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Economic Systems Research
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/cesr20

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Published online: 16 May 2007.

To cite this article: Thijs Ten Raa & Amarendra Sahoo (2007) Competitive Pressure on the Indian Households: A General Equilibrium Approach, Economic Systems Research, 19:1, 57-71, DOI: 10.1080/09535310601164781

To link to this article: http://dx.doi.org/10.1080/09535310601164781

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Economic Systems Research
Vol. 19, No. 1, 57–71, March 2007

Competitive Pressure on the Indian Households: A General Equilibrium Approach

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(Received February 2006; revised November 2006)

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ABSTRACT *How would competitive pressure impact upon the income distribution and the poverty of household groups? We analyse the gains in efficiency and productivity due to competitive pressure, and its distributional effects using a general equilibrium input–output framework. Efficient utilization of the available resources, technical progress and free trade constitute our sources of growth. Welfare would increase under competition, but the income distribution would become more skewed. Rural household groups would stand to lose relative to the urban ones. Urban poverty would be reduced significantly more than rural. In fact, the agricultural worker would even suffer from an increase in poverty. The study shows that competitive pressure has a positive effect on efficiency, productivity and poverty, but an adverse effect on the income distribution in the Indian economy.*

KEY WORDS: Efficiency, productivity, applied general equilibrium, income distribution, poverty

1. Introduction

After an economic crisis, India resorted to a major program of reform in 1991, to improve efficiency, productivity and global competitiveness. Macro- and microeconomic reforms were introduced in industrial, trade and financial policies (Bhagwati and Srinivasan, 1993). The Indian economy seemed to be responsive to the reform measures undertaken during 1991–1996; it featured globalization and liberalization. GDP grew more than 6.5% per annum during this period. However, reform commentators believe that India's agenda is still unfinished. Bajpai and Sachs (1997), Fischer (2002) and others advocate a greater momentum of reform, with more openness in trade, deregulation of industries,

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0953-5314 Print/1469-5758 Online/07/010057–15 © 2007 The International Input–Output Association
DOI: 10.1080/09535310601164781

and agricultural and labour market reforms. It is expected that the further reform will spur the economy to reallocate its resources efficiently and thus raise productivity. Once the economy operates on its frontier, competitive factor rewards would change the households' income and consumption and thus the welfare distribution. We analyse the consequences with the aid of a general equilibrium model built around a Social Accounting Matrix (SAM).

In the tradition of Kaldor (1956) and Kuznets (1955), Pananek and Kyn (1986) and Fields (1991), Cogneau and Guenard (2002) discuss the issue of whether growth creates or absorbs inequality. Economic growth creates employment opportunities and thus changes the income distribution. Indian industries were inefficient and hampered by pervasive government control. Although India has an impressive record of growth since the late 1980s, it still faces massive poverty and inequality. Many studies, namely Jain and Tendulkar (1990), Kakwani and Subbarao (1990), Datt and Ravallion (1992), and Ravallion and Datt (1996), emphasized the influence of growth on poverty in India.

The Indian economy is still well within its production possibility frontier. The inefficiency can be measured by the degree to which the net output vector could be extended given the resource and technology constraints (ten Raa, 1995). Despite many skeptical views on free trade versus growth (Rodriguez and Rodrik, 1999; Rodrik, 1999), there has been strong evidence that free trade enhances growth (Edwards, 1992; Sachs and Warner, 1995). Trade and development economists have exposited that in the absence of market failure and distortions, trade stimulates growth and improves welfare (Bhagwati, 1994; Srinivasan and Bhagawati, 1999). Competitive pressure can push the economy towards its production possibility set and trade can augment this set. Thus, the economy becomes not only productively efficient (on its production possibility frontier), but also allocatively efficient (on the utility possibility frontier) (Srinivasan and Bhagwati, 1999).

Few studies have analysed the sources of productivity growth in a general equilibrium framework. Ten Raa and Mohnen (2002) found a shift of the source of productivity growth from technical change to the terms of trade effect for the Canadian economy. Shestalova (2002) used a new technological measure to analyse the total factor productivity (TFP) performance of the three large trading economies endogenizing not only the domestic prices, but also the terms of trade. Ten Raa and Pan (2005) have analysed the personal income distribution using an inter-provincial model in the Chinese economy. We derive the sources of income for different household groups (or ownership of factor endowments), and their expenditure patterns from the Indian SAM. As we confine our analysis to the income distribution of households at the national level, we adjust the weights attached to the household in the welfare function in Negishi (1960) style, comparing the computed propensities to consume to the observed ones, rather than the trade surpluses in the cited studies.

The rest of the paper is divided into five sections. The theoretical model is presented in the next section. The section after analyses the basic data set. The fourth section briefly describes the analysis of poverty and inequality measures in our framework. Results and implications of the model are discussed in the fifth section, while the sixth section concludes.

2. The Methodology

The benchmark data set describes the Indian economy for the fiscal year 1994–95. The model distinguishes 21 production sectors. Four rural and five urban household groups

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are classified by their main source of income. Households have welfare function of the Leontief type, that is, the observed consumption bundles are presumed to be preferred by the household. We make the small country assumption, under which producers take the world prices of the commodities.[1] The pattern of trade will be endogenous, but the level of imports is controlled by the observed deficit on the balance of payment. Capital, labour, agricultural land and the deficit are considered to constitute the 'endowments' of the economy. The model assumes that the competitive market allows labour to move freely among the sectors. However, we assume that capital and land are sector-specific.[2]

Each household group h has a consumption demand vector, $d\mathbf{f}_h c_h$, where d is the scalar of total consumption demand, $\mathbf{f}_h$ is the vector of consumption shares of the commodities and c_h represents the consumption weight attached to the household group. The model maximizes total final private consumption subject to the commodity, factor and trade deficit constraints, while preserving the compositions of the vectors of private consumption of the household groups. The other components of final demand, government consumption and investment, are fixed in the model. The shadow prices are used to derive the competitive income of each household group. The implied competitive propensities to consume are matched to the observed ones, by adjusting the consumption weights given to the households. The allocations of activity and shadow prices that are finally obtained constitute the general equilibrium (Negishi, 1960).

The SAM provides a consistent data framework for economy-wide models with detailed accounts for industries, categories of working persons, institutional sub-sectors, and various socio-economic household groups. The rows in the SAM state the receipts (or income) of the different accounts and the columns the expenditures (or costs). Table 1 gives a bird's eye view of the SAM we have used for our analysis. The input–output table is in the first cell. The first column also shows how factor endowments owned by the different household groups contribute to the production process (the value added cell). The second column shows the factor incomes returned, by ownership. The first row displays household consumption and the other component of final demand.

The basic idea of the efficiency gain on the frontier can be illustrated graphically. This frontier can be reached by optimal allocations of factors of production across the sectors and by re-allocation of trade with the rest of the world (Figure 1). In Figure 1, y and D_0f denote the actual production and domestic final demand, on the international trade budget line. As shown by ten Raa and Mohnen (2002), D_0f can be expanded to D^*f by producing y^* instead of y. Notice that the optimal pattern of trade is reversed in Figure 1. The following linear program determines the optimal allocation:

$$\max_{d,\mathbf{x},\mathbf{t}} d\mathbf{e}' \sum_h \mathbf{f}_h c_h$$

subject to

$$\mathbf{x} \geq \mathbf{A}\mathbf{x} + \sum_{h=1}^{9} d\,\mathbf{f}_h c_h + \mathbf{g} + \begin{pmatrix} \mathbf{t} \\ 0 \end{pmatrix},\ \hat{\mathbf{k}}\mathbf{x} \leq \bar{\mathbf{k}},\ \mathbf{l}'\mathbf{x} \leq \bar{l},\ \hat{\mathbf{n}}\mathbf{x} \leq \bar{\mathbf{n}},\ -\boldsymbol{\pi}'\mathbf{t} \leq -\boldsymbol{\pi}'\mathbf{t}^0,\ \mathbf{x} \geq 0$$

Table 1. A schematic SAM

	Production account	Factors of production	Households	Government	Capital account	Rest of World	Total
Production account	I-O		Household consumption	Government consumption	Investment demand	Net exports	Total demand
Factors of production	Value added						Value added
Households		Factor income of households					Total household income
Government account			Taxes				Government income
Capital account			Household savings	Government savings		Foreign savings	Total savings
Rest of World							
Total	Value of output	Value added	Total household expenditure	Total Govt. outlay	Total investment		

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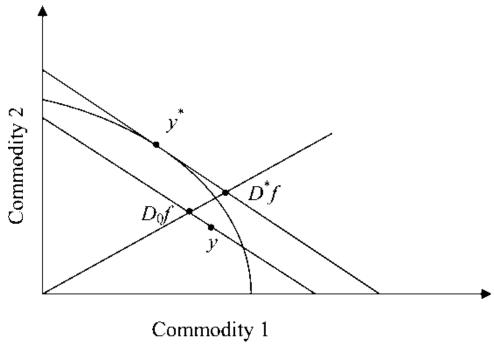

Figure 1. Movement towards the frontier and efficiency gain

Here the exogenous variables and parameters are the following: $\mathbf{f}_h$ is the column vector of hth household's consumption share (21-dimensional); c_h is a scalar of share of consumption demand of each hth household in total consumption demand; $\mathbf{e}'$ is a unit row vector; $\mathbf{A}$ a 21×21-dimensional matrix of intermediate flow coefficients; $\mathbf{g}$ a 21-dimensional vector of fixed final demand comprising government consumption demand, investment demand; $\bar{\mathbf{k}}$ is a 21-dimension column vector of sector specific capital stock; $\bar{l}$ is the total labour endowment in the economy; $\bar{\mathbf{n}}$ is a 21-dimension column vector of sector specific land endowments in the economy; $\hat{\mathbf{k}}$ is a diagonal matrix with sector-specific technical coefficients of capital; $\mathbf{l}'$ is a row vector of technical coefficients of labour; $\hat{\mathbf{n}}$ is a diagonal matrix with sector-specific technical coefficients of land; $\boldsymbol{\pi}'$ is a 19-dimension row vector of terms of trade in dollar terms; and $\mathbf{t}^0$ is a 19-dimensional vector of observed net exports. The endogenous variables are: $\mathbf{x}$ is a 21-dimensional column vector of economy's output; d a scalar of overall private consumption demand in the economy; and $\mathbf{t}$ a 19-dimensional vector of net exports. The primal problem expands the final private consumption demand (d) given the household group's weights, c_h. The weights will be adjusted to equilibrate the model. The first constraint is the commodity constraint, i.e. the material balance, while the next three constraints are for capital, land and labour, respectively. The fourth constraint states that the net exports valued at world prices cannot conflict the existing trade deficit.

The dual problem reads:

$$\min_{\mathbf{p}',\mathbf{r}_1',\mathbf{r}_2',w,\varepsilon} \mathbf{r}_1'\bar{\mathbf{k}} + \mathbf{r}_2'\bar{\mathbf{n}} + w\bar{l} - \mathbf{p}'\mathbf{g} - \varepsilon\boldsymbol{\pi}'\mathbf{t}^0$$

subject to

$$\mathbf{p}' \leq \mathbf{p}'\mathbf{A} + \mathbf{r}_1'\hat{\mathbf{k}} + \mathbf{r}_2'\hat{\mathbf{n}} + w\mathbf{l}' \,;\, \mathbf{p}'\sum_{h=1}^{9} \mathbf{f}_h c_h = \mathbf{e}'\sum_{h=1}^{9} \mathbf{f}_h c_h \,;\, \mathbf{p}' = \varepsilon\boldsymbol{\pi}'$$

In the dual problem, shadow prices $\mathbf{p}'$, $\mathbf{r}_1'$, $\mathbf{r}_2'$, w and ε are for output, capital, land, labour and purchasing power parity, respectively. The first dual constraint reflects that the factor cost of production exceeds value added. For active sectors, there is equality (ten Raa, 1995). The second dual constraint takes care of the price normalization. The last constraint

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equalizes the prices of the tradable sectors with their opportunity cost under the assumption of free trade.

The idea is to compute the propensity to consume at the competitive prices for each household group and to equalize relative propensities to consume with the observed ones. If the propensity to consume of the first household group turns out to be disproportionately high, its higher consumption demand signals that we have attributed too much welfare to this group in the social welfare function. We adjust the weight (downward in this case) and re-compute the optimal allocation given by a linear program. Through an iteration process, we arrive at the optimum pattern of consumption and income for each household group. In a solution to the linear program, the households consume $d\mathbf{p}'\mathbf{f}_h c_h$, whereas their incomes are $\mathbf{r}_1'\bar{\mathbf{k}}\theta_k^h + \mathbf{r}_2'\bar{\mathbf{n}}\theta_n^h + w\bar{l}\theta_l^h$, given the household groups' ($h = 1, \ldots ,9$) shares θ_k^h, θ_n^h and θ_l^h of the capital, land and labour endowments. The implied propensities to consume are $m_h^1(d) = d\mathbf{p}'\mathbf{f}_h c_h/(\mathbf{r}_1'\bar{\mathbf{k}}\theta_k^h + \mathbf{r}_2'\bar{\mathbf{n}}\theta_n^h + w\bar{l}\theta_l^h)$. The observed propensities to consume, $m_h^0(d)$, valued at competitive prices for current consumption are similar, but with the optimal consumption baskets $d\mathbf{f}_h c_h$ replaced by the observed baskets. If a household category h has a low optimal propensity to consume, we rerun the linear program, giving it more weight in final consumption, c_h. There are eight independent such weights (one of the nine weights is determined by the adding-up condition) and the condition that nine household groups have equal optimal/observed ratios of the propensities to consume amounts to eight equations. In equilibrium, the optimal/observed ratios of the propensities to consume are the same for all household groups. Mathematically, the equilibrium is found as in ten Raa and Pan (2005).

3. Data

We use the SAM of Pradhan *et al.* (1999), with some adjustments. The intermediate flows in the SAM are based on the commodity-by-commodity matrix, which we have aggregated from the original 60 commodities down to 21. Households are classified according to their principal sources of income. There are four rural and five urban occupational household groups. The 1996 MIMAP-India Survey (Pradhan and Roy, 2003) provides the information on the factors of production, and the income and consumption distributions. Table 2 shows that the bulk of rural income derives from agriculture, while urban income stems nearly exclusively from the other activities. The rural agricultural households derive around 87% of their income from the agriculture. The other rural household groups derive between 87% and 89% of their income from non-agricultural activities.

Table 3 shows that the urban 'salaried class' (12% of the population) secures a big chunk of the wage bill (34%), whereas 'agriculture labour' (22% of the population) gets a meagre part (17%). The small 'non-agriculture self-employed' household group (5.4% of the population) lays claim to the bulk of capital income (33%). The rural 'cultivator' household group also enjoys a great share of capital income (20%), but they are many (24% of the population). This group dominates agricultural land. Table 4 reveals that rural households have a rather uniform pattern of consumption, with the bulk spent on primary, mainly agricultural, goods. The vast majority of the urban households consume services.

The benchmark coefficients for the factor input are given in Table 5. The Annual Survey of Industry (ASI) (Government of India, 1994–95) gives information on the number of employees engaged in the different registered manufacturing industries and their total

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Table 2. Sources of Income for Household Groups (in percentage)

Household categories	Agriculture	Non-agriculture	Total
All-India	32.14	67.86	100
Rural			
Self employed in agriculture	87.12	12.88	100
Self employed in non-agriculture	12.87	87.13	100
Agriculture wage earners	88.52	11.48	100
Non-agriculture wage earners	10.32	89.68	100
Other households	12.53	87.47	100
Total rural	55.66	44.34	100
Urban			
Agriculture households	74.91	25.09	100
Self employed in non-agriculture	0.95	99.05	100
Salaried earners	0.90	99.10	100
Non-agriculture wage earners	2.19	97.81	100
Other households	1.03	98.97	100
Total urban	2.46	97.54	100

Source: Pradhan and Roy (2003).

emoluments. We compute the average wage rate for each registered industry. Because of the difficulty in procuring information on unregistered industries, we apply the wage rates of the registered industries to the unregistered ones. Application of the wage rates to the SAM-based labour value added statistics, yields estimates of the numbers of employees in the manufacturing industries. Unfortunately, ASI does not give information on agriculture sectors, mining and quarrying, construction and service sectors. Using the information on the numbers of main and marginal workers engaged in these activities given by the Government of India (1991), we compute the benchmark wage rate for these sectors. An unemployment rate of 6% is applied to get the labour constraint in the model.[3] We assume that land is used in agriculture only and we assume it is fully utilized.

Table 3. Percentages of income across household groups by sources

Household	Population	Wage income	Capital income	Land rent	Total
Total	100	100	100	100	100
Rural					
Cultivator	24.22	13.36	20.46	78.49	23.92
Agriculture labour	22.08	16.85	0.46	0.56	9.97
Artisans	13.85	10.01	14.81	15.50	12.12
Other households	14.76	14.8	3.76	4.18	10.21
Urban					
Agriculture households	1.24	0.74	1.62	1.28	1.06
Non-agriculture self-employed	5.40	6.03	32.69	0	12.97
Salaried	12.19	34.34	14.26	0	24.04
Non-agriculture labour	2.81	2.96	3.54	0	2.74
Other households	3.44	0.90	8.40	0	2.96

Source: Calculated from the SAM for India, Pradhan *et al.* (1999).

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Table 4. Composition of household expenditure

Household	Primary	Secondary	Services	Total	Share in total spending
Rural					
Cultivator	41.16	26.10	32.74	100	0.12
Agriculture labour	47.17	25.71	27.11	100	0.06
Artisans	41.18	28.08	30.75	100	0.06
Other households	42.23	29.07	28.70	100	0.05
Urban					
Agriculture households	43.77	23.76	32.47	100	0.01
Non-agriculture self-employed	35.07	24.86	40.07	100	0.06
Salaried	24.63	31.36	44.00	100	0.11
Non-agriculture labour	44.37	25.32	30.31	100	0.02
Other households	19.08	27.46	53.46	100	0.02

Source: Calculated from the SAM for India, Pradhan *et al.* (1999).

Table 5. Factor prices and coefficients across the sectors

Sectors		Capital/ Output	Labour/ Output	Land/ Output	Average wage*	Rent of capital*	Rent of land*
S1	Food grains	0.065	4.88	0.276	0.065	1.000	1.000
S2	Other agriculture	0.075	5.75	0.302	0.065	1.000	1.000
S3	Crude oil, natural gas	0.594	2.70		0.089	1.000	
S4	Other mining and quarrying	0.454	2.03		0.089	1.000	
S5	Food products, etc.	0.133	0.48		0.172	1.000	
S6	Textiles	0.117	0.63		0.262	1.000	
S7	Other traditional manufacturing	0.162	0.58		0.289	1.000	
S8	Petroleum products	0.268	0.15		0.461	1.000	
S9	Finished petrochemicals	0.276	0.13		0.461	1.000	
S10	Fertilizer	0.230	0.20		0.365	1.000	
S11	Other chemicals	0.225	0.23		0.365	1.000	
S12	Non-metallic products	0.170	0.51		0.236	1.000	
S13	Basic metal industries	0.156	0.18		0.444	1.000	
S14	Metallic products	0.157	0.55		0.309	1.000	
S15	Capital goods	0.175	0.49		0.449	1.000	
S16	Other manufacturing	0.269	0.70		0.342	1.000	
S17	Construction	0.075	0.46		0.810	1.000	
S18	Electricity	0.277	0.30		0.383	1.000	
S19	Infrastructure service	0.377	0.80		0.311	1.000	
S20	Financial service	0.531	0.75		0.311	1.000	
S21	Other services	0.243	1.65		0.289	1.000	

Source: Calculated from the SAM for India, Pradhan *et al.* (1999).

*Wages are calculated from Annual Survey of India (various issues), Government of India (1991) and rent to capital and land are assumed to be one at observed level.

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Table 6. Capacity utilization and sources of information

Sectors		Capacity utilization (%)	Sources
S1	Food grains	81	Gupta *et al.* (2000) for irrigation
S2	Other agriculture	81	Gupta *et al.* (2000) for irrigation
S3	Crude oil, natural gas	88	Indiainfoline.com (2003)
S4	Other mining and quarrying	85	Government of India (1996) for coal
S5	Food products, etc.	49	Government of India (1992a)
S6	Textiles	69	Government of India (1992a)
S7	Other traditional manufacturing.	58	Government of India (2001a)
S8	Petroleum products	88	Indiainfoline.com (2003)
S9	Finished petrochemicals	78	Government of India (2001a)
S10	Fertilizer	90	Trivedi *et al.* (1998)
S11	Other chemicals	78	Directories-today.com (2003)
S12	Non-metallic products	71	Government of India (1992b) for cement industry
S13	Basic metal industries	78	Government of India (1992b) for aluminium industry
S14	Metal products	55	Government of India (2001a)
S15	Capital goods	83	Government of India (2001a)
S16	Other manufacturing	78	Government of India (2001a)
S17	Construction	75	Indiainfoline.com (2003)
S18	Electricity	41	Government of India (2001b)
S19	Infrastructure service	75	Indiainfoline.com (2003)
S20	Financial service	100	Authors' own assumption
S21	Other services	52	Government of India (1987)

We assume that capital and land rents are uniform across sectors. Table 6 shows the capacity utilization rates for different sectors, taken from different sources.

4. Income Distribution and Poverty

This section of the study is based on Pradhan and Sahoo (2006). The measurement of poverty requires an estimation of the income distribution within each group. The distribution will be used to evaluate the group poverty incidence. The implicit assumption is that, given the within-group variances, the intra-group distribution changes proportionally with the change in mean income. For within-group distribution we use a lognormal frequency distribution,

$$f(y) = \frac{\exp\frac{-[\log(y)-\mu]^2}{2\sigma}}{(\sqrt{2\pi}\sigma)}$$

parameterized by the log-mean μ and the standard deviation σ. The FGT poverty measure

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(Foster *et al.*, 1984) is suitable to estimate group-wise poverty. It is defined by

$$P_\alpha^h = \frac{1}{n^h} \sum_{i=1}^{q^h} \left[\frac{z - y_i^h}{z} \right]^\alpha$$

with $h = 1, \ldots, 9$; n^h the population size in household group h (i.e. occupational class); q^h the number of people below the poverty line; z the poverty line[4] and y_i^h is the income of the ith person in household group h. α is a measure of poverty aversion; the most commonly used values are 0, 1 and 2. P_0 is the 'head-count ratio measure', P_1 is the 'poverty-gap measure' and P_2 the 'distributionally sensitive measure'. In this paper, we use only the head-count ratio of poverty measure; it is simply the fraction of households living below the poverty line.

When income distribution is given in the form of group data, the poverty measure requires continuous income density functions, one for each household group, and the FGT poverty index can be expressed as

$$P_\alpha^h = \int_0^z \left(\frac{z - y}{z} \right)^\alpha f^h(y) dy$$

By assumption of the lognormal distribution and a transformation, the 'head-count ratio' becomes

$$P_0 = N\left(\frac{\log z - \mu}{\sigma} \right)$$

where N is the standard normal distribution.

For each household group we estimate of μ σ using the MIMAP-India household survey data (see Table 7). We estimate the observed level P_0 for household groups by applying information on income distribution from the SAM. However, the estimated observed

Table 7. Parameters of lognormal distribution

Households	Log-mean (μ)	Standard deviation (σ)
Rural		
Cultivator	5.85	0.76
Agriculture labour	5.33	0.60
Artisan	5.55	0.79
Other household	5.93	0.72
Urban		
Farmer	5.41	1.05
Non-agricultural self-employed	6.36	0.89
Salaried class	6.68	0.76
Casual labour	5.54	0.82
Other household	6.47	1.35

Source: Estimated from Pradhan and Roy (2003).

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Table 8. Poverty head-count ratio P_0 at observed period

Households	Poverty (1994–95)	
	Estimated	Official*
Rural	0.3943	0.3979
Cultivator	0.3679	0.2946
Agriculture labour	0.5497	0.5675
Artisan	0.3586	0.4404
Other households	0.2041	0.2451
Urban	0.2837	0.2245
Farmer	0.7396	0.6179
Non-agricultural self-employed	0.3860	0.2389
Salaried class	0.1424	0.1038
Casual labour	0.6103	0.5910
Other household	0.2135	0.2912

*Pradhan and Roy (2003).

poverty ratios at the observed level could be different from that officially reported by Pradhan and Roy (2003) due to differences in assumption regarding distributions and other adjustments in the SAM (see Table 8). The optimum solutions of our general equilibrium model yield sets of new relative prices and mean income of household groups, which are used to calculate the changes in poverty line and mean income (μ) from the observed level.[5] We measure inequality by the Gini coefficient.

5. Results and Implications

The main objectives of the economic reforms in India have been to accelerate the growth of the economy by removing the distortions, domestic as well as trade, and to mitigate the poverty situation. Table 9 shows that, since 1983, the rural poverty ratio is higher than the urban. The poverty ratio has declined since the late 1980s.

If these policies of economic reform were realized to the fullest theoretical extent, the competitive pressure would twist the distribution of income. The Indian economy could expand by a factor 1.42, indicating that it operates at an efficiency level of 70%.[6] This

Table 9. Poverty head-count ratio

Year	Rural	Urban	Total
1973–74	56.4	49.0	54.9
1977–78	53.1	45.2	51.3
1983	45.7	40.8	44.5
1987–88	39.1	38.2	38.9
1993–94	37.3	32.4	36.0
1999–00	27.1	23.6	26.1
2007*	21.1	15.1	19.3

Source: Government of India (2003).
*Poverty projection for 2007.

Table 10. Household consumption weights, income inequality and poverty head-count ratio

Households	Ratio of optimum to observed: Consumption weights	Income	Consumption	Percentage change in poverty Head-count
Rural				−0.62
Cultivator	0.792	0.931	1.12	2.44
Rural agricultural labour	0.795	0.935	1.13	3.51
Artisan	1.072	1.261	1.52	−11.69
Rural other	0.881	1.036	1.25	−2.10
Urban				−11.38
Urban farmer	1.157	1.360	1.64	−17.39
Urban non agricultural self	1.458	1.714	2.07	−16.72
Urban salary	0.996	1.171	1.41	−5.57
Urban casual labour	1.196	1.406	1.70	−23.86
Urban other	1.513	1.779	2.15	−15.42
Gini coefficient	0.2739			0.3424
Expansion vector	1.00			1.42

would come with a great increase in the Gini coefficient, from the observed 0.2739 to 0.3424. However, poverty (the head-count ratio P_0 defined in the previous section) would decline for the overall rural as well as the overall urban households (see Table 10). The decline is quite significant for the urban household and marginal for the rural households.

When the economy is allowed to be fully competitive, factors are fully utilized and the mobile factor, labour, is reallocated to the sectors with strong demand. The assumption of labour mobility gives rise to a single competitive wage rate. It is seen to be lower than the benchmark average wage (see Table 11). The rents to capital and land are determined by the interplay of demand and supply of each sector; and differ by industries. We observe that the demand for capital is stronger than that for labour and land. Land used in the sector ‘other agriculture’ is non-binding in the optimum, yielding a zero shadow price, while land used in the ‘food grains’ sector marginally gains in factor reward.

Rent on capital in all the industries other than the intensive-intensive primary sectors would increase, namely agricultural sectors (S1 and S2), ‘crude oil and natural gas’ (S3) and, ‘other mining and quarrying’ (S4), and non-tradable sectors, namely ‘construction’ (S17) and ‘electricity’ (S18) (see Table 10). We observe that the agriculture sector has no comparative advantage. Agricultural output would not increase or drops (in the ‘other agriculture’ sector). Labour is thus released to the manufacturing and service sectors, which enjoy a strong comparative advantage. This observation is very close to that of Wood and Calandrino (2000). Labour is absorbed by the sectors with low capacity utilization rates.

As competitive factor prices of capital increase more than the other factors, we expect that household groups owning more capital stand to gain. Table 5 shows that among *rural* household groups, the ‘cultivator’ households own the most capital as well as land. Their income would decline though, because competitive land rent is low. The low competitive wage and the near non-existence of capital and land rents in agricultural sectors adversely effect the income of the rural ‘agriculture labour’ and ‘cultivator’ classes. Only the

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Table 11. Change in output, prices of factors and commodities

Sectors		Ratio of optimum to Benchmark				
		Factor prices				
		Labour	Land	Capital	Prices	Output
S1	Food grains	0.92	0.111		1.005	1.000
S2	Other agriculture	0.92	0.00		1.005	0.766
S3	Crude oil, natural gas	0.92		0.94	1.005	1.136
S4	Other mining and quarrying	0.92		1.04	1.005	1.176
S5	Food products, etc.	0.92		2.43	1.005	2.041
S6	Textiles	0.92		2.72	1.005	1.449
S7	Other traditional manufacturing.	0.92		2.86	1.005	1.724
S8	Petroleum products	0.92		1.36	1.005	1.136
S9	Finished petrochemicals	0.92		1.56	1.005	1.282
S10	Fertilizer	0.92		1.45	1.005	1.111
S11	Other chemicals	0.92		1.70	1.005	1.282
S12	Non-metallic products	0.92		2.25	1.005	1.408
S13	Basic metal industries	0.92		2.06	1.005	1.282
S14	Metallic products	0.92		3.21	1.005	1.818
S15	Capital goods	0.92		2.36	1.005	1.205
S16	Other manufacturing	0.92		1.96	1.005	1.282
S17	Construction*	0.92			0.610	1.062
S18	Electricity*	0.92			0.527	1.362
S19	Infrastructure service	0.92		1.89	1.005	1.333
S20	Financial service	0.92		1.26	1.005	1.000
S21	Other services	0.92		4.10	1.005	1.923

*These are the non-tradable sectors.

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'artisan' household group stands to gain. The worst affected household group in the economy is the rural 'agricultural labour', which has a very low share of capital and large labour endowment. *Urban* household groups fare better under competition. The 'salaried class' with maximal labour endowment experiences lowest gain in income, while greatest gain is enjoyed by the 'non-agricultural self-employed' household group, which own capital (see Tables 5 and 10).

The wide income disparity between the rural and urban household groups gives rise to an increase in the Gini coefficient. Adverse income effects among most rural household groups explain the low gain in the rural poverty ratio. Only the 'artisan' household group shows a significant decline in poverty; the 'agricultural labour' suffers heavily from an increase in poverty ratio (see Table 10). The poverty ratio increases by around 19% for rural 'agriculture labour' household group. As the ratio is already high for this group, (0.55 according to Table 8), the contribution is disastrous to this group. On the other hand, the urban groups would enjoy a sharp decline in poverty.

6. Conclusion

The efficiency pursuit of the Indian economy comes at the cost of adverse income effects, particularly among the rural household groups. The income distribution would become more skewed. Households dependent on labour and land tend to suffer. The urban household groups attain a better welfare distribution, with significant decline in the poverty headcount ratio. Not so for the rural household groups; the only rural household group that stands to decline in poverty is the 'artisan'. The worst victim of competition is expected be the 'agricultural labour'. Similarly, among the urban household groups, the relative gain for 'salaried class' is low.

Notes

[1]India's share in world merchandise exports and imports in value terms have been only 1.1% and 1.4% respectively; its shares in world exports and imports of commercial services have been only 1.5% and 1.8% respectively (WTO, 2005).

[2]In an economy like India, capital and land may not be mobile in the medium-run. Most of the capital and land are highly specialized due to its inherent technology, product-specificity, etc.

[3]The unemployment rate is the ratio of unemployed to the total labour force based on daily status. The source is National Sample Survey Organization (1997).

[4]Poverty lines for rural and urban are taken from NCAER (2000). Government of India (1993) estimated (nutritional) poverty line for Rural and Urban India for the year 1973–74 based on the pattern of consumption expenditures of households. NCAER (2000) revised the 1993–94 poverty lines by using consumer price index number for agriculture labour and industrial workers for rural and urban areas respectively.

[5]Our general equilibrium model provides the income for each group. If the log variances are known, then log means can be calculated from the following relationship $\mu = \ln(y) - \frac{1}{2}\sigma^2$, where y is the arithmetic mean income, σ^2 is log variance and μ is the log mean.

[6]As $1/1.42 = 0.70$.

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