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Growth and Inequality in India: Analysis of an Extended Social Accounting Matrix

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Summary. — Based on an extended Social Accounting Matrix (SAM) for 2002–03, this study shows how sectoral growth in India affects inequality. A breakdown of the wage account into three educational levels and 10 sectors of employment improves the link between sectoral expansion and household income in the SAM. The results show that only agricultural growth reduces inequality, while growth in heavy manufacturing and services sectors raises inequality. Given India's current growth pattern, inequality is likely to increase further. In an analysis of the standard SAM growth in any sector would appear to reduce inequality, which underlines the importance of our extension.

Key words — sectoral growth, inequality, education, Social Accounting Matrix, Asia, India

1. INTRODUCTION

In India, growth in the 1990s was accompanied by increasing inequality across and within states, between rural and urban areas, and within urban areas (Deaton & Drèze, 2002; Dhongde, 2007). Though growth led to considerable poverty reduction, increasing inequality offset part of its effect. The slowdown of poverty reduction is one reason to care about inequality, but even in itself it is a key characteristic of the development process and of actual concern to policy makers (Kanbur, 2000, 2007). Rising inequality puts stress on popular support for growth strategies and threatens social and political stability. As such, it may be detrimental to future growth and poverty reduction (Nissanke & Thorbecke, 2006). Reducing inequality and achieving more inclusive growth are in fact prime objectives in India's current Five Year Plan (Government of India, 2008).

Inequality is related to the sectoral structure of growth because different industries use different production factors and different households differ in their supply of various production factors. Ravallion and Datt (1996) show that during 1950–90 growth in the primary and tertiary sector reduced poverty in India, while growth in the secondary sector did not. They relate this to growth of the capital-intensive production in manufacturing in this period, which was not beneficial to the poor. Similar conclusions are drawn in Khan and Thorbecke (1989) and James and Khan (1997). Their study of the Indonesian Social Accounting Matrix confirms that traditional labor-intensive technologies are more egalitarian than modern capital-intensive technologies. The reason is that production under traditional technology creates more employment, directly and indirectly, and more income for rural households. These studies focus on the distribution of value added between capital and labor, but do not address inequality among workers.

Inequality of earnings is an important source of total income inequality (Gottschalk & Smeeding, 1997). Many studies have shown that the wage rate of skilled relative to unskilled workers, the skill premium, has risen in developing countries (Anderson, 2005; Goldberg & Pavcnik, 2007). Kijima (2006) finds that earnings inequality in India in the 1990s increased due to a rising skill premium. Especially the returns to tertiary education increased much, because relative demand outgrew relative supply. Furthermore, and related to this, the service sector has been the leading sector in terms of output and employment growth and is the most skill-intensive sector. During 1980–2000, labor moved out of agriculture into services, while the employment share of manufacturing hardly changed (Mazumdar & Sarkar, 2008, p. 225). Likewise, Chamarbagwala (2006) finds that in the period 1983–2000 employment in India shifted from low-skilled into high-skilled and medium-skilled occupations due to service sector expansion and agricultural sector contraction. It seems clear that inequality of earnings, and especially the skill premium, is an important factor in the relationship between sectoral growth and household income inequality. Therefore, the distribution of skills across households should be taken into account when analyzing this relationship.

The aim of this paper is to find out how the sectoral structure of growth contributes to household income inequality in India, and to show how one can—and should—account for inequality among workers. The analysis is based on an extended Social Accounting Matrix (SAM) for the years 2002–03. The SAM is a suitable tool to analyze the distributive effects of sectoral growth, as it captures the flow of income and interdependence between industries, production factors, and households, among others. The SAM has been widely used for development planning, reflecting the view that aggregate economic growth is an inadequate policy objective unless attention is paid to distributional changes (see Defourny & Thorbecke, 1984; Hayden & Round, 1982; Pyatt & Round, 1977). Due to its underlying assumptions of constant technology and excess capacity, SAM-based multiplier analysis is

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sometimes regarded as rather restrictive. However, it offers a transparent framework of data with macroeconomic consistency. Compared to regression-based studies of sectoral growth and inequality or poverty (e.g., Loayza & Raddatz, 2009; Ravallion & Datt, 1996) the SAM analysis offers more insight by taking into account sectoral interdependencies and uncovering the channels through which income flows. Standard SAMs for India are available and have been used, for example, in Ten Raa and Sahoo (2007).

A methodological contribution is made by extending the standard SAM through accounting for the skill-intensity and the skill premium by sector and the education and sector of employment of households. This is done using satellite accounts for earnings and employment by sector and household survey data for education and employment characteristics. The extension of the SAM consists of dividing the single wage account into 30 sub-accounts: three levels of educational attainment and 10 sectors of employment. The main innovation is the fact that each sector has its own wage account in the extended SAM. It shows the distribution of wage income between 30 different worker subgroups within the SAM's representative household groups.

Distribution analysis based on the standard SAM shows that growth of any sector will slightly reduce inequality, suggesting that the sectoral structure of growth does not matter for inequality. After extending the SAM, however, we find that growth in several sectors increases inequality between and within household groups. The effects are largest for community, social, and personal services; followed by heavy manufacturing and the other services sectors. Growth in these sectors increases inequality because they pay relatively high wages (the sector premium), they are skill-intensive, and pay a high skill premium. Only agricultural growth reduces inequality. The results confirm the importance of our extension for an analysis of income distribution, and emphasize that employment creation is not sufficient to secure equitable growth. They strengthen the call for the development of unskilled-labor-intensive manufacturing, as India's current pattern of growth offers too little opportunities for low-skilled workers.

The rest of the paper is organized as follows. In Section 2 the structure of the SAM, multiplier analysis, and the method for extension of the SAM are discussed. In Section 3 the data are presented, and in Section 4 the results are discussed. In Section 5 the results are related to India's policies and pattern of growth. Finally, Section 6 concludes.

2. METHODOLOGY

The SAM is a data system that can serve as the basis for different kinds of analyses. Its structure and the basic multiplier analysis are discussed in Section 2(a). The extension applied to the standard SAM is explained in Section 2(b), and the scenarios used for distribution analysis are described in Section 2(c).

(a) *Social accounting and the multiplier matrix*

The SAM is a data system covering the complete flow of income in the economy, [1] which is divided into different accounts. Rows in the SAM show an account's income, while the columns show its expenditures. When using the SAM as a model it is necessary to make a distinction between endogenous and exogenous accounts. The former typically includes industries, production factors, households, and firms, and the latter includes the government, capital account, and rest of the world. A schematic SAM is presented in Figure 1, where all exogenous accounts are grouped together. The money that flows from exogenous to endogenous accounts makes up the injections vector x, while the money from endogenous to exogenous accounts constitutes the leakages vector l'.

Among the endogenous accounts, T_{11} records industries' intermediate input requirements as in the standard input–output table. T_{21} includes the division of industries' value added between production factors, and total income of each factor is distributed across household groups in T_{32}, reflecting households' factor endowments. The private consumption expenditure patterns are recorded in T_{13}, and finally, T_{33} shows direct transfers among households and firms. Chander, Gnasegarah, Pyatt, and Round (1980) point out how the SAM explicitly maps factor income from industries to households through the factor accounts. That way, the SAM reflects two stages in the household income distribution: the distribution of income across production factors and the distribution of production factors across households. Together, the functional income distribution and the factor ownership distribution make up the household income distribution.

From the SAM it is possible to calculate the effect of an injection into any endogenous account (a change in the vector x) on the income of all endogenous accounts (y_1, y_2, and y_3) using multiplier analysis. Exogenous injections reflect government consumption, investment goods demand, and exports, for example. The multiplier matrix is derived from the matrix of expenditure propensities A_n, which is obtained by dividing each entry in the endogenous accounts by its respective column total. The vector of total income of endogenous accounts y_n (consisting of y_1, y_2, and y_3 in Figure 1) can be expressed as

$$y_n = A_n y_n + x. \tag{1}$$

where y_n is a $(n \times 1)$ column vector of total income of all n endogenous accounts. A_n is the $(n \times n)$ matrix of average expenditure propensities, and x is a $(n \times 1)$ column vector of injections.

From this expression it follows that

$$y_n = (I - A_n)^{-1} x = M_A x, \tag{2}$$

where the $(n \times n)$ matrix M_A is the so-called accounting multiplier. One problem with the accounting multiplier is that it is based on average expenditure propensities that are fixed in the coefficient matrix A_n. For household consumption expenditure, for example, this implies unitary income elasticities of consumption for all goods. It is common to include marginal expenditure propensities for household consumption, which replace the respective average expenditure propensities in A_n. We use the Indian SAMs for 1994–95 and 1997–98 (Pradhan, Saluja, & Singh, 2006) to calculate the income elasticity of consumption for each commodity (industry), for rural and urban households separately. [2] With the new coefficient matrix C_n, we get

$$\Delta y_n = (I - C_n)^{-1} \Delta x = M_C \Delta x, \tag{3}$$

where M_C is called the fixed price multiplier. An element m_{ij} of this matrix shows the total effect of an injection into account j on the output or income of account i. For example, it shows the effect of export growth in the heavy manufacturing industry on the income of urban casual labor households. This effect includes direct and indirect effects. The direct effect would be to increase intermediate input demand by the heavy manufacturing industry, and an increase in factor income through the industry's value-added growth. The total effect, however, reflects that the industries supplying intermediate inputs to the