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Welfare and Distributional Impacts of Financial Liberalization in an Open Economy: Lessons from a Multi-sectoral Dynamic CGE Model for Nepal

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Abstract

By equalizing rates of return across sectors, financial liberalization improves efficiency and equalizes the distribution of income. Efficiency gained in the allocation of resources increases capital usage more in previously heavily repressed sectors such as agriculture and textile, allowing up to a 19 percent expansion in production and employment. The savings and investment responses, degree of factor substitutions, are higher in the complete liberalization than in partial or piecemeal liberalization. Income, consumption, utility and overall welfare of rural and urban households increase. Liberalization is not effective if savings are used in accumulations of unproductive assets i.e. gold, jewellery, urban land, and foreign exchange. Financial liberalization improves the distribution of income by raising the wage rate of rural labor than for urban labor as rural labour-intensive sectors invest more with increased access to financial institutions and demand more labor to complement additional capital employed in these sectors.

Keywords: financial intermediation, development, dynamic CGE model, Nepal, growth, redistribution

1. Introduction

Nepal went through a series of conflicts and tensions over last 20 years. Not only the system of governance has changed but also the awareness for economic growth and redistribution have improved substantially. As the process of planned development from the first five-year plan in 1956 up to 13th plan adopted in 2013 has not been able to fulfil aspirations of people, it has become urgent to move from the lower rate of economic growth and lack of clear policy of redistribution and alleviating the massive degree of poverty both in rural and urban areas towards a faster growth and more equal distribution of income (NPC 2013). Financial sector can play its role in that process.

Nepalese policy makers tried to deregulate the financial institutions, privatize public enterprises and liberalize international trade for the efficient allocation of resources to promote long-run growth in 1992[1] by removing distortionary elements in the system[2] to correct the redistribution of income. These reforms could not be

[1]The economic liberalization project started in 1992 represents a breakthrough towards consistent economic policy-making in Nepal. This reform package included various reforms: on fiscal management, on external trade, on the financial system, on tax system, on industrial policy, privatization of public enterprises, and on institutional and legal frameworks. All these reforms were basically intended to increase the role of market forces in determining the allocation of resources in the economy. Therefore, the reform of the financial system and development of the capital market for more efficient mobilization of domestic resources received a high priority in that package.

[2]Before the 1992, the Nepalese financial sector was characterized by ceilings on interest rates, credit controls, high reserve requirement, tight regulations on entry and exit of financial institutions, controls on foreign exchange, uncontrolled budgetary deficits and underdeveloped capital markets. The financial repression from all these features resulted in higher transaction costs for borrowers, and often negative rates of interest for savers. High subsidies on credits to selected sectors coexisted with higher interest rates for other sectors.

implemented properly because of the political instability[3]. Now with a new constitution promulgated in 2015 and federal system of government, Nepal is gradually moving towards a steady path of growth and development. It has become more important to assess potential impacts of financial reforms in the economy as a whole and in the rural and urban areas particularly. No systematic and comprehensive study exists in the literature that compares growth and distribution impacts of complete and partial liberalization with a dynamic CGE model of Nepal. Objective of this study is to fill this gap. It intends to show how the process of economic development can be augmented by liberalizing financial markets that has been a central theme in policy debates in Nepal as well as around the world in the last few decades[4].

This study aims to answer some important questions relating to the impacts of financial sector reforms in Nepal. Have the financial sector reforms in Nepal released extra resources for investment by improving efficiency in resource allocation? Has it increased the volume of savings available for productive investment? Has spending been cut on unproductive assets such as land, jewellery and precious metals? Did the reform process redistribute income from urban to rural households? Has financial liberalization increased the demand for rural labor to complement added capital stocks in rural-labor intensive sectors? Have rural labor experienced greater increases in its wage rates than urban labor? Has the level of welfare increased of the rural households? Are the impacts of liberalization greater when the economy is allowed to borrow in international markets than when all imports are paid by exports at the same period? What will be the effects if the productivity of rural lands grow faster than the population? Answers to these questions are found by analysing results of a dynamic CGE model of Nepal that was specially designed for this purpose in Bhattarai (1997, 2001, 2007 and 2011).

The welfare and distributional impacts of financial reforms result from changes in the volume of saving and investment. However, economic theory yields ambiguous predictions about such changes. Whether the volume of saving increases with financial liberalization or not, depends upon whether the income effect from a change in the rate of interest dominates the accompanying substitution effect, namely saving will increase only if the substitution effect is stronger than the income effect. Also, financial sector reform is often accompanied by an increase in the real interest rate. Standard theory states that when the cost of investment funds increases, the amount of investment is likely to fall. The net effect of the reforms on investment then depends upon whether the efficient reallocation of capital after the liberalization can compensate for the effect of an increase in the cost of funds after liberalization. Thus not only the size but also the direction of the changes in saving and investment owing to financial liberalization are important. Finding the magnitudes of these effects require empirical analyses. Specifically, by removing distortions, does financial liberalization promote capital accumulation and output? Is there overall gain in welfare after the liberalization? If welfare improves, by how much does it improve? Is it distributed equally among consumers located in rural and urban areas? Do urban consumers with better access to the financial institutions benefit more from liberalization than rural consumers, as is commonly perceived? These questions are investigated with the help of a dynamic CGE model in this paper.

A forward-looking multi-sectoral computable general equilibrium (CGE) model of Nepal[5] with financial intermediation is developed to find the economy-wide long-run consequences of financial sector liberalization in the Nepalese economy. This model is an appropriate tool to study welfare and redistribution consequences of financial sector reform to households and producers in a developing economy. While numbers of financial institutions, the cost of funds, the volume of savings and investment, assets and liabilities and freedom of financial institutions on the allocation of credits are important measures used to ascertain the degree of competition in the financial system, these measures alone are not sufficient to evaluate wide ranging welfare and redistributive effects of reform. General equilibrium analysis is required to connect these elements and to correctly quantify benefits of reform and their distribution among households. This study aims to provide meaningful guidelines to policy makers in choosing the most dominating policy option in which gainers can compensate to losers.

[3]The reform program was under the initiative of the Eighth Plan (1992-97) prepared by the National Planning Commission and Extended Structural Adjustment Facility of International Monetary Fund (IMF 1992, Ministry of Finance 1994-2016).

[4]For instance McKinnon (1993), Taylor (1990), King and Levine (1993), Pagano (1993).

[5]There exist a multi-regional multi-sectoral model of Nepalese economy (Elbers (1992)), foreign aid and economic development model (Bhattarai (1990)) and a trade model (Buehrer & di Mauro (1993) works on Asian Development Bank's model and Stamp's (1992) report on a general equilibrium model for Nepal). None of these study effects of financial liberalization and none of them take a forward-looking approach.

The forward looking CGE modelling framework presented here builds on standard applied general equilibrium[6] analyses that have been in use for policy analyses with more disaggregated institutional and sectoral structures since mid 1970s (Shoven and Whalley (1973, 1984, 1992), Robinson (1991), Mercenier and Srinivasan (1994)). Advancement in mixed complementarity modelling algorithm and software (Rutherford (1995), and Dirske and Ferris (1994)) have made numerical analysis of a fairly decentralized forward-looking models much easier in recent years than used to be in the past. Whilst a number of CGE models with forward-looking behaviour by economic agents exist in the literature[7], none of the previous studies apply a forward-looking modelling framework to study the multi-sectoral impact of financial sector liberalization. The point of departure in the model presented here lies on explicit incorporation of an investment cost index in a multi-sectoral forward-looking behavioural framework to study the impacts of financial sector reforms over time. With more detailed modelling of investment saving behaviour, the policy prescription generated by this model may be more consistent in explaining the development process of the Nepalese economy. Detailed specification of the dynamic CGE model is presented in section 2 followed by a procedure of calibration in section 3, and analysis of results of the model in section 4. Conclusion is given in section 5 followed by references at the end.

2. Dynamic CGE Model of Nepal

A forward-looking multi-sectoral computable general equilibrium (CGE) model of Nepal explains the process of dynamic optimization by households and firms in Nepal. It shows how resources are allocated efficiently over time across sectors and between public and private sectors of the economy first in a set of equations. Model is then calibrated to the Social Accounting Matrix (SAM) of Nepal. Then the model is solved with GAMS/MPSGE to get the dynamic reference and counter-factual paths of the economy. The model incorporates two trade sectors: India and the rest of world to allow for Nepal's high degree of integration with its large and dominant neighbouring economy. It is suitable to analyze wide-ranging impacts of financials sector policies in an open economy framework.

We consider urban and rural households who allocate their life time income to maximize utility by choosing an optimal path of consumption and saving. These households provide factor services to producers of goods and services, who sell products both in domestic and foreign markets. The capital stock, determined overtime by the volume of savings and investment, complements labor input. In the central case, we assume that labor force grows exogenously. Output expands along with increase in labor and capital inputs, its level is consistent with the demand of consumers, investors, the government and foreign sectors.

Consumers' Intertemporal Problem

Representative households located in urban and rural areas of the economy allocate lifetime income to maximize utility over an infinite horizon; i.e.

$$\max \sum_{t=0}^{\infty} \beta^t U(C_t^h) \tag{1}$$

where β is the discount factor, and it depends on the rate of time preference; C_t^h is composite consumption; U is a time separable utility function. We choose a constant relative risk aversion (CRRA) CES utility function to represent U in (1).

$$U(C_t^h) = \frac{\left(C_t^h\right)^{1-\sigma} - 1}{1-\sigma} \tag{2}$$

here $1/\sigma$ measures the elasticity of substitution between the present and future consumption. The smaller is σ the more slowly marginal utility falls as consumption rises, so households are more willing to allow changes in

[6]While the development of growth literature in the mainstream macroeconomics during the last few decade has been encouraging, application of these models in policy analysis has not been fully successful owing to the limited institutional structures and scant sectoral details in these models (Abel and Blanchard 1983, Romer 1986, Lucas 1988, Rebelo 1991, Barro and Sala-i-Martin 1995, Leeper and Sims 1994, Romer 1996).

[7]Whalley (1977), Adelman & Robinson (1978), Ballard (1983), Ballard-Fullerton-Shoven-Whalley (1985), Mansur & Whalley (1986), Feltenstein (1986), Aurbach and Kotlikoff (1987), Goulder and Summers (1989), Devarajan and Lewis (1990), Go (1993), Mercenier & Michel (1994).

consumption over time. Thus smaller σ implies higher elasticity of substitution between current and future consumption or the higher degree of consumption smoothing and substitution over time.

Each type of households faces an inter-temporal budget constraint which implies that its present value of consumption cannot exceed its present value of life time income (wealth).

$$\sum_{t=0}^{\infty} R_t^{-1} P_t C_t^h = WH^h \tag{3}$$

where, $R_t^{-1} = \prod_{s=0}^{t-1} \frac{1}{1+r_s}$ is a discount factor to convert future expenses in the present value terms; r_s represents the real interest on financial assets; P_t is composite of vectors of relative prices, and C_t is composite consumption goods, which is composed of sectoral consumption goods, $C_t = \prod_{i=i}^{N} 1nC_{i,t}^{\alpha_i^h}$, where α_i^h gives the share of spending on good i by household h. WH_h is the life time wealth of household h and is defined as:

$$WH_h = \frac{J_0^h}{1+r_0^c} + \frac{J_1^h}{\left(1+r_0^c\right)\left(1+r_1^c\right)} + .. + \frac{J_2^h}{\Pi_s^h\left(1+r_0^c\right)} + ... = \sum_{t=0}^{\infty} R_t^{-1} J_t^h \tag{4}$$

where J_t^h is disposable household income in period t. It includes labor and capital income plus transfers.

We combine equation (1) to (4) to form Lagrangian of consumers' the inter-temporal allocation problem in (5).

$$\Im^h = \sum_{t=0}^{\infty} (\frac{1}{1+\rho})^t (\frac{C_t^{h\,1-\sigma} - 1}{1-\sigma}) + \lambda.[\sum_{t=0}^{\infty} R_t^{-1} P_t C_t^h - WH_t^h] \tag{5}$$

Here, λ is the shadow price of income in terms of present value of utility, and β in (1) is replaced by $\frac{1}{1+\rho}$, where ρ is the rate of time preference. We derive consumption function by taking first order condition on (5) giving an Euler equation:

$$\frac{C_{t+1}}{C_t} = \left(\left(\frac{1+r_t}{1+\rho}\right)\frac{P_t}{P_{t+1}}\right)^{\frac{1}{\sigma}} \tag{6}$$

or using a steady state assumption on the growth rate

$$C_{t+1} = \left(\left(\frac{1+r_t}{1+\rho}\right)\frac{P_t}{P_{t+1}}\right)^{\frac{1}{\sigma}} C_0(1+g)^{t-1} \tag{7}$$

Thus the consumption level at time t, in the steady state, is a function of growth rate, the rate of interest and intertemporal prices of commodities $\left(\frac{P_t}{P_{t+1}}\right)$. Consistency of the intertemporal budget constraint implies that:

$$\sum_t R_t^{-1}[C_0 + \Omega_1 C_0 + \Omega_2 C_0 + ...] = WH^h \tag{8}$$

where $\Omega_t = [\beta^t R_t^{-1} \frac{P_t}{P_0}]^{\frac{1}{\sigma}}$. Economy wide savings is total of household savings, S_t^h, which in turn is the portion of income not consumed :

$$S_t = \sum_h S_t^h = \sum_h J_t^h - \sum_h C_t^h \tag{9}$$

The consumption saving decisions are two sides of the same coin. Once we know the level of consumption we also know the level of savings. Saving like consumption is influenced by the rate of interest prevailing in the economy and the time preference of individuals. The efficiency in the financial system can contribute to raise in the level of saving, depending upon the value of σ, by influencing the decision between the current and future consumption and reducing the wedge between the cost of capital to investors and gains received by the savers.

Savings of households are intermediated through the financial institutions to investors, who use those savings to purchase investment goods from different sectors. Like consumers investors in each of n production sectors solve an intertemporal profit maximization problem. They combine goods produced in a set of n sectors to deliver a unit of investment in sector j. Therefore, the unit cost of investment in sector j is a weighted average of the prices of components of sector n goods used for investment purpose. One unit of investment at period t produces once unit of capital stock in period $t+1$:

$$\prod_{j,t}^{I} = P_{j,t+1}^k - \sum_i P_{i,t} a_{i,j}^I \le 0 \tag{10}$$

here $\prod_{j,t}^I$ is profit from one unit of investment at period t, $P_{j,t+1}^k$ is the price of capital in period t+1, and $a_{i,j}^I$ is the investment coefficient matrix. One unit of capital at the start of period 1 generates a rate of return ($r_{j,t}^k$) today and delivers $(1-\delta)$ unit at the start of the subsequent period. The arbitrage condition in capital accumulation implies that:

$$\prod_{j,t}^{k} = (1-\delta)P_{j,t+1}^k + r_{j,t}^k - P_{j,t}^k \le 0 \tag{11}$$

Entering capital (K_0) stock is transferred into initial capital stock for the various sectors, $K_{i,0}$, according to a fixed coefficient transformation process. Once the initial capital is allocated among different sectors, $K_{i,t}$, the law of motion of capital in a sector is explained by the following equation.

$$K_{j,t+1} = I_{j,t} + (1-\delta_K)K_{j,t} \tag{12}$$

where $I_{j,t} = \sum_{j=1}^{J} a_{i,j}^I I_{j,t}$. Net investment demand, $I_{i,t}$, in each sector is the sum of investment by origin. The relationship given by $a_{i,j,t}^I$ is called capital coefficient matrix of the economy.

We assume that in the terminal period the investment in each sector grows at the rate of the population so that economy can continue along the steady state growth path even after the terminal period as given by the following equation.

$$I_{j,t} = (g + \delta_{K,j})K_{j,t} \tag{13}$$

here g = growth rate of the economy, which equals the growth rate of the labor force in terms of efficiency units, and δ_K = rate of depreciation.

Holding aggregate stock of capital fixed to the savings of households in the beginning of each period, the objective of firms in j th sector of the economy is to maximize the present value of profit subject to the constraints of production technology. Zero profit for sector j written in dual form in terms of composite prices of commodities and inputs takes the following form:

$$\Pi^{y}_{j,t} = [(\theta^{x}_{j} PX^{1+\eta}_{j,t} + (1-\theta^{x}_{j}) PD^{1+\eta}_{j,t})]^{\frac{1}{1+\eta}} - \theta^{v}_{j} PV^{v}_{j} - (1-\theta^{v}_{j}) \sum_{j} a_{i,j} P_{i,t} \leq 0 \tag{14}$$

here $\Pi^{y}_{j,t}$ is the unit profit of activity in sector $PX_{j,t}$ price of exports; $PD_{j,t}$ price of domestic sales; PV^{v}_{j} price of value added per unit of output in activity j; $P_{i,t}$ price of final goods used as intermediate goods; θ^{x}_{j} share parameter for exports in total production; θ^{v}_{j} share of costs paid to labor and capital and $a_{i,j}$ input output coefficients.

The equation (14) is a unit profit function. The profits of operating these firms are given by the differences between the revenue from sales and the cost of supply. The unit revenue function is constant elasticity transformation (CET) composite of unit price of domestic sales and unit price of exports. The unit costs are divided between value-added, i.e. payments to labor and capital, and the unit intermediate input costs.

In this model, the gross output in each sector is given by a nested production function between the value added and the intermediate inputs.

$$Y_{j,t} = \min(V_{j,t}, a_{i,j} Y_{j,t}) \tag{15}$$

where $Y_{j,t}$ is the output of sector j in period t, $V_{j,t}$ is the value added part and $a_{i,j}$ is the intermediate inputs per unit of gross output produced in sector j.

We use Shepherd's lemma to derive the demand for labor and capital from (14). The demand for labor is:

$$L_{j,t} = Y_{j,t} \frac{\partial \Pi^{V}_{j,t}}{\partial PV_{j,t}} \frac{\partial PV_{j,t}}{\partial PL_{j,t}} \tag{16}$$

where $L_{j,t}$ is a composite of rural (unskilled) and urban (skilled) labor. Equilibrium in the labor market requires that demand for labor be equal to supply of labor:

$$\sum_{j} L_{j,t} \frac{\partial \Pi^{L}}{\partial PL^{LC}_{t}} \leq \bar{L}_{t} \tag{17}$$

$\bar{L}_{t}$ in the above equations is a composite of urban and rural labor. The ratio of urban to rural labor employed by firms mainly depends upon the ratio of urban to rural wage rates.

The demand for capital in sector j, again by Shepherd's lemma is given by:

$$K_{j,t} = Y_{j,t} \frac{\partial \Pi^{V}_{j,t}}{\partial PV_{j,t}} \frac{\partial PV_{j,t}}{\partial PK_{j,t}} \tag{18}$$

where $Y_{j,t}$ is activity level; $PK_{j,t}$ is price of capital $PV_{j,t}$ is price of value added. In equilibrium the demand for capital is equal to its supply:

$$\sum_j K_{j,t} = \overline{K}_t \tag{20}$$

$\overline{K}_t$ is the aggregate capital stock in the economy, which grows according to the low of motion of capital stock as given by equation (12). $\sum_j K_{j,t}$ is the total demand for capital by various sectors of the economy.

When an economy is repressed, the arbitrage condition implied by (11) and $P^k_{j,t+1} = \sum_{j=1}^{J} P_{j,t} a^I_{i,j}$ does not exactly hold. There is additional distortionary cost $\tau_{j,t}$ on top of the cost of materials required for per unit investment. The overall cost of investment is rather given by:

$$P^k_{j,t+1} = \left(1+\tau_{j,t}\right)\sum_{j=1}^{J} P_{j,t} a^I_{i,j} \tag{21}$$

where $\tau_{j,t}$ = per unit wedge between the return to saving and the cost of investment. $P^k_{j,t+1}$ = present value price of sector j capital at the beginning of next period; $P_{i,t}$ = present value price of sector i commodity at period t.

In repressionary situation certain portion of saving dissipates in the process of financial intermediation. Therefore, the total investment in the economy is less than the total savings i.e. the amount of savings net of intermediation costs. Moreover, additional resources may be available by liquidating the real unproductive assets (ΔRA) of the households and firms.

$$c(S_t - \Delta RA_t) = I_t \tag{22}$$

Here c is the proportion of saving available for investment purpose, or, $(1-c)$ being the cost of financial intermediation. In this model cost of financial intermediation is represented by the distortionary cost of repression.

3. Calibration to a Steady State

In the steady state all sectors of the economy grow at the same rate, g. The bench mark rate of return is calibrated assuming the non-distorted economy being in the steady state in the base year. Calibration of dynamic component follows the relationship between the current and future prices of capital and investment goods. Specifically, investment produces one unit of capital stock in period 2 (P^k_2) from one unit of output in the period one, P^I_1. The present value of one unit of capital in period 2 is equal to $(1-r)P^k_1$.

$$P^I_1 = 1 = P^k_2 = \left(1+r\right)P^k_1 \Rightarrow P^k_1 = \frac{1}{1-r} P^k_2 \tag{23}$$

Here $(1-r)$ is the discount rate between two periods, and is approximation to $1/(1+r)$.

$$\frac{P_{t+1}^k}{P_t^k} = (1-r) \tag{24}$$

One unit of capital at the beginning of period one earns a rate of return today, r_1^k and delivers $(1-\delta)$ unit of capital for the start of the next period.

$$P_1^k = r_1^k + (1-\delta)(1-r)P_2^k \tag{25}$$

This relationship applies to all other periods included in the model. Using base year prices equal to 1 to P_2^k and P_1^k by using relationship between P_2^k and P_1^k we get:

$$\frac{1}{1-r} = r_1^k + (1-\delta) \tag{26}$$

which gives the cost of capital to be equal to the rate of interest plus the rate of depreciation:

$$r_1^k = \frac{r}{1-r} + \delta \tag{27}$$

The base-year social accounting matrix (SAM) contains information on capital income V_1 and it is related to rate of return and capital stock, $V_1 = r_1^k K_1$. Now substituting for r_1^k between the steady state interest rate r and the parameters of the model:

$$K_1 = \frac{V_1}{\frac{r}{1-r} + \delta} \tag{28}$$

Then substituting this value of K_1 in I_1 function, the relationship between the investment and capital earning component of value added may be expressed as:

$$\frac{I_1}{V_1} = \frac{g+\delta}{\frac{r}{1-r} + \delta} \tag{29}$$

If the ratio of investment and capital earning ($\frac{I_1}{V_1} = 1$) is equal to one then $g = \frac{r}{1-r}$ or $r = \frac{g}{1+g}$.

When $\frac{I_1}{V_1} \neq 1$, then the key parameter to calibrate is the rate of depreciation, which can be calculated using the relationship between the interest rate, growth rate, depreciation and earning of capital as following:

$$\delta_j = g\frac{V_j}{I_j - V_j} - \frac{r}{1-r}\frac{I_j}{I_j - V_j} \tag{30}$$

In a repressionary regime the cost of capital is distorted by a repressionary component of intermediation, ∂j. This can be expressed as:

$$r_1^k = \frac{\bar{r}_1^k}{1-\tau_j} \tag{31}$$

here r_1^k is actual cost of capital, $\bar{r}^k$ is rate of interest in the steady state, and τ_j is distortionary element in the financial market. The price of capital becomes

$$P_1^k = r_1^k\left(1-\tau_j\right)+\left(1-\delta\right)\left(1-r\right)P_2^k \tag{32}$$

or the cost of capital

$$r_1^k = \frac{1}{1-\tau_j}\left[\frac{r}{1-r}+\delta\right] \tag{33}$$

Now adjusting (29) to take account of distortions in the capital market:

$$\frac{I_1}{V_1} = \frac{g+\delta}{\frac{r}{1-r}+\delta}\left(1-\tau_j\right) \tag{34}$$

or

$$\tau_j = 1-\frac{\bar{r}_j^k}{\delta+g}\frac{I_j}{V_j} \tag{35}$$

Thus the spread between the true cost of capital r^k and the actual cost of capital $\bar{r}^k$ depends upon the ratio of investment to capital and ratio of natural rate of interest to depreciation plus the growth rate of the economy.

4. Government Budget and BOP Closures

In the core part of the model the government's budget is balanced in every period, and, therefore government is not involved in intertemporal savings. This essentially implies that all government expenditure is basically the government consumption.

The sources of revenue for the government are taxes on value added[8], tariffs on imports, sales taxes, income taxes and capital taxes. Lump sum income taxes are collected from total household income, and such income taxes are assumed to grow at the rate of population growth rate. In addition, there are other sources of government revenue such as export taxes, taxes on tourism, revenue generated from import-licensing and refund of excise taxes from India.

Government transfers its revenues to households and firms in the form of consumption and production subsidies, and it also serves domestic and foreign debt. In the core part of the model we assume all sorts of government non-transfer spending to public consumption.

This is an open economy model. We follow standard Armington specification of international trade in this model. For each tradable sector constant elasticity of transformation (CET) function defines relation between exports and domestic supply, and constant elasticity of substitution (CES) function explains relation between domestic supply and imports in forming a composite good that goes to the utility function of the households. We use two level nests in trade to take account of different natures of trade relations between India and rest of the world (ROW). More detailed discussion of trade specification is available in Bhattarai (1997).

We consider two rules of BOP closure. In the first case no foreign borrowing is allowed; imports need to be paid by exports[9]. In the second case intertemporal borrowing and lending is permitted. It is presented in the form of CAPFLOW scenario in the next section

[8]From the fiscal year 1996/97 the government has been adopting a value-added tax (VAT) system to replace sales and excise taxes imposed on consumers and producers. Given the self-enforcing mechanism of VAT against other indirect taxes are believed to reduce leakage of tax-revenues, though its implementation seem challenging if one considers illiteracy of 67 percent of population in the country (Dixit 1995). In ideal conditions revenue generated from VAT and taxes on the final product would be the same.

[9]In the model number of sectors trading with India and rest of the world are seven and eight respectively.

The elasticities of substitution between domestic and imported products in consumption and the elasticity of transformation between domestic sales and foreign sales are taken based on sensitivity analyses.
Finally, the market clearing condition for goods market is given by:

$$A_{j,t} = C_{j,t} + \sum_{j=1}^{12} a_{i,j} Y_{j,t} + G_{j,t} + \sum_{j=1}^{12} a_{i,j}^{I} I_{j,t} + DST_{j,t} + TD_{j,t} \quad (36)$$

here $A_{j,t}$ is total supply in the economy in a sector j should be equal to sum of various components of demand as given on the right hand side, i.e. the consumption of households: $C_{j,t} = \sum_{h} C_{j,h,t}$, intermediate demands: $\sum_{j=1}^{12} a_{i,j} Y_{j,t}$, government demand: $G_{j,t}$, investment demand: $I_{j,t} = \sum_{j} a_{i,j} I_{j,,t}$, inventory demand: $DST_{j,t} = DSTR_{j,t} \cdot Y_{j,t}$, and demand by tourists: TD_t^s; for simplicity we assume that demand by tourists grows at the rate of growth of the economy.

5. Definition of a Competitive Equilibrium

A competitive equilibrium is a set of sequences of prices of composite commodities, $P_{i,t}$; prices of domestic goods sold in domestic markets, $PD_{i,t}$; prices of exported commodities, $PX_{i,t}$; prices of capital goods, $P_{j,t}^{k}$; prices of terminal capital, $PTK_{j,t}$; wage rates for each categories of labor, $w_{h,t}$; prices of government services, PG_t; prices of provisions for tourism, PT_t; value of transfers to the households, PR_t ; prices of consumption, PU_t; welfare index, PW_t; rental rate of capital for each sector, $r_1^k : \mathrm{R}_+ \to \mathrm{R}$, and sequences of gross output, $Y_{i,t}$; total supply of commodities, $A_{i,t}$; sectoral capital stock, $K_{i,t}$; sectoral investment, $I_{i,t}$; exports, $X_{i,t}$; government services, GOV_t; level of household utility from consumption, U_t; and total welfare, W such that given these prices and commodities:

1) households solve intertemporal utility maximization problems subject to life time income constraints;
2) investors solve intertemporal profit maximization problem subject to arbitrage conditions in capital markets;
3) producers solve their profit maximization problem subject to technology and resource constraints
4) markets for goods and services, labor, capital clear;
5) government account constraints are satisfied;
6) balance of payments condition is fulfilled;
7) financial markets are in equilibrium.

In this equilibrium, consumers have perfect foresight, capital accumulation is consistent with household's optimization, income and expenditure balance over the life period. An agent is doing the best he can in light of actions taken by others and actions taken together are technically feasible. This ensures the compatibility of plans of individuals or correspondence between consumers' preferences and firms' technology or the nation as a whole as explained in Bhattarai (2011).

There are mainly two limitations of this model. First, analytical solution of this model with 8,977 variables is very complex and possible only at the topological representation. We rely on numerical methods that generate a set of relative prices consistent with the Walrasian equilibrium. Absolute prices do not matter in general equilibrium models; it generates the same equilibrium even if all prices are multiplied by a constant. For analyses of model results we basically compare ratios of prices in terms of a numeraire in benchmark and counterfactual scenarios, not the absolute differences in prices.

Second, the model presented here does not contain any adjustment costs or penalties. The role of dynamics in such a model is not to show the pattern of adjustment, but to track the prices of commodities with a multi-period character, e.g. the capital stock. The model is suitable to study the impact of a certain policy that changes the steady state of the model and thus the growth and welfare of the households over a model horizon.

In spite of these limitations this model is capable of generating results that are interesting from a point of view of a policy maker. We use a welfare index as the criterion for making the best policy choice from various options available to a policy maker.

6. Measure of Welfare

General equilibrium solutions are used to compute equivalent or compensating variations in consumer welfare from given changes in policy regimes. In this model the overall welfare is given by sum of utility over periods measured in terms of prices of composite consumption.

$$UW^h = \sum_t^{\infty} PU_t^h U_t^h \tag{37}$$

Here UW^h is a measure of welfare to household h for the period of model horizon, PU_t^h is the price of composite consumption in period t, and U_t^h is the utility to a household from consumption of goods and services in the economy. We use welfare measures in order to quantify the impacts of various policy measures. A policy experiment that has greater value of UW^h is more desirable than the one with lower one.

We can also use this model to study the behaviour of output, employment, capital accumulation and overall and sectoral prices for a fairly decentralized open economy. This advancement in numerical analysis of an economy is made possible by the development of MPSGE/GAMS software and algorithms to solve the mixed-complementary problem with nested functions, computation of a standard model with a more elaborate specification is not a problem (see Rutherford, (1995)). The task was made even easier by base year micro-consistent data readily available from the ADB model (see Maxwell Stamp's report to ADB 1992). The dataset and the GAMS/MPSGE program used for computation of the model are in details in Bhattarai (1997)[10].

7. Analysis of Model Results

Effort is made in this section to answer questions raised in the introduction section based on the dynamic CGE model calibrated to the Nepalese economy. Analyses of model results show that financial liberalization improves efficiency on allocation of resources by eliminating the distortionary costs of capital in the various sectors of the economy. Enhancement in efficiency allows expansion in capital stock, employment and total output over period. Overall welfare of consumers increases. Welfare gains of rural households are higher than the welfare gains of urban households. This indicates a significant effect of liberalization on the redistribution of income. The degree of liberalization matters. The impact of complete liberalization is greater than the impact of a partial or a sector specific piecemeal liberalization for both efficiency and redistribution. The impact would have been greater had Nepal have political stability since 1992.

Financial liberalization here means the removal of distortions in the user cost of capit¬l ıcross sectors. The percentage distortions from a steady state rate of return across sectors, represented by δj in the model, are given in table 1. In repression, agricultural and manufacturing sectors pay up to a 60 percent higher rate than in an undistorted steady state, while modern sectors such as public services, electricity, transport sectors received

[10]Author appreciates guidance received from Professor Rutherford while he was developing this program as a part of the research for doctoral degree from the Northeastern University in Boston in mid 1990s.

subsidies ranging from -4.7 percent to 112 percent in their capital use. Thus rental rates are not necessarily tied down to the rate of returns or productivity of capital and an artificial rule of allocation makes the rates of return vary from one sector to another.

Table 1. Capital market distortions in the base year

Food	Cash	Food proc.	Textile	Chem.	Capital
0.591	0.591	0.591	0.578	0.536	0.424
Transp.	Electric	Constr.	Tourism	Services	Public
-0.047	-0.157	-0.336	0.161	0.011	-1.118

In the liberalized regime rates of return to capital equalize across various sectors, this is the key to the efficiency and distribution effects we have discussed in this paper. We consider economy-wide and sector specific piecemeal liberalization. Economy-wide liberalization is further classified into a partial and a complete liberalization depending upon the amount of reduction in the distortion. In the case of economy-wide liberalization the distortionary cost of financial intermediation (d_j), the spread between the lending and borrowing rates, is changed across all sectors at the same rate. In the partial economy-wide liberalization d_j is reduced by a fifty percent in each sector, and it is set equal to zero in a complete liberalization. In the case of piecemeal liberalization, the distortionary cost of financial intermediation is reduced only for one or a few selected sectors. For instance, would a cut in the subsidy on the user cost of capital to the public sector increase the volume of investment in other sectors? Or does a reduction in the premium on cost of capital in food sector or a cash crop sector matter? We search for answers to these questions solving the model for a 30 years' horizon.

The impact of financial liberalization policy varies according to conditions and structure of the entire economy upon which these policies are undertaken. We capture these conditions selecting five different scenarios:

1. the baseline is calibrated assuming a steady state equilibrium in the base-year;
2. complete market scenario (CAPFLOW) represents a steady state growth rate across all sectors, unrestricted borrowing and lending permitted to close the balance of payment (BOP) gap along with exogenous interest rate;
3. the incomplete market scenario (BOPCON) assumes a common steady state growth rate across all sectors and a period by period BOP constraint;
4. in black-hole scenario (BKLHOLE) we study a special feature of repression in the Nepalese economy by allowing leakage of savings to accumulation of unproductive assets such as jewellery, purchases of precious metals, hoarding of urban land or foreign exchange when households anticipate a negative rate of return on their financial assets. This raises the real cost of financial intermediation. This scenario takes period by period BOP constraint and steady state growth path.
5. non-steady state scenario (NONSS) covers cases where supply of some factors grow at different rate than the steady state growth rate assumed in the model. Here, we assume that the urban labor grows twice faster than the steady state growth rate and land productivity grows at 1/3 of the steady state growth rate. In addition as in CAPFLOW scenario we allow free flows of capital with exogenous interest rates.

The overall gains in welfare from financial sector liberalization under various scenarios are presented in Table 2. The overall welfare effects in CAPFLOW and NONSS model are comparable to findings of many other studies in the tax reforms and trade liberalization literature (Shoven and Whalley (1984) Robinson (1989) and Devarajan et. al (1996)).

Table 2. Welfare indices under different scenarios of liberalization

	Capital Flow Scenario			Non steady State			Black Hole Scenario		
	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban	Overall
Partial	1.103	0.747	1.0674	1.045	0.822	1.0227	0.905	0.920	0.9065
Complete	1.166	0.441	1.0935	1.166	0.947	1.1441	0.855	0.880	0.8575

The greatest welfare gain is up to 14.4 percent more than the baseline welfare in NONSS scenario under complete liberalization, compared with 9.3 percent gain in CAPFLOW scenarios. These results indicate the importance of growth conditions in the labor market and the growth in productivity of agricultural land in analyzing the impacts of financial liberalization. They also highlight the importance of international capital flows. However, if savings leak in unproductive assets high cost of intermediation reduces overall welfare as shown in the Blackhole scenario. The rural households lose more than urban households because of high cost of financial intermediation. Welfare gains under partial liberalization are smaller than in the case of complete liberalization but still sizable. Overall welfare under partial liberalization is up 6 percent in CAPFLOW scenario compared to 2 percent in NONSS scenario. If accumulation in unproductive assets persists reduction in welfare is less with a partial than in a complete liberalization.

The redistribution impacts of liberalization are noticeable. Model solutions generally show that the process of

financial liberalization is in favor of rural households in comparison to the urban households. This result might seem counter-intuitive as one would expect urban households to benefit more from the financial liberalization than the rural households. In repression, firms in urban areas have more access to financial institutions compared to those in rural areas and credit rates are kept artificially low by means of interest rate subsidies for one or another reason, i.e. promoting small scale enterprises, enhancing self-sufficiency or increasing exports. After liberalization various channels of capital and labor markets are also open to rural households making them relatively better off than the urban households.

The financial liberalization eliminates cheap credit facilities for privileged firms located in urban areas, forcing all firms to compete for capital on the basis of productivity. Firms operating with a heavy subsidy under repression, i.e. the public sector, can attract less capital and tend to substitute labor to capital after liberalization. Firms employing unskilled labor intensively, such as textiles, food-crops and cash-crop sectors expand their investment and production in response to increased access to funds in liberalized regime. They demand more unskilled labor than skilled labor to complement the additional capital. Given the fact that the endowment of unskilled labor is larger than the endowment of skilled labor in the Nepalese economy an easy access to credit markets for labor intensive firms has positive consequences in the market for rural labor. An increase in the demand for labor raises their wage rates. The higher relative wages of unskilled labor benefit rural households which by our assumption supply only unskilled type of labor.

Liberalization of the formal financial sector also has a widespread effect on informal credit markets in the rural sector. Nepal's rural credit market is dominated by the informal sector. In repression, access of rural firms or households to financial institutions is limited and the local money lenders exercise their market power charging a very high rate of interest. This creates additional distortions in rural sectors as reflected in the high cost of fund to rural sectors such as food crop and cash crop sectors. After liberalization more savings and loans flow through formal channels. Therefore, local money lenders have to provide attractive lending and borrowing rates if they want to sustain their business. This implies liberalization opens competition even in the rural areas where the formal financial institutions are not accessible. Cheap credit facilities increase rural investment and the productivity of the rural labor.

Table 3. Impacts of financial liberalization on capital stock under free capital flow scenario

	Food	Cash	Food proc.	Textile	Chem	Capital
Complete	2.37	3.02	2.11	4.72	1.73	1.12
Partial	1.73	2.02	1.61	2.88	1.42	1.08
Base	1.00	1.00	1.00	1.00	1.00	1.00
$K_{i,0}$	80031	32746	14427	11267	10056	7077

	Transp.	Electric	Constr.	Tourism	Services	Public
Complete	1.07	1.06	1.07	1.02	0.81	0.62
Partial	1.06	1.06	1.05	1.02	0.91	0.84
Base	1.00	1.00	1.00	1.00	1.00	1.00
$K_{i,0}$	21590	2673	20144	3892	26821	17058

Enhancement in welfare and a significant redistribution of income in favor of rural households occurs through improvement in allocation of capital resources and expansion in output. In the liberalized regime capital is allocated according to its marginal productivity. Investors look at the rate of return while allocating investment across sectors. It means that more productive sectors receive more capital. Reallocation of capital continues until the rate of return across the sectors is equal and all of these returns are equal to the cost of capital net of depreciation. Model results presented in Table 3 show the impact of financial liberalization on capital stock.

The capital stock grows faster in complete liberalization than in partial liberalization. For instance, the index of capital stock in the textile sector in 1918 is 2.88 in the case of partial liberalization, and 4.72 in case of complete liberalization. Thus the impact of complete liberalization in this sector is 61 percent higher than that in the partial liberalization. Similarly, the capital stock index in the public service sector in complete liberalization is 73 percent of partial liberalization. The impact in other sectors varies between these two extremes and depends upon the level of investment following liberalization.

The capital stock shrinks in public services and service sectors implying substitution of labor for capital in these sectors following the removal of interest rate subsidies after the liberalization. The stronger capital re-allocation effect under a complete liberalization compared to a partial liberalization implies that conventional practice of creating special rules for the promotion of selected sectors is not effective in the long run. The best rule for a greater accumulation of capital is to remove these special rules and let the capital market operate according to demand and supply forces of the liberalized market economy.

From the model results it is safe to conclude that the substitution effect dominates the income effect of the increase in the rate of interest on savings and the capital reallocation effect dominates the increase in the cost of capital on the investment side. The magnitude of saving effects depend upon the intertemporal elasticity of substitution (σ), as mentioned earlier a small σ implies higher degree of consumption smoothing and more pronounced saving effect due to liberalization. Thus both supply and demand in the capital market respond positively to liberalization policies. The overall effect of liberalization increases both savings and investment which ultimately leads to a higher rate of capital accumulation and growth after liberalization.

An increase in overall welfare is possible through increase in output and redistribution effects that results from the changes in composition of sectoral output compared to the base year. Model results presented in Table 4 show that output increases in all sectors after liberalization. But the output expansion in primary rural-labor intensive sectors, such as textiles, food-crops, cash-crops and chemical (mining and querying) sectors, are greater than in secondary sectors, i.e. transportation, electricity, tourism and construction. For instance, output index of textile sector in 2018 was 4.4 in partial liberalization compared to 5.7 in complete liberalization.

Table 4. Output impacts of liberalization under free capital flow scenario

	Food	Cash	Food proc.	Textile	Chem.	Capital
Complete	1.856	2.533	1.976	5.738	2.273	1.685
Partial	1.826	2.226	1.904	4.026	2.083	1.723
Base	1.00	1.00	1.00	1.00	1.00	1.00
	Transp.	Electric	Constr.	Tourism	Services	Public
Complete	1.633	1.788	1.947	1.591	1.375	1.796
Partial	1.7	1.801	1.817	1.664	1.561	1.772
Base	1.00	1.00	1.00	1.00	1.00	1.00

Output increases even in the public and services sectors in spite of some reductions in capital stocks in these sectors compared to baseline model. This suggests that in response to the elimination of subsidies on interest rates, these sectors substitute labor for capital in the liberalized regime. From sensitivity analyses, substitution of labor for capital is higher for larger values of elasticity of substitution between capital and labor.

Expansion in output is even greater than that of capital stock for every sector. None of the production sectors are experiencing any reduction in the level of output compared to baseline model. This reflects the fact that producers maximize profits by substituting capital and labor until the wage rental ratios are equal to marginal productivity ratios of capital and labor. Even if the capital stock de-accumulates in public and service sectors because of factor substitution, the production index is still greater than one. A careful comparison of the capital accumulation path and output path indicates this underlying process of substitutions between capital and labor by producers intending to maximize intertemporal profits. An increase in the capital stock complements urban and rural labor in the production of goods and services in the economy. However, the increase in the capital stock is neither a necessary nor a sufficient condition for an increase in output.

The level of output can expand even by an increase in the employment of labor for a given stock of capital. Changes in wage rental ratios imply changes in capital labor ratios in order to fulfil the requirements for profit maximization. Thus, increases in the capital stock leads to an increase in output but the output can increase even by an increase in the labor for a given stock of capital. Firms operating the expanding sectors tend to increase employment of both labor and capital to raise production sufficient enough to meet the increased demand for goods and services in the economy.

Expansion in output is supported by increases in final and intermediate demands. Growth in demand for consumption good from a sector may take the forms of increased consumption of households increased level of investment, higher intermediate demand and increased volume of exports. Even the government demand increases after an increase in revenues due to expansion in income.

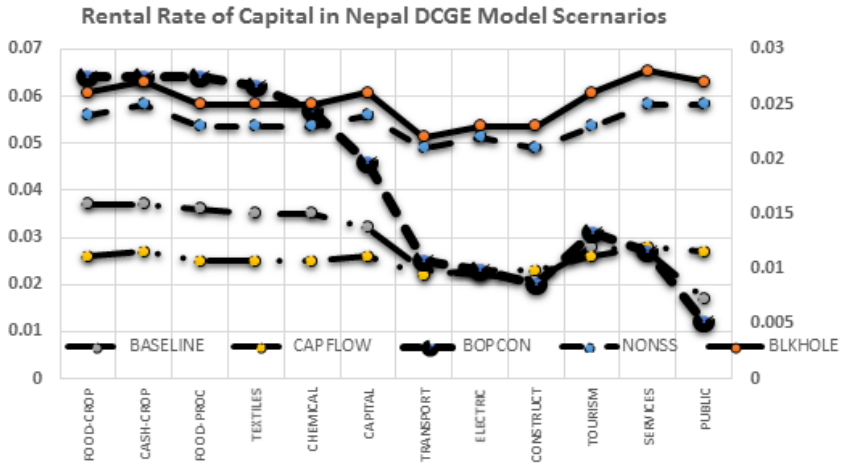

Figure 1. Rental rate of capital in Nepal DCGE model scenarios

By reducing the cost of capital the financial liberalization, as shown in Figure 1, lowers commodity prices supplied by domestic producers. A large proportion of demand met by imports before liberalization, particularly in the expanding sectors such as food crops, cash crops and textiles, are met by internal production after liberalization.

The output indices are very intuitive in considering the growth strategy for the Nepalese economy. If distortions are removed the economy starts growing through expansion of primary sectors, agriculture and its related sectors. Producers in these sectors respond to reduced cost of production by increasing output. The production of textiles expands to meet internal and international demands. The expansion rate of ancillary sectors, i.e. transport, electricity, construction and services is lower than the growth rates of the primary sectors. Given the structure of the model, financial sector liberalization policy actually turns out to be equivalent to an agriculture-led growth strategy for the Nepalese economy.

So far we have only reported welfare impacts of economy wide complete and partial liberalization. Table 5 presents the overall welfare gains by sector specific piecemeal liberalization. The highest welfare gain of 3.8 percent occurs through the piecemeal liberalization of textile sector, followed by 2.4 percent from the agriculture sector. These gains are positive except in case of construction and tourism sectors which do not have strong linkages with the rest of the economy (Bhattarai (1997)). As explained above financial liberalization releases extra resources in unskilled labor intensive sectors by increasing their productivity and wage rate more than for urban labor.

Table 5. Welfare indices under targeted piecemeal financial liberalization by sectors

	τ_j	Rural	Urban	Overall
Food crop	0.591	1.063	0.669	1.0236
Cash crop	0.591	1.035	0.874	1.0189
Food Proc.	0.591	1.015	0.919	1.0054
Textiles	0.578	1.051	0.917	1.0376
Chemicals	0.536	1.015	0.919	1.0052
Capital	0.424	1.006	0.948	1.0002
Construct	-0.336	0.994	1.029	0.9975
Tourism	0.161	1.001	0.988	0.9997

Financial liberalization is more effective when intertemporal borrowing and lending are permitted in the model. The rental cost of capital is higher in solutions of BOPCON scenario where several instruments of the financial system become inapplicable because of limited financial markets. If the economy cannot participate internationally, markets are not free, so the liberalization has little reallocation effect. In face of a period by period BOP constraint, thus the effect of liberalization on welfare is minimal.

From analysis of welfare figures both in complete, partial and piecemeal liberalization considered so far we can conclude that in general financial liberalization leads to an overall increase in welfare, and the welfare gain of rural households is larger than that of urban households.

8. Wage Rate Impacts of Liberalization

Wage earnings are key components of income in the intertemporal budget constraints of households. A rise in wage rates increases income, consumption and utilities and hence overall welfare across the model horizon. Redistribution takes place over the period if wage rates of rural households increases faster than wage rates of the urban households or vice-versa. As can be seen from table 6, the increase in wage rates of rural labor in comparison to the urban labor is the major source of income redistribution due to financial liberalization. We present the complete path of indices of gains in wage rates of rural labor relative to urban labor under partial and full liberalization in table 6. Wage gains of rural labor are greater in non-steady state scenario where the urban labor force grows twice than the rural labor force and agricultural productivity growth is one third of the growth rate of the rural labor force. An increase in urban labor supply causes a slower growth rate of urban wages in comparison to rural wage rates.

There are various explanations for relatively larger wage gains by rural labor. Reforms in the financial sector provide an easy access to credit to rural labor intensive firms in urban areas. These firms increase the demand for rural labor to complement addition in capital stock acquired from cheap credits. The competition in credit markets reduces interest rates in the informal markets in rural areas. Rural firms are able to purchase more capital stock which makes rural labor more productive. Households also convert their savings from unproductive assets to formal channels in order to earn interest. This re-conversion of capital takes places in rural sectors favoring rural households more than urban households.

Table 6. Ratio of rural to urban wage increases under different model scenarios

	Capital flow Scenario		Non-steady state scenario		Blackhole	scenario
	Partial	Complete	Partial	Complete	Partial	Complete
1990	1.028	1.049	0.995	1.024	1.029	1.049
1995	1.010	1.016	1.036	1.043	1.010	1.016
2000	1.003	1.010	1.081	1.083	1.003	1.010
2005	1.004	1.009	1.125	1.132	1.002	1.009
2010	1.003	1.010	1.176	1.179	1.003	1.010
2015	1.003	1.009	1.213	1.219	1.003	1.009

Lower rates of credit lead to more investment and greater demand for labor. Gradually segmentation of the labor market characteristic in a repressed economy fades away as an integrated labor market in which rural labor is paid according to its productivity emerges.

In all scenarios the wage rate increase is higher for rural labor relative to the wage rates of urban labor. Greater demand for rural labor drives up the rural wage rate after liberalization. Significantly higher rural wage rate in NONSS model is indicative of cuts in urban wages due to a higher growth rate of the urban labor force.

Model results in table 6 show that increase in wage rates depends upon the degree of liberalization. Wage rate effects are higher in case of complete liberalization than in the case of partial liberalization.

9. Conclusions

Nepal is going through series of conflicts and troubles in last 20 years. This paper argues that these are caused by lack of implementation of growth and redistribution policies aimed at reducing poverty and argues how financial liberalization policy can bring higher rates of growth and better distribution of income. It uses a forward-looking multi-sectoral general equilibrium model to analyze wide-ranging impacts of financials sector policies in an open economy framework. The model incorporates two trade sectors: India and rest of world to allow for Nepal's high degree of integration with its large neighbouring economy.

The major conclusions from the model analyses are the following:

1. By equalizing rates of return across sectors, financial liberalization insures efficiency in the allocation of resources. Efficiency in resource allocation increases the capital usage in sectors that were more repressed before liberalization. It causes a reduction, or slower growth, of capital use in sectors that used to be subsidized before repression. Output expands with an increase in the capital stock.

2. The benefits of liberalization accrue more to the rural households than to the urban households. Following liberalization rural labor intensive sectors invest more with increased access to financial institutions. More labor is required to complement additional capital. Demand for unskilled labor increases faster than the demand for skilled labor. This means an increase in the wage rate of rural labor is greater than the increase in the wage rate of the urban labor. Consequently, welfare gains of rural households are larger in comparison to the welfare gains of urban households. In this sense, liberalization redistributes income from urban to rural households. The redistribution of welfare occurs by increasing the wages of unskilled labor relative to skilled labor.

3. Numerical solutions of the model imply that the substitution effect of the increase in the rate of interest dominates the income effect on the savings side and the efficiency in capital reallocation effect dominates the increased cost of capital effect on the investment side. The overall effect is on increase in both savings and investment after the liberalization leading to a higher level of capital stock and output in each sector and higher level of welfare to both urban and rural households.

4. Conflicts and tension seen in Nepal over last twenty years can be solved by adopting a policy that promotes growth which redistributes income to poor households and thus gradually alleviates the mass of poverty. Dynamic multi-household multi-sectoral general equilibrium as discussed in this paper is the right modelling framework to put all parts of economy together while making the policy analyses and to assess the effective monitoring of the impacts of those policies in the life time welfare of households located in urban and rural areas.

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