up to what level does it improve the welfare of all types of households residing in Pakistan?

To this end, we considered a social accounting matrix (SAM) for 2010-11, which was advanced in 2015 by Dorosh et al., for the Pakistan economy.This matrix comprises 172×172 rows (incomes) and columns (expenditure),which contain huge and complete statistical information about various eminent sectors of Pakistan's economy. We used Static Computable General Equilibrium (CGE) model to come up with the outcomes.

To diminish the poverty and inequality gap, increase the welfare of the households, and achieve sustainable economic development and growth, it is necessary to reduce the budget as well as trade deficits to the level of zero. Suitable adjustments in tax reforms are required to target the point, as the present study presents. Reducing indirect tax like sales tax and increasing direct tax like income tax mix policy can be effectively helpful in this regard, as this study finally shows through indicating reduction in the gap between the haves and have nots, decreasing the level of poverty, and increasing overall welfare of the households of all the categories.

The question that whether the instruments of fiscal policy impact inequality, poverty, and welfare has been widely analyzed in the literature. Changes in direct and indirect taxes influence the pattern of households` living and all the economic activities like earning income, making the expenditure, managing savings, framing investments, etc., and ultimately economic stability. For Pakistan`s economy, to remove poverty, reduce income inequality, and increase welfare, taxation instrumentsare required to achieve the targets.

A. A. Bhatti, et al. (2015) utilized two simulations sets to analyze the impact of taxes as well as transfer payments on income inequality and concluded thatindirect tax like sales tax or transfer payments alone can influence the income distribution form, even if it reduces budget deficit at the same period. Likewise, the same investigators(2015) observed in different analyses and discovered that Fiscal policy can abolish the gap between the haves and have-nots directly together with indirectly. The instruments of fiscal policy candidly affect the disposable income of the households, whereas indirectly their imminent capacities of earnings.

Dehghan and Nonejad (2015) noticed the adverse effect on Iran`s growth when investigating the influence of business, corporate, and indirect taxesfor the period 1981-2010 by using the least square method. Phiri (2016) examined the impact of indirect and direct taxes and growth for South Asia from 1990-Q1 to 2015-Q2 and found economic growth positively related to indirect taxes whereas negatively to direct taxes. The study by Nmesirionye, J.A. et al. (2019) reveals the positive impact of value-added tax, custom-duty, and excise duty on the real gross domestic product of Nigeria for the years 1994 to 2017 by using the ex-post-facto method.

Lustig et al. (2014) investigated that income inequality and poverty decreased through direct taxes and transfers significantly in Argentina, Uruguay, and Brazil, whereas in a very small amount in Peru, Bolivia, and Mexico. The researchers argue that cash transfers are progressive except in Bolivia where the plans are not aimed at low-income households. Direct taxes are also progressive but with minor redistributive effects because the share of direct taxes in the gross domestic product is normally low.Their study further explores that indirect tax offsetsthe poverty rection effect of transfers in Brazil and Bolivia.As one

incorporates in-kind cash transfers in the sectors like health and education, valued at public sector costs, decreases income inequalityis significantly high as compared to transfers.

Rossignolo, D. (2017)examined the effect of taxand spending strategies on poverty and distribution of income in Argentina by considering the data about income and spending 2012-13 from the national household survey and found that fiscal policy is an effective instrument in reducing poverty, and inequality but the study also pointed out that public spending may result into unsustainability in plans. Similarly, for the Indonesian economy, Amir et al. (2013) analyzed the impact of income tax reforms on major macroeconomic indicators, poverty, and income distribution. The study found that income tax (personal as well as corporate) results in an increase in economic growth under the assumption of a balanced budget. The results show a small reduction in poverty but an increase in inequality because tax cut benefits the upper-income class of the households.

For the economy of Pakistan, Mashkoor et al. (2010) analyzed data from 1973-2008 by employing the ARDL technique and found that direct taxes are a significant reason for the growth of the real gross national product. Similarly, H. A. Naqvi (2011) examined the impact of imposing agricultural income tax, and reducing sales tax rates and closed that this strategy should be taken to increase the welfare of the households living in Pakistan. In 2015, Iqbal et al. examined Pakistan's economy`s datafrom 1979-2010 and concluded the favorable impact of general taxation on the growth of the economy.

2. Estimation Technique

The computable General Equilibrium Model is utilized to estimate the effect of decreasing sales tax and increasing income tax mix on inequality, poverty, and welfare. CGE Modelling provides all-inclusive and reliable algebraic matrix designed input-output numerical facts concerning key sectors of the economy as types of households, categories of commodities, forms of institutions, and factors of production, which is following the static model composition created by Lofgren et al. (2002). This analysis envelops the influence of all prominent economic indicators in the milieu of a singlemodel, harmonized with Naqvi (2010).

Pakistan`s current Social Accounting Matrix (2010-11) is counted as a scale, which was established by Dorosh et al. in 2015. This SAM comprises 172 columns (expenditures) and 172 rows (incomes) of the Pakistan economy during this period. The SAM 2010-11 forthe Pakistan economy takes account of 64 activities, 63 commodities, 12 factors, 16 types of households, and 17 other key accounts. For this study, this SAM is segregated into 47 columns and 47 rows. The questions are ascertained by inclusive equations` set for CGE operating. Running the matrix in General Algebraic Modeling System to find the outcomes and then recommendingthe strategies to solve the problems in question of the economy. The model`s equations endorse the satiation of evaluation of production market, factor market, savings, investment, and balances of current accounts. The study does not utilize second-time variations as it is a typical static system. All the equations formed here state the interrelationship of all the sectors of the economy.

The matrix demonstrates real sums for coefficients, which are clarified for equilibrium first and then shocked by the changes in the values of exogenously selected variables. Afterward, resolved again and finally, the outcomes have corresponded with the values of source time equilibrium and hence the exogenic shocks` impact is evaluated.

The segregated SAM model 9-Activities, 9-Commodities, 3-Factors, 16-Households types, and 10-Other Key Accounts of the country. The activities and Commodities consist of and are denoted symbolically by Agriculture [A-AGRI, C-AGRI], Minerals [A-MINE, C-MINE], Food manufacturing [A-FMAN, C-FMAN], Yarn [A-YARN, C-YARN], Textile [A-TEXT, C-TEXT], Leather [A-LEAT, C-LEAT], Other Manufacturing [A-MANF, C-MANF], Energy [A-ENRG, C-ENRG], and Services [A-SER, C-SER]. The factors of production are Labor, Land, and Capital [LAB, LND, CAP]. The households are grouped (Quartile) into Rural Small Farmers [H-RS1, H-RS234], Rural Medium Farmers [H-RM1, H-RM234], Rural Landless Farmers [H-RL1, H-RL234], Rural Farm Workers [H-RW1, H-RW234], Rural Non-Farm [H-RN1, H-RN2, H-RN3, H-RN4], and Urban [H-U1, H-U2, H-U3, H-U4]. While, the other 10 key accounts of the country contain Transaction [TRC], Enterprise [ENT], Government [GOV], Subsidies [SUB], Sales Tax [STAX], Import Duty [MTAX], Rebate [ETAX], Direct Tax [DTAX], Saving-Investment [S-I], and Rest of the World [ROW].

2.1 Equation`s Block

The Model coversprice, production & commodity, institution, and system constraint blocks, whichcontainsets of equations (Equations can be offered if requested).

2.1.1 Price Block

Price block in this model includes the set of equations that consists not only of endogenous prices but exogenous also. Moreover, this block contains non-price indicators too. PX stands for activity manufacturer price which covers taxes during the process of production as well. Likewise, PE, the export price, and MP, the import price also include the tax on exports and tax on imports respectively. Finally, PQ, the product`s final market price takes in sales taxoverly.

2.1.2 Production & Commodity Block

Profit maximization is the basic aim of all the activities, which depends upon their production function, transmutability, and static coefficient. Moreover, it is also subject to constant returns to scale. Entrepreneurs opt for the inputs and factors on CES, which permit them to react to the relative variations of input returns. The rewards of the factors are determined as per the rule of factors` marginal cost and marginal revenue equality, confirmed on the crux of endogenous relative prices.The CGE model assumes that each activity can produce only one product. In this model, factors are combined with fixed share to determine the production methodology by employing the Leontief order. This block reports domestic inputs` employment and output, output`s allocation in internal and external markets, and internal market supply sum. The cobb-Douglas production function is handled to attain the relationship between activities and inputs.

2.1.3 Institutions Block

Households, enterprises, and Government are the main institutions in this model. Households are the owners of factors, therefore rewards of labor, land, and capital are an aid to value-added. Rent and wages are the rewards of land and labor owners, while interest goes to enterprises and the government as a share of the initial endowment of capital.Government revenue comprises taxes on factors of production and transfers from outside the country, whereas government spending is her consumption and transfers to other

countries.Returns on capital are the income source of enterprises. The enterprises make payments to cover savings and transfers. Moreover, it is supposed that enterprises do not consume commodities.When Government income and expenditure are equal, her budget is called balanced. A deficit budget can only be financed through the country`s capital market. Pakistan`s CGE model considers the role of the Government as a consumer. Its expenditure is fixed. Its transfers are fixed in nominal terms, i.e., transfers are CPI indexed.

2.1.4 System Constraint Block

System constraint block indicates the behavioral equations, which are developed with certain limitations matching to the structure where the selected variables adjust for achieving the goal of macroeconomic stability. Factors supply should be as per their demand in the economy`s activities. similarly, equality in income and expenditure is also required for the current account balance for the rest of the world. Moreover, the saving-investment constraint is also stated. To manage this balance, an elastic scalar across non-government institutions is multiplied by rates of savings.

2.1.5 Price Normalization

The CGE Model hypothesis is zero degrees homogeneous. For this norm price normalization equation is formed to prove an exclusive solution, which convalesces the gauges of CPI.

2.2 Model Closure

CGE Model encompasses endogenous as well as exogenous variables. The number of endogenous variables is always equal to the number of equations. Under the macroeconomic hypothesis,

While running the model, the impact on equilibrium is evaluated, which is realized as a result of changes in the values of exogenous variables. Savings from abroad are assumed as fixed, so for current account clearance, a flexible exchange rate is treated. Model supposed saving driven investment to verify saving investment account. Flexible factors enable investmentto adjust because the model assumes savings as fixed.Capital is stated as the main active factor in all activities of the model, therefore the capital market can be cleared through changing fixed capital price and factor price alteration.

3. Data and Sources

Dorosh et al. (2015) developed a 172X172 Social Accounting Matrix (SAM) for the year 2010-11 for Pakistan which is segregated into 47X47 for this analysis, i.e., the sectors except households emerged as; 64-Activities into 9-Activities, 63-Commodities into 9-Commodities, 12-Factors into 3-Factors, 17-Other Accounts into 10. The SAM expresses income in rows and expenditure in columns and it is fully balanced.

3.1 Structure of Social Accounting Matrix (2010-11)

The structure of SAM shows the sector-wise form of the economy of Pakistan for the years 2010-11. It presents a correlation between consumption expenditure, investment expenditure, and production of commodities. It figures eminent 47 accounts column-wise (expenditure) and row-wise (income). The accounts are titled; Activities [A1-A9], Commodities [C1-C9], Factors [F1-F3], Households [F1-F16], and Other Accounts. Other Accounts are headed as; Transaction Cost [TRC], Enterprises [ENT], Government [GOV], Subsidies [SUB], Sales Tax [STAX], Import Tax [MTAX], Direct Tax [DTAX], Saving-Investment [S-I], and Rest of the World [ROW]. Energy [ENRG] can only be produced and consumed internally.

The column directed by GOV, S-I, and ROW versus rows C1-C9 communicates indirect taxes, investment expenditure on commodities, and Pakistan`s exports. Rewards, sources, and their distribution among households, enterprises, government, and institutions are expressed by factors accounts. The household types H1-H12 are arranged according to the title of the land, whereas H13-H16 are approved as per the urban area. Expenditure of the enterprises is shown by the savings and transfers to the institutions. The gross profit of the enterprises is attainable on their capital account. The column titled by GOV reveals the government`s spending on consumption, transfers, and savings, while the row headed by GOV indicates the government`s revenue from direct taxes, indirect taxes, and transfers. Investment is financed by savings, it is presented by a capital account. Pakistan`s exports-imports are exposed by ROW beside the C1-C9 column, which shows income from abroad. Equality of revenue and spending of ROW is displayed by column S-I through foreign savings in the capital account, which exhibits the balance of the current account.

3.2 Trade Elasticities

Armington Elasticity is used to measure the degree of substitution of domestic products with products of the rest of the world. If the elasticity is low, it means foreign commodities are less reliable substitutes for domestic commodities, whereas more trustable in case of high elasticity.

4. Results of the Experiments

To estimate the impact of the increase in direct tax and decrease in indirect tax on improving the households` welfare, and reducing inequality as well as poverty in Pakistan, two experiments are performed. Simulation-I is tested by 5% and -II by 10%. The sectoral and overall sequels are recorded as under.

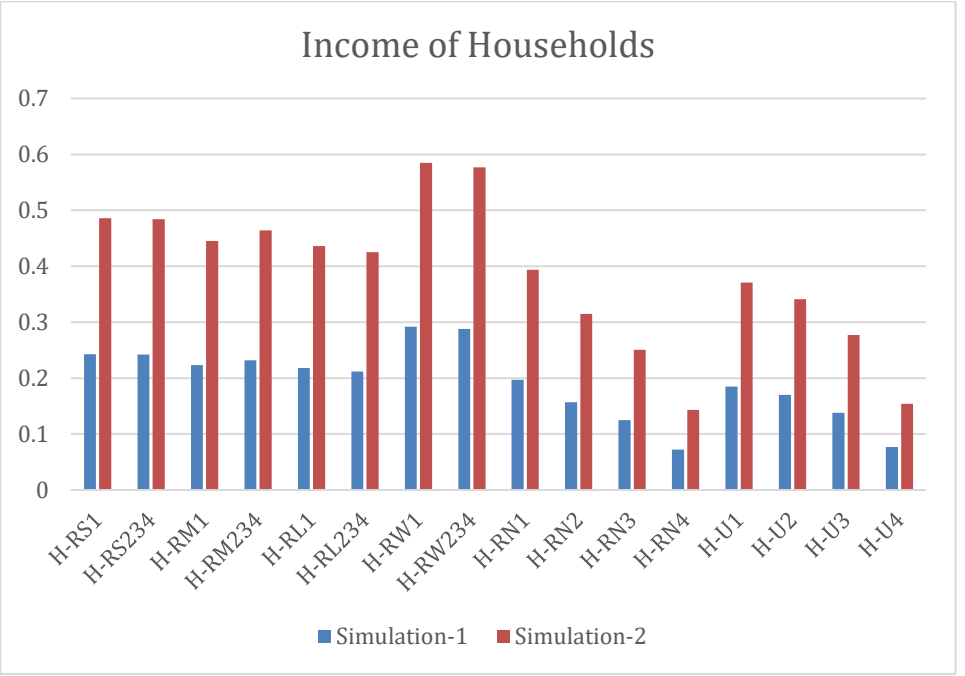
4.1 Income of Households

Both the simulation results indicate a positive impact on all types of households. Real income decreases by the action of increasing income tax while increasing through decreasing sales tax. In this tax mix policy, the outcomes show improvement in the real income of the households.As a result, the consumption power of the households increases accordingly, which boosts their welfare level. A simultaneous increase in income tax and a decrease in sales tax by 5%, and then by 10% shows the following impact.Category wise households` real income increase is recorded as; for H-RS1 (rural small farm) by [0.243% and 0.486%], for H-RS234 (rural small farm) by [0.242% and 0.484%], for H-RM1 (rural medium farm) by [0.223% and 445%], for H-RM234 (rural medium farm) by [0.232% and 0.464%], for H-RL1 (rural large farm) by [0.218% and 436%], for H-RL234 (rural large farm) by [0.212% and 425%], for H-RW1 (rural farm workers) by [0.292% and 0.585%], for H-RW234 (rural farmworker) by [0.288% and 0.577%]. Similarly, for H-RN1 (rural non-farm) by [0.197% and 0.394%], for H-RN2 (rural non-farm) by [0.157% and 0.315%], for H-RN3 (rural non-farm) by [0.125% and 0.251%], and for H-RN4 (rural non-farm) by [0.072% and 0.143%]. The urban households` increase in real income is noted as; for H-U1 (urban) by [0.185% and 0.371%], for H-U2 (urban) by [0.170% and 0.341%], for H-U3 (urban) by [0.138% and 277%], and for H-U4 (urban) by [0.077% and 0.154%] respectively. (see Table:4.1)

Table 4.1 Income of Households

Households	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
H-RS1	266.794	267.441	0.243	268.090	0.486
H-RS234	2162.746	2167.976	0.242	2173.218	0.484
H-RM1	14.465	14.497	0.223	14.529	0.445
H-RM234	863.868	865.871	0.232	867.878	0.464
H-RL1	196.529	196.957	0.218	197.386	0.436
H-RL234	932.712	934.694	0.212	936.680	0.425
H-RW1	200.420	201.005	0.292	201.592	0.585
H-RW234	620.021	621.806	0.288	623.596	0.577
H-RN1	400.802	401.591	0.197	402.381	0.394
H-RN2	556.320	557.196	0.157	558.073	0.315
H-RN3	754.234	755.180	0.125	756.128	0.251
H-RN4	1297.821	1298.751	0.072	1299.682	0.143
H-U1	232.361	232.792	0.185	233.224	0.371
H-U2	565.192	566.154	0.170	567.119	0.341
H-U3	1207.981	1209.654	0.138	1211.331	0.277
H-U4	6499.509	6504.496	0.077	6509.492	0.154

Source: Simulation Results



Source: Simulation Results

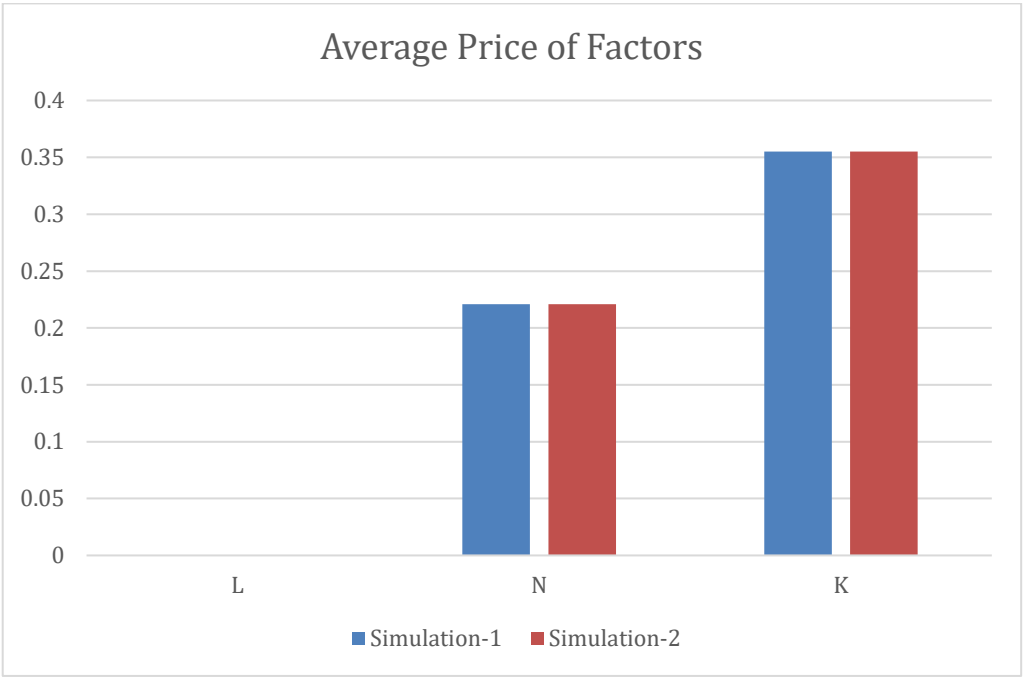
4.2 Average Price of Factors

The impact of this policy mix trialis positive onfactors` average prices. The simulations'bare rise in the capital`s average price is higher than the land`s. In simulation-I, this growth, for land is observedat 0.221%, while for capital it is 0.355%. In simulation-II, the increase is noticed by 0.442% for land and 0.711% for capital respectively (see, Table 4.2).This increase in the average price of the factors means an increase in the welfare of the owners of these factors (i.e., households) as well as areduction in poverty, which ultimately increases the welfare of the people living in Pakistan. Because higher-income results in encouraging the consumption level which boosts up the standard of living and hence growth as well.

Table 4.2 Average Price of Factors

Factors	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
L	1.059	1.059	-	1.059	-
N	1.388	1.391	0.221	1.394	0.221
K	0.965	0.968	0.355	0.972	0.355

Source: Simulation Results



Source: Simulation Results

4.3 The welfare of the Households

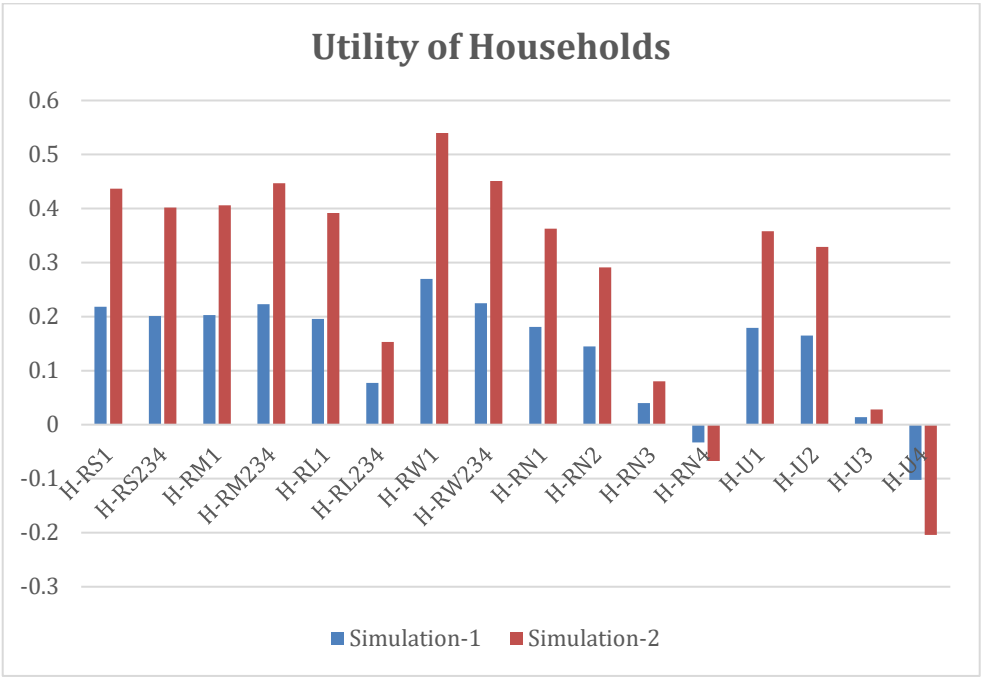
Except forH-RN4 (rural non-farm) and H-U4 (urban), all other types of households benefitted from the experiment of mix policy in this study. Highly benefitted categories are recorded like H-RS1and H-RS234 (rural small farm), H-RM1and H-RM234 (rural medium farm), H-RL1and H-RL234 (rural large farm), H-RW1and H-RW234 (rural farm workers), whereas less benefitted types of the households noted are H-RN1, H-RN2, H-RN3, and H-RN4 (rural non-farm) and H-U1, H-U2, H-U3, and H-U4 (urban), (see Table 4.3.1). Likewise, the same trend is demonstrated in their consumption expenditure (see Table 4.3.2). The increasing propensity in consumption reflects the increase in utility, i.e., welfare.The negative impact of these two experiments is noticed only in two types of households: H-RN4 and H-U4. Their income and therefore consumption fall but minorly. The overall result is in favor of the economy`s welfare increase. An increase in income encourages the households to increase savings, which results in improving investment and employment simultaneously. And finally, reducing poverty in general. Compared with all other studies, this analysis gives concrete favorable results in the sense that a major number of households get welfare through the implementation of an increase in income tax and

reducing sales tax. Many the households are ofthe medium or low-income class, so they enjoy relief from indirect taxes.

Table 4.3.1 Utility of Households

Households	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
H-RS1	209.026	209.482	0.218	209.939	0.437
H-RS234	1574.720	1577.883	0.201	1581.052	0.402
H-RM1	11.550	11.573	0.203	11.597	0.406
H-RM234	562.715	563.972	0.223	565.232	0.447
H-RL1	157.381	157.689	0.196	157.998	0.392
H-RL234	717.089	717.639	0.077	718.188	0.153
H-RW1	171.265	171.727	0.270	172.190	0.540
H-RW234	505.740	506.879	0.225	508.021	0.451
H-RN1	336.441	337.050	0.181	337.660	0.363
H-RN2	459.968	460.637	0.145	461.308	0.291
H-RN3	567.222	567.449	0.040	567.676	0.080
H-RN4	826.154	825.877	-0.033	825.600	-0.067
H-U1	187.381	187.717	0.179	188.053	0.358
H-U2	447.636	448.372	0.165	449.110	0.329
H-U3	904.536	904.662	0.014	904.786	0.028
H-U4	4153.751	4149.511	-0.102	4145.265	-0.204

Source: Simulation Results

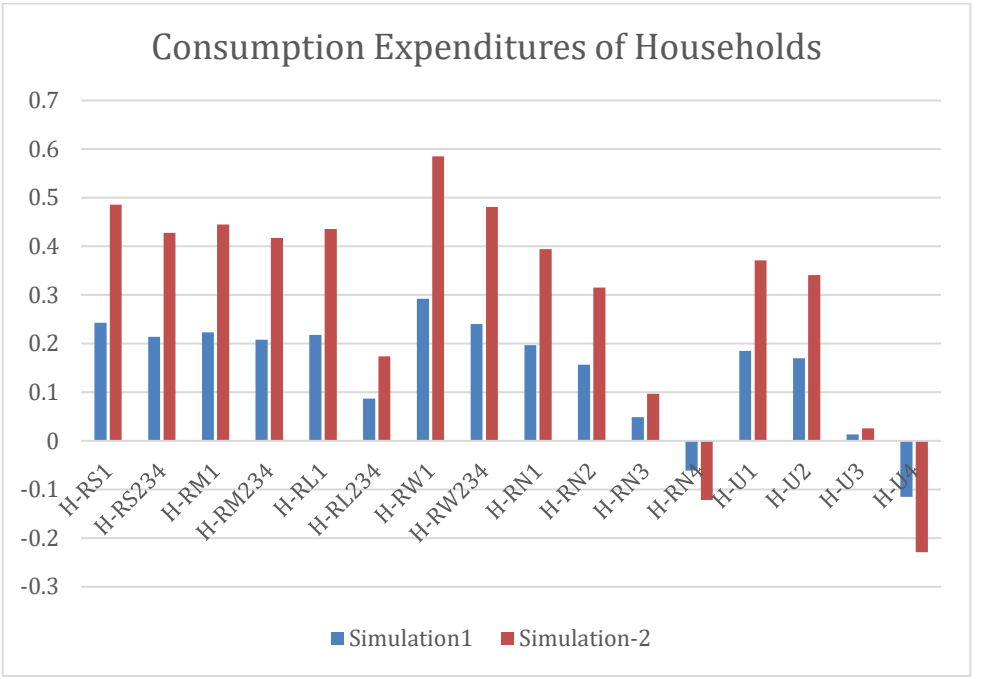


Source: Simulation Results

Table 4.3.2 Consumption Expenditures of Households

Households	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
H-RS1	243.869	244.461	0.243	245.053	0.486
H-RS234	1821.438	1825.330	0.214	1829.230	0.428
H-RM1	13.482	13.512	0.223	13.542	0.445
H-RM234	653.910	655.272	0.208	656.636	0.417
H-RL1	183.739	184.139	0.218	184.540	0.436
H-RL234	831.864	832.587	0.087	833.308	0.174
H-RW1	199.493	200.076	0.292	200.660	0.585
H-RW234	586.354	587.761	0.240	589.172	0.481
H-RN1	392.490	393.263	0.197	394.037	0.394
H-RN2	534.257	535.098	0.157	535.941	0.315
H-RN3	655.291	655.609	0.049	655.928	0.097
H-RN4	944.746	944.172	-0.061	943.597	-0.122
H-U1	217.622	218.025	0.185	218.429	0.371
H-U2	516.694	517.574	0.170	518.456	0.341
H-U3	1039.996	1040.129	0.013	1040.261	0.026
H-U4	4706.977	4701.581	-0.115	4696.179	-0.229

Source: Simulation Results



Source: Simulation Results

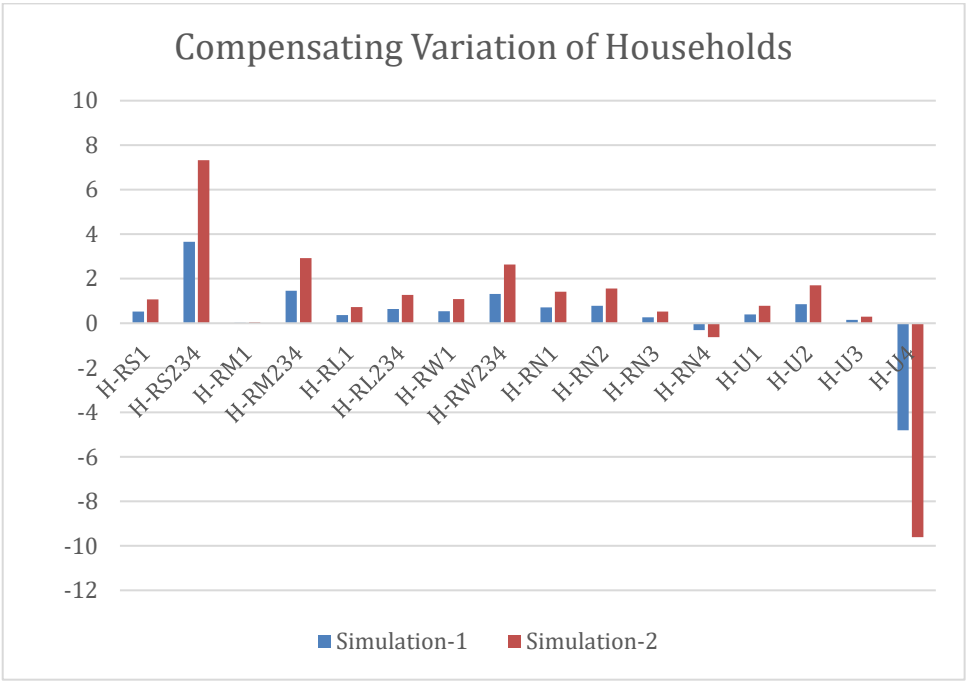
Households` Compensating variation (CV) verifiedprogressingimpact on 14types of households. Only two types are worsened. The highest value of CV is documentedby H-RS234 (rural small farm), which is estimated at 3.659% in simulation-I, while 7.326% in simulation-II. It is because of the increase in land`s average price. While, a high adverse effect is noted for the householdH-U4 (urban), which is 4.804% in simulation-I and 9.613% in simulation-II. Rest all categories of the households are noticed with improvementin welfare, except H-RN4 (rural non-farm), whose welfare droppedby 0.316% and 0.632% in simulation-I and -II respectively. The compensating variation of all other householdsgrewin both experiments.

Increase in the welfare recorded for the households is H-RS1 (rural small farm) by 0.532% and 1.066%, for H-RM1 (rural medium farm) by 0.027% and 0.055%, for H-RM234 (rural medium farm) by 1.460% and 2.924%, for H-RL1 and H-RL234 (rural large farm) by 0.360%, 0.638% and 0.720%, 1.275%, for H-RW1 and H-RW234 by 0.538%, 1.321% and 1.079%, 2.645%, for H-RN1, H-RN2, H-RN3 (rural non-farm) by 0.711%, 0.777%, 0.262% and 1.423%, 1.557%, 0.524%, and finally for H-U1, H-U2, H-U3 (urban) by 0.390%, 0.850%, 0.144% and 0.780%, 1.702%, 0.288%. (see Table 4.3.3)

Table 4.3.3 Compensating Variation of Households

Households	Simulation-I [5%]	Simulation-II [10%]
H-RS1	0.532	1.066
H-RS234	3.659	7.326
H-RM1	0.027	0.055
H-RM234	1.460	2.924
H-RL1	0.360	0.720
H-RL234	0.638	1.275
H-RW1	0.538	1.079
H-RW234	1.321	2.645
H-RN1	0.711	1.423
H-RN2	0.777	1.557
H-RN3	0.262	0.524
H-RN4	-0.316	-0.632
H-U1	0.390	0.780
H-U2	0.850	1.702
H-U3	0.144	0.288
H-U4	-4.804	-9.613

Source: Simulation Results



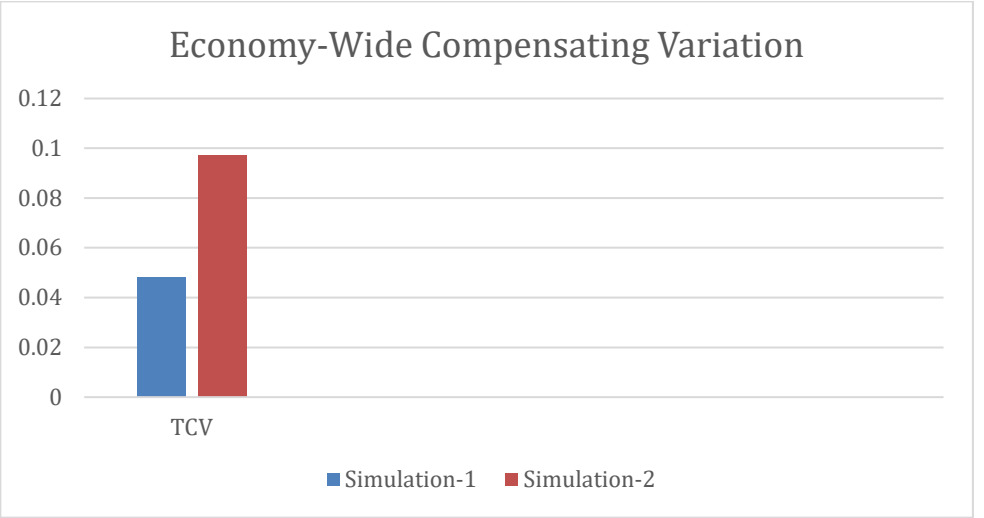
Source: Simulation Results

Correspondingly, the compensating variation associatedwiththe all-economy also confirms auspicious results. In Experiment-I, 0.048% growth in compensating variation is registered and it is mapped by 0.097% in test-II (see, Table 4.3.4)

Table 4.3.4 Economy-Wide Compensating Variation

Compensating Variation	Simulation-I [5%]	Simulation-II [10%]
TCV	0.048	0.097

Source: Simulation Results



Source: Simulation Results

An increase in the households`welfare explainedabove,correspondswith the risein their average prices which is the result of the increase in their real income. As 0.221% growth is proved in the simulation-I and 0.442% in sim-II documented for land (N), while for capital (k) it is reportedin simulation-I by 0.355% and 0.711% in simulation-II respectively (see, Table 4.2)

4.4 Balance of Trade

The experiment onincome and sales tax mix policy resulted inan adverse impact in both the simulations on the export of 4 commodities. Fall in exports are registered such as C-AGRI (agriculture) by 0.640% and 1.276%, C-MINE (mining) by 0.506% and 1.011%, C-FMAN (food Manufacturing) by 0.305% and 0.610%, and C-YARN (cotton lint/ yarn) by 0.274% and 0.550%. conversely, import of the same commodities is recorded as 0.606% and 1.215% in C-AGRI, 0.858% and 1.723% in C-MINE, 0.400%, and 0.802% in C-YARN. This ultimately results in a decrease in receipts from, and an increase in payments abroad (see, Table 4.4.1, and Table 4.4.2).

On the other hand,a favorable effect is recorded on the export of the remaining selected 4 commodities of the model like C-TEXT (textile) by 0.688% and 1.374%, C-LEAT (leather) by 0.507% and 1.1014%, C-MANF (other manufacturing) by 1.060% and 2.129%, and

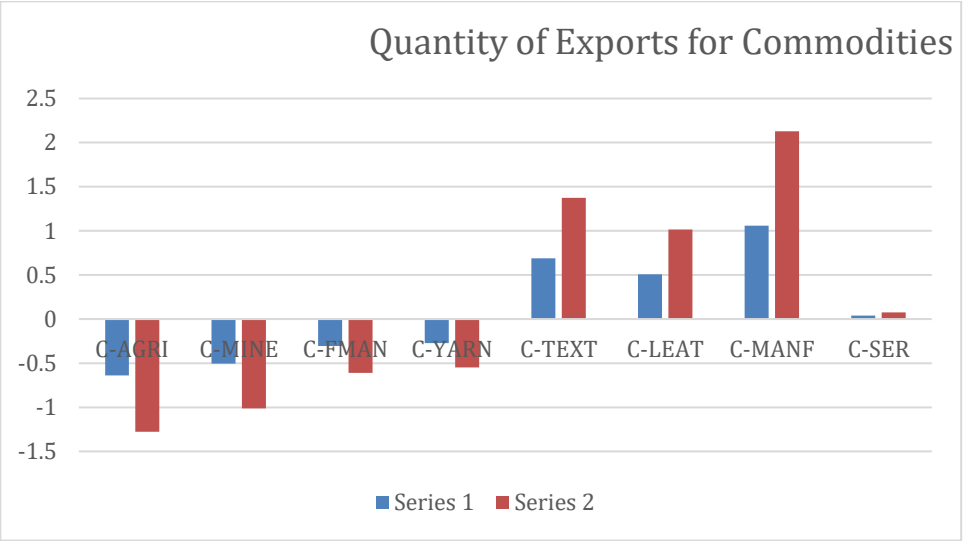
C-SER (services) by 0.039% and 0.077%. whereas, decrease in import of the same commodities is documented as 0.123% and 0.248% in C-TEXT, 0.036% and 0.071% in C-LEAT,0.094% and 0.188% in C-MANF. Import of services is noticed by 0.198% and 0.397%, higher than its exports (see, Table 4.4.1, and table 4.4.2).

It is observed that export growth is higher as compared to growth in imports of the sectors like textile, and other manufacturing, which results in a positive impact onthe balance of trade. The overall average conclusion depicts that the households` consumption level is appreciated after this experiment, which indicates an increase in the overall welfare of the households.An increase in exports of a few commodities will cause more receipts from the international market as compared to the reduction in receipts from exports of other goods as shown in the table and similarly increase in imports and consumption of goods will increasethe welfare of the households. Thus, the analysis recommends the policy.

Table 5.4.1 Quantity of Exports for Commodities

Commodities	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
C-AGRI	82.769	82.240	-0.640	81.713	-1.276
C-MINE	59.731	59.429	-0.506	59.128	-1.011
C-FMAN	318.911	317.938	-0.305	316.966	-0.610
C-YARN	499.595	498.224	-0.274	496.848	-0.550
C-TEXT	999.712	1006.586	0.688	1013.451	1.374
C-LEAT	97.557	98.051	0.507	98.546	1.014
C-MANF	435.110	439.721	1.060	444.374	2.129
C-SER	272.101	272.207	0.039	272.310	0.077

Source: Simulation Results

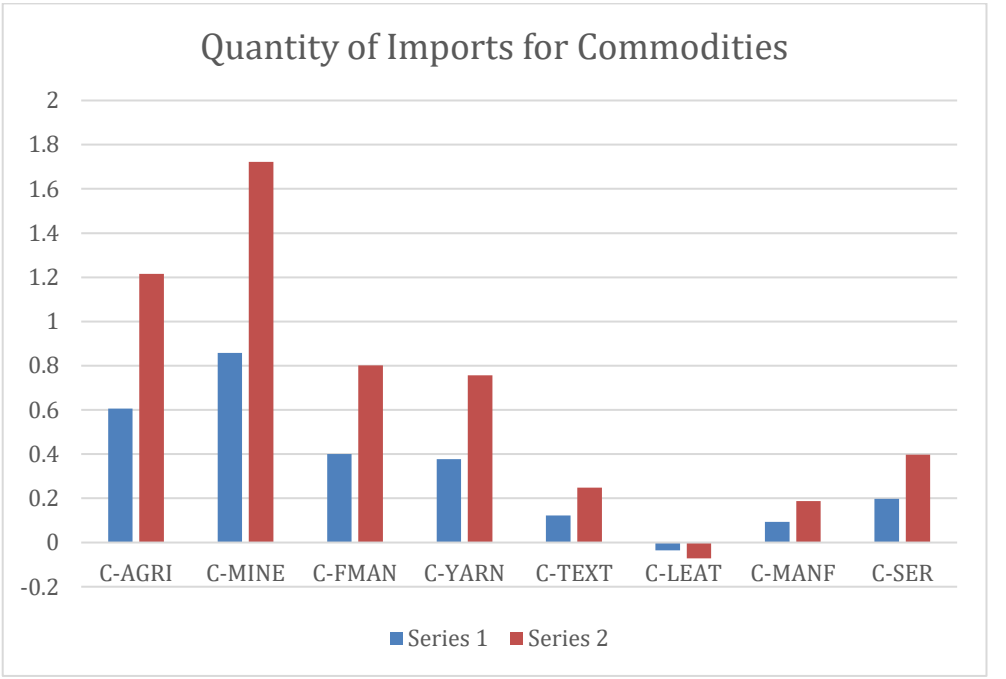


Source: Simulation Results

Table 4.4.2 Quantity of Imports for Commodities

Commodities	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
C-AGRI	160.616	161.589	0.606	162.567	1.215
C-MINE	406.733	410.224	0.858	413.742	1.723
C-FMAN	421.239	422.924	0.400	424.618	0.802
C-YARN	108.664	109.074	0.377	109.486	0.757
C-TEXT	160.194	160.391	0.123	160.590	0.248
C-LEAT	11.901	11.897	-0.036	11.893	-0.071
C-MANF	2340.378	2342.579	0.094	2344.770	0.188
C-SER	335.117	335.781	0.198	336.448	0.397

Source: Simulation Results



Source: Simulation Results

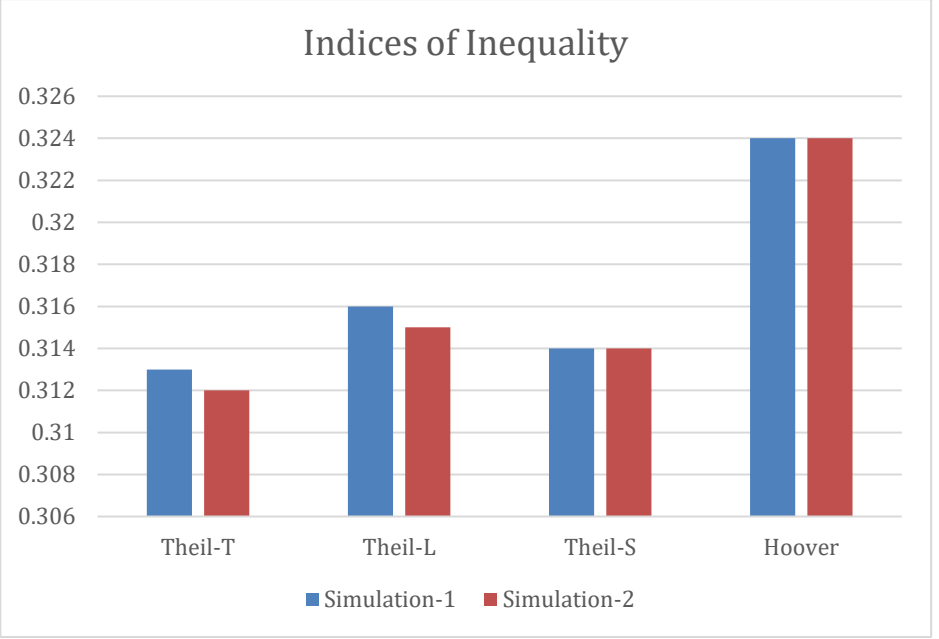
4.5 Indices of Inequality

Household income inequality is measured by using Theil Indices and Hoover Index. Household types are the result of data limitations. In both the experiments, the tax mix policy results indicate that by 5% shock, the inequality results of Theil-T, Theil-L, and Hoover`s remained unchanged, while Theil-S presents a minor reduction by 0.001% (i.e., from 0.315% to 0.314%). Similarly, in shock 10%, Theil-T, Theil-L, and Theil-S all shows reduction by 0.001% (i.e., from 0.313% to 0.312%, from 0.316% to 0.315%, and from 0.315% to 0.314% respectively), while Hoover shows no change (i.e., 0.324%), (see, Table 4.5.1).

Table 4.5.1 Indices of Inequality

Indices	Base	Simulation-I [5%]	Simulation-II [10%]
Theil-T	0.313	0.313	0.312
Theil-L	0.316	0.316	0.315
Theil-S	0.315	0.314	0.314
Hoover	0.324	0.324	0.324

Source: Simulation Results



Source: Simulation Results

4.6 Impact of Price on inequality, welfare, and poverty

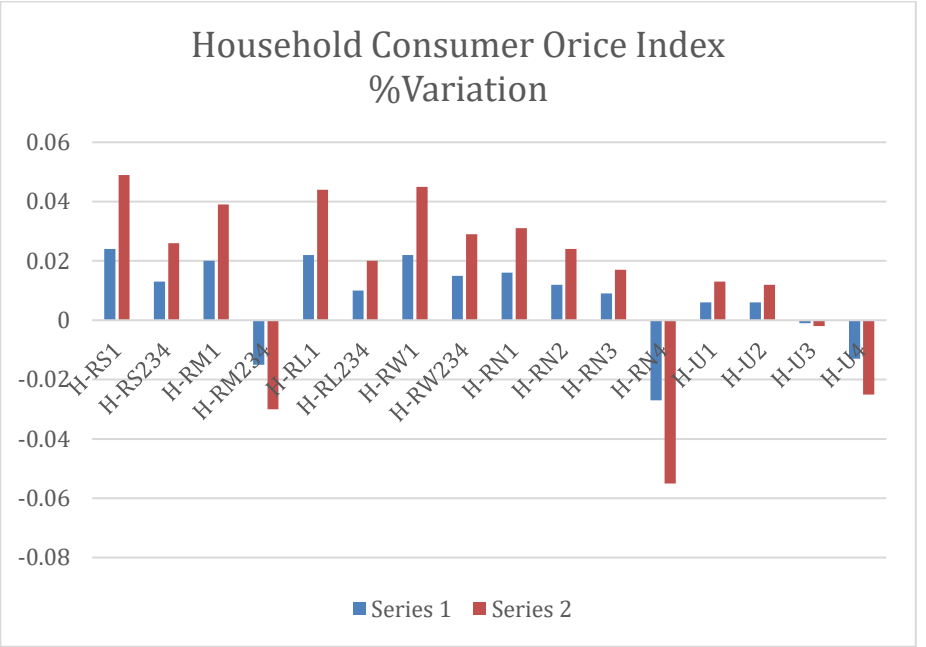
Tax mix policy experiment reveals positive impact of household consumer price index on different types of the households except few, like; H-RM234 (rural medium farmer) by 0.015% and 0.030%, H-RN4 (rural non-farm) by 0.027% and 0.055%, H-U3 (urban) by 0.001% and 0.002%, and H-U4 (urban) by 0.013% and 0.025%. Whereas, all other

outcomes are positive. As it is noticed 0.024% and 0.049% for H-RS1, 0.013% and 0.026% for H-RS234, 0.020% and 0.039% for H-RM1, 0.022% and 0.044% for H-RL1, 0.010% and 0.020% for H-RL234, 0.022% and 0.045% for H-RW1, 0.015% and 0.029% for H-RW234, 0.016% and 0.031% for H-RN1, 0.012% and 0.024% for H-RN2, 0.009% and 0.017% for H-RN3, 0.006% and 0.013% for H-U1, 0.006% and 0.013% for H-U2 respectively.Hence, a large number of households'welfare increases while poverty and inequality decrease (see, Table 4.6.1).

Table 4.6.1 Household Consumer Price Index (% Variation)

Households	Base	Simulation-I [5%]	Simulation-II [10%]
H-RS1	1.167	0.024	0.049
H-RS234	1.157	0.013	0.026
H-RM1	1.167	0.020	0.039
H-RM234	1.162	-0.015	-0.030
H-RL1	1.167	0.022	0.044
H-RL234	1.160	0.010	0.020
H-RW1	1.165	0.022	0.045
H-RW234	1.159	0.015	0.029
H-RN1	1.167	0.016	0.031
H-RN2	1.162	0.012	0.024
H-RN3	1.155	0.009	0.017
H-RN4	1.144	-0.027	-0.055
H-U1	1.161	0.006	0.013
H-U2	1.154	0.006	0.012
H-U3	1.150	-0.001	-0.002
H-U4	1.133	-0.013	-0.025

Source: Simulation Results



Source: Simulation Results

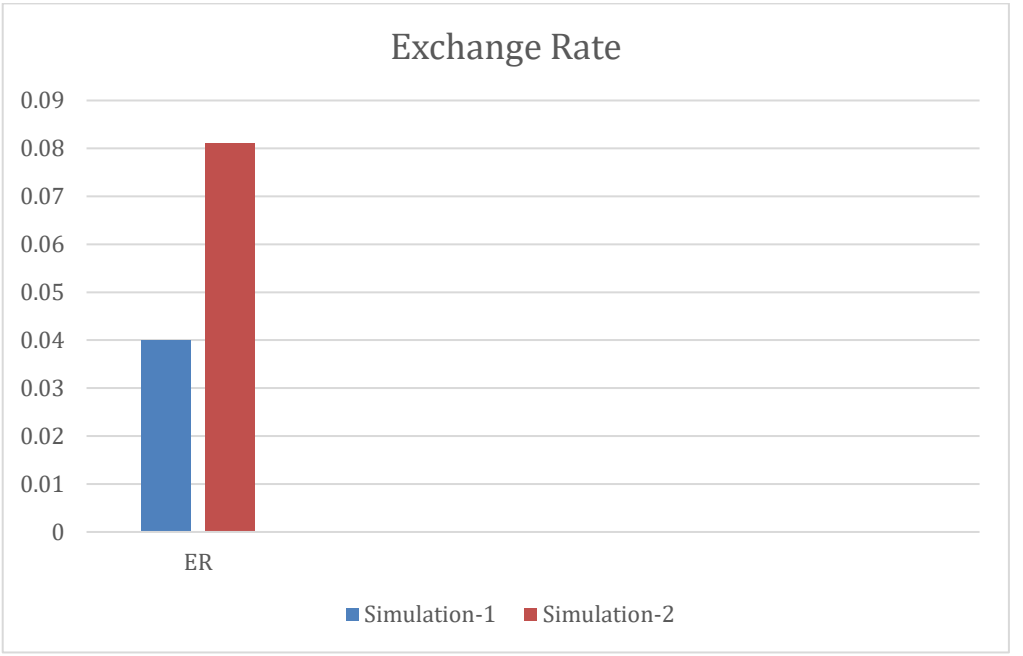
The exchange rate also indicatesa positive result, that is, 0.040% and 0.081%, which also means a positive impact on households` welfare. (see, Table 4.6.2).A favorable exchange rate encourages exports and checks imports, which ultimately corrects the balance of trade or payments. So, if the balance of trade or payment is unfavorable, this experiment indicates its correction or reduction.

Table 4.6.2 Exchange Rate

(Value of one unit of foreign currency in terms of domestic currency)

Exchange Rate	Base	Simulation-I (5%)	Simulation-II (10%)
ER	0.987	0.040	0.081

Source: Simulation Results



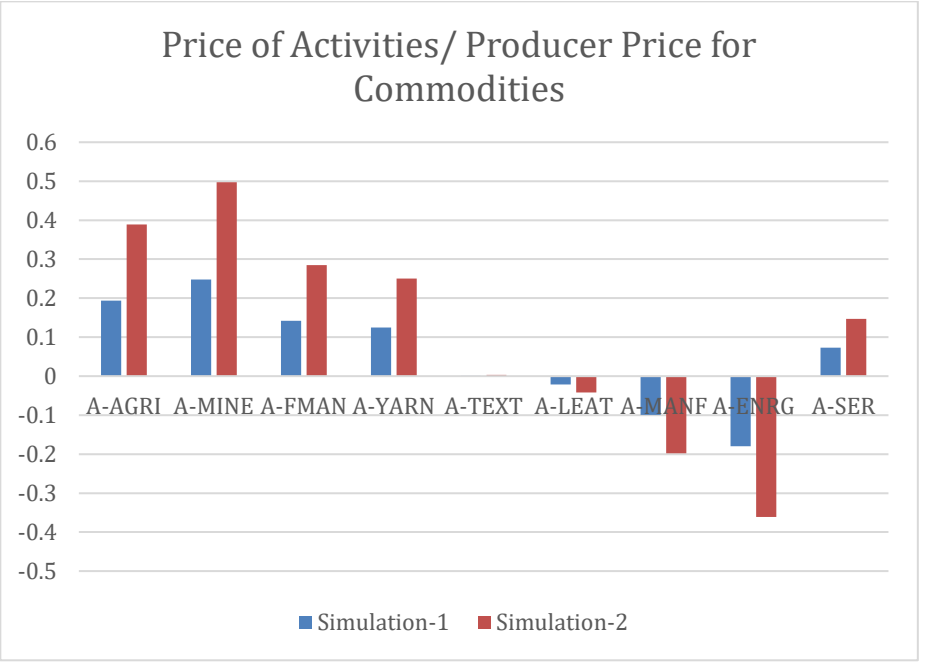
Source: Simulation Results

Activities Price, as well as Producer Price for Commodities,conveyencouragingeffectin both the trialsexcept A-LEAT, C-LEAT (leather) by 0.021% and 0.042%, A-MANF, C-MANF(other manufacturing) by 0.099% and 0.198%, and A-ENRG, C-ENRG (energy) by 0.180% and 0.361%. It is highest on A-MINE, C-MINE activity as well as commodity, that is, 0.248% in Simulation-I and 0.497% in Simulation-II (see Table 4.6.3). For A-AGRI and C-AGRI it is noticed at 0.194% and 0.389%, for A-FMAN and C-FMAN 0.142% and 0.285%, for A-YARN and C-YARN 0.125% and 0.250%. for a-TEXT and C-TEXT 0.001 and 0.003%, while for A-SER and C-SER 0.073% and 0.147%. This increase in the price of activities and producer price for commodities means encouragement of all these sectors` production as well as consumption. The net result of this policy mix is noticed as a rise in the welfare of the country.

Table 4.6.3 Price of Activities/ Producer Price for Commodities

Activities	Base	Simulation-I (5%)	Simulation-II (10%)
A-AGRI	1.011	0.194	0.389
A-MINE	0.924	0.248	0.497
A-FMAN	0.995	0.142	0.285
A-YARN	0.999	0.125	0.250
A-TEXT	1.025	0.001	0.003
A-LEAT	1.007	-0.021	-0.042
A-MANF	0.971	-0.099	-0.198
A-ENRG	1.300	-0.180	-0.361
A-SER	0.962	0.073	0.147

Source: Simulation Results



Source: Simulation Results

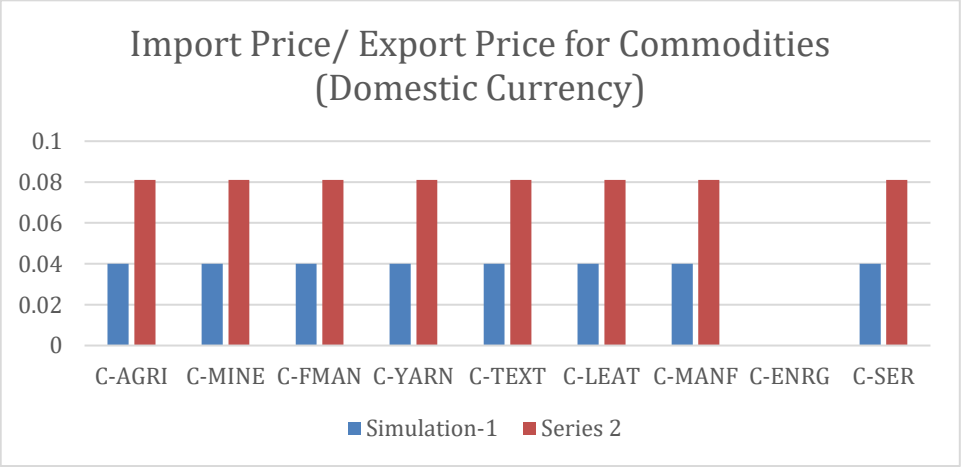
Similarly, Export and Import Price for all the Commodities in term of domestic currency showa positive effectin the tryoutsmade (see, Table 4.6.4),that is., in simulation-I (5%), all

the commodities reveals 0.040% while in simulation-II (10%), it is 0.081%. this impact representsan encouraging impact on households` increase in the average standard of living. In both the simulations, the energy sector shows no result because energy is the only product in this model which is assumed that can never be exported or imported, it is just produced and consumed within the country for domestic use only.

Table 4.6.4 Import Price/ Export Price for Commodities (Domestic Currency)

Commodities	Base	Simulation-I (5%)	Simulation-II (10%)
C-AGRI	0.987	0.040	0.081
C-MINE	0.987	0.040	0.081
C-FMAN	0.987	0.040	0.081
C-YARN	0.987	0.040	0.081
C-TEXT	0.987	0.040	0.081
C-LEAT	0.987	0.040	0.081
C-MANF	0.987	0.040	0.081
C-ENRG	1.000	-	-
C-SER	0.987	0.040	0.081

Source: Simulation Results



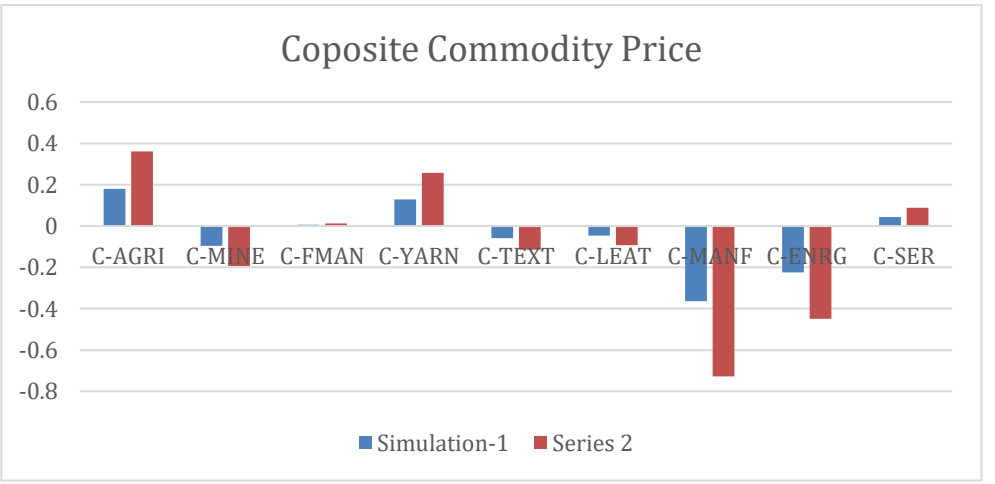
Source: Simulation Results

Furthermore, imposition of this policy-mix signifiesthe negativeeffect on Composite Commodity Price of five types of commodities like C-MINE (mining) by 0.096% and 0.193%, C-TEXT (textile) by 0.058% and 0.0115%, C-LEAT (leather) by0.046% and 0.092%, C-MANF (other manufacturing) by 0.364% and 0.728%, and C-ENRG (energy) by 0.225% and 0.449% (see, Table 4.6.5).The composite Commodity Price for all other commodities is positive in both simulations.Like, in both the tests it is noticed 0.180% and 0.361% for C-AGRI, 0.007% and 0.013% for C-FMAN, 0.129% and 0.258% for C-YARN, and 0.044% and 0.089% for C-SER.

Table 4.6.5 Composite Commodity Price

Commodities	Base	Simulation-I [5%]	Simulation-II [10%]
C-AGRI	1.169	0.180	0.361
C-MINE	1.126	-0.096	-0.193
C-FMAN	1.230	0.007	0.013
C-YARN	1.163	0.129	0.258
C-TEXT	1.247	-0.058	-0.115
C-LEAT	1.218	-0.046	-0.092
C-MANF	1.259	-0.364	-0.728
C-ENRG	1.311	-0.225	-0.449
C-SER	0.968	0.044	0.089

Source: Simulation Results



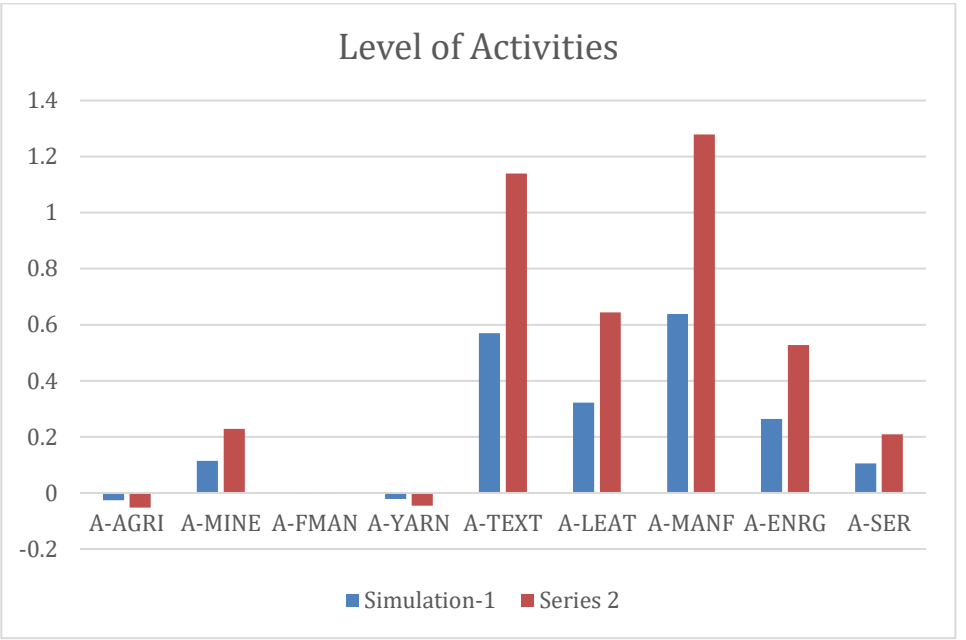
Source: Simulation Results

The testalsoillustrates a positive effect on six activities except three like A-AGRI (agriculture) by 0.026% and 0.052%, A-FMAN (food manufacturing) by $5.75960e^{-4}$% and 0.001%, and A-YARN (cotton lint/ yarn) by 0.022% and 0.045%. The mostpositiveeffect is chronicledon A-LEAT (leather) by 0.322% and 0.644% in Simulation-I and Simulation-II respectively (see Table 4.6.6). while, on A-MINE it is noted 0.114% and 0.229%, on A-TEXT 0.570% and 1.139%, on A-MANF 0.638% and 1.279%, on A-ENRG 0.264% and 0.528%. and on A-SER 0.105% and 0.209%. this increase in the number of activities shows the increase in welfare and reduction in poverty and inequality.

Table 5.6.6 Level of Activities

Activities	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
A-AGRI	7047.148	7045.309	-0.026	7043.454	-0.052
A-MINE	730.595	731.432	0.114	732.267	0.229
A-FMAN	5073.711	5073.681	$-5.75960e^{-4}$	5073.652	-0.001
A-YARN	2480.102	2479.551	-0.022	2478.983	-0.045
A-TEXT	1757.475	1767.487	0.570	1777.485	1.139
A-LEAT	362.897	364.067	0.322	365.235	0.644
A-MANF	4439.234	4467.552	0.638	4496.022	1.279
A-ENRG	1956.650	1961.810	0.264	1966.982	0.528
A-SER	9337.056	9346.832	0.105	9356.565	0.209

Source: Simulation Results



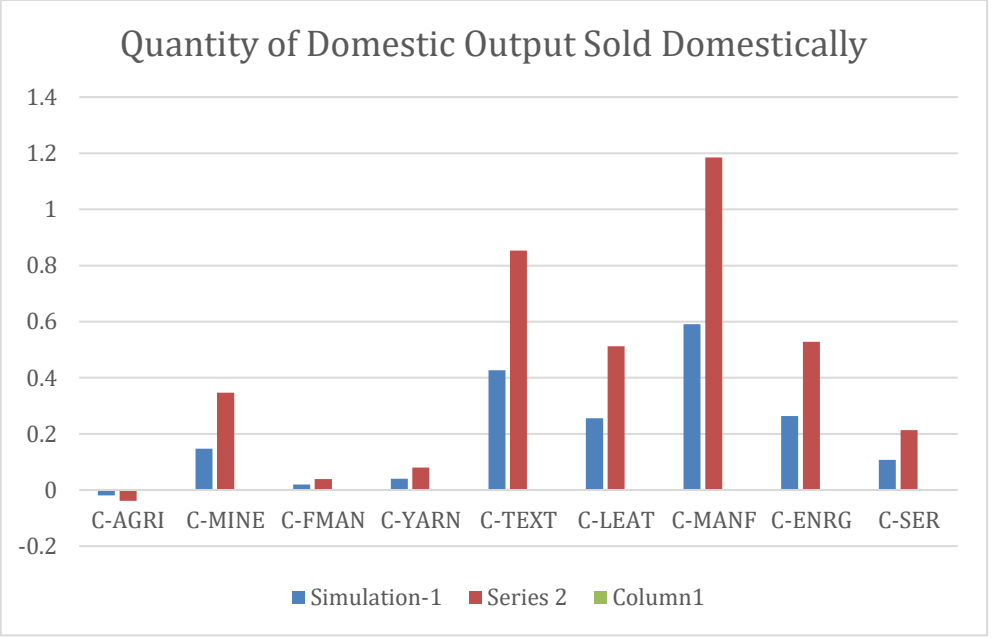
Source: Simulation Results

The policy of tax mix influences theQuantity of Domestic Output Sold Domestically as well as the number of Composite Goods Supplied Domestically favorably in both the experiments except for only one commodity, that is, A-AGRI (agriculture) by 0.019% and 0.038% (see, Table 4.6.7) and 0.005% and 0.011% (see, Table 4.6.8). The results of both the simulations reveals positive impacts on different commodities except agricultural sector`s output as [0.147%, 0.347%] and [0.444%, .8895] for C-MINE, [0.020%, 0.039%] and [0.050%, 0.101%] for C-FMAN, [0.040%, 0.80%] and [0.058%, 0.115%] for C-YARN, [0.427%, 0.853%] and [0.377%, 0.754%] for C-TEXT, [0.256%, 0.512%] and [0.244%, 0.488%] for C-LEAT, [0.591%, 1.185%] and [0.406%, 0.813%] for C-MANF, [0.264%,0.528%] and [0.264%, 0528%] for C-ENRG, and [0.107%, 0.213%] and [0.110%, 0.220] for C-SER quantity of domestic output sold domestically and quantity of composite goods supplied domestically, respectively.These results indicate a positive effect on the welfare of the households as well as on reducing their inequality and poverty.

Table 4.6.7 Quantity of Domestic Output Sold Domestically

Commodities	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
C-AGRI	6963.021	6961.700	-0.019	6960.258	-0.038
C-MINE	664.689	665.844	0.147	666.996	0.347
C-FMAN	4750.970	4751.904	0.020	4752.837	0.039
C-YARN	1974.068	1974.867	0.040	1975.651	0.080
C-TEXT	748.124	751.317	0.427	754.503	0.853
C-LEAT	263.447	264.122	0.256	264.796	0.512
C-MANF	3970.752	3994.227	0.591	4017.807	1.185
C-ENRG	1956.650	1961.810	0.264	1966.982	0.528
C-SER	9064.766	9074.441	0.107	9084.075	0.213

Source: Simulation Results

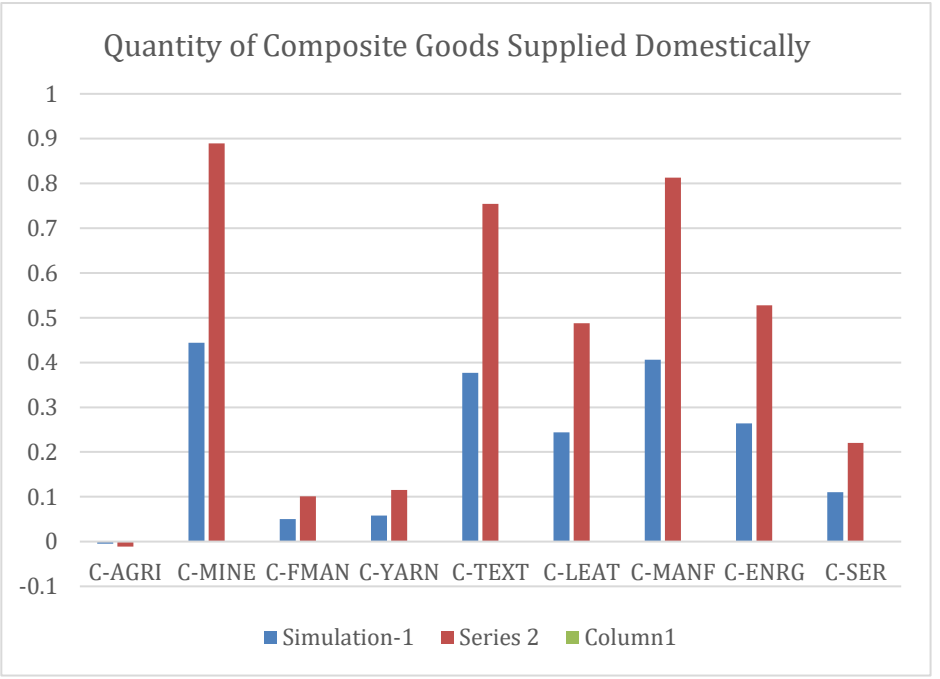


Source: Simulation Results

Table 4.6.8 Quantity of Composite Goods Supplied Domestically

Commodities	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
C-AGRI	7123.460	7123.087	-0.005	7122.697	-0.011
C-MINE	1069.909	1074.655	0.444	1079.423	0.889
C-FMAN	5172.157	5174.763	0.050	5177.373	0.101
C-YARN	2082.677	2083.879	0.058	2085.068	0.115
C-TEXT	906.300	909.721	0.377	913.137	0.754
C-LEAT	275.327	275.999	0.244	276.669	0.488
C-MANF	6310.897	6336.494	0.406	6362.173	0.813
C-ENRG	1956.650	1961.810	0.264	1966.982	0.528
C-SER	9399.559	9409.906	0.110	9420.214	0.220

Source: Simulation Results



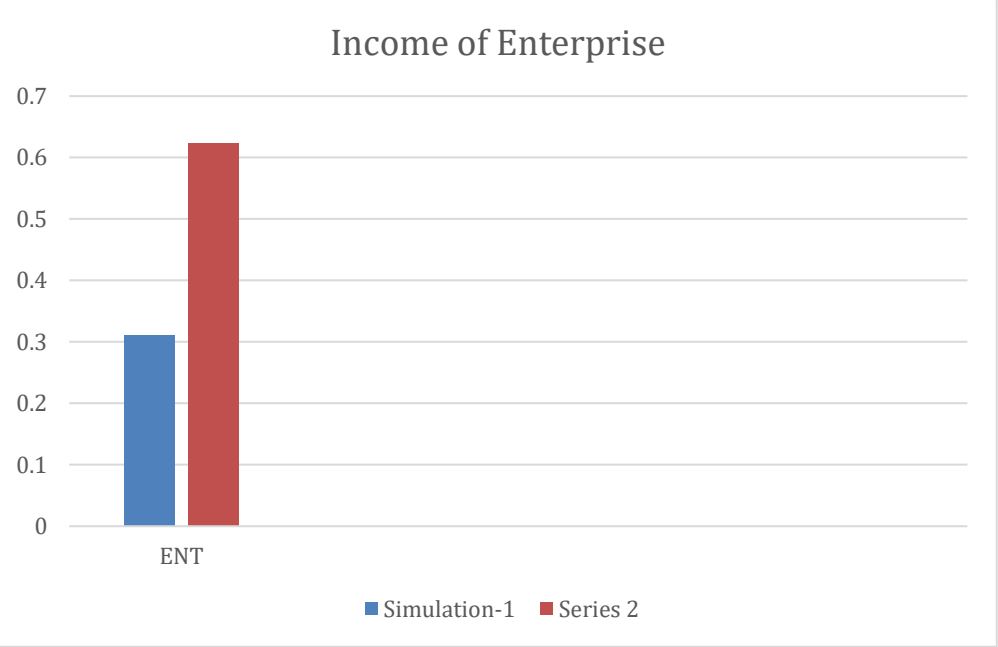
Source: Simulation Results

The experiment also records a positive impact on the Income of enterprises by 0.311% and 0.623% (see Table I.1). surely, all this impact encourages investment, employment, production, consumption, exports-imports, and all other macroeconomic variables. This leads to an increase in the welfare of the households as well as reduces the level of inequality and poverty.

Table I.1: Income of Enterprise

Enterprise	Base	Simulation-I[5%]		Simulation-II[10%]	
		Shock	%Δ	Shock	%Δ
ENT	8497.089	8523.514	0.311	8550.030	0.623

Source: Simulation Results



Source: Simulation Results

5. Conclusion and Policy Implications

To examinethe effect of direct (income) tax as well as the indirect (sales) tax on welfare, and inequality and poverty in Pakistan, this study utilizedthe Computable General Equilibrium (CGE) Model by running the model in GAMS and used Social Accounting Matrix (SAM) 2010-11, which was developed in 2015 by Dorosh et al.this SAM is the latest SAM over 172 columns and 172 rows till now. For the saidobjectives, two simulations have

been experimented with, that is, increasing income tax and decreasing sales tax at the same time by the same rate i.e., 5% and 10%.

The results of this studypresentthat in general, this policyplacedsatisfactoryimpacts on increasing households' welfare and reducing income inequality as well as poverty in Pakistan's economy. However,few indicatorsindicate that this tax mix policy effect is adverse as well, but the encouraging effect is observed onthe increase in welfare, reduction in inequality, and poverty because of a boost in various economic activities.

Keeping in view the above verdicts, this analysis advisesthat an increase in income tax anda decrease insales tax simultaneously can be initiatedsteadily to have a positive impact on the welfare of all types of households and to reduce income and poverty inequality. Despite this, rural household groups characterizea relativelyless increase thanurban households.Positive impact on balance of trade, household consumer price index, exchange rate, commodities` export and import prices, composite commodity prices, activities level, the quantity of domestic output sold in the domestic market, quantity of composite goods supplied domestically, and enterprise income also indicate a favorable impact on welfare. But if the political stability, climatic condition, and other circumstances remain disturbed, the result may also be different.

The empirical evidence endorsesoverall this type of mix-tax policy for Pakistan's economic stability. By adopting this policy, the welfare of different types of households can easily be increased. Inequality and poverty can be reduced to a desirable level. The sector-wise results of the experiments made in this study are clearer as compared to all the studies discussed in the literature. Impact of policy mix further can be estimated on many other economic indicators like investment, Savings, trade, etc.

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