

Income and Employment Effects in Mumbai Region: An Input-Output Approach

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Abstract

Since independence Mumbai has emerged as the industrial as well as financial capital of India. However with economic reforms in the 1990s, Mumbai's position as financial capital of India has become stronger (at the cost of the manufacturing sector) as most of the newly emerging financial companies have chosen Mumbai as their centre of operation. This calls into question what will be its implication on income and employment generation in this region in the coming years. To analyse the issues, this study evaluates ex-post income and employment linkages of the various sectors of the Mumbai economy using a specially constructed input-output table of the Mumbai region

Our results indicate that while the banking/insurance sectors have the highest direct income multipliers, their position drop considerably when one take into account indirect or induced effect. We also find that the banking and insurance sectors rank middle among all the sectors in terms of indirect or induced employment generation. Thus one can conclude that this shift towards financial sector would not lead to significant employment generation in the region.

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1. Introduction

It is well recognised that a megacity plays a lead role in the overall socio-economic progress of a region or country. It is basically a centre of production, consumption, and distribution as well as the nucleus of social infrastructure, transport, and communications. In this respect, Greater Mumbai (earlier named as Bombay) with an estimated urban population of 11.1 millions in 1997 contributes immensely to Maharashtra's and India's economy. Mumbai alone generates about 23 per cent of State Domestic Product (SDP) of Maharashtra, 37 per cent of its manufacturing value added in factory sector. Its contribution in the Indian economy is also huge: it provides employment to roughly 10 per cent of the all-India factory sector employment in addition to the fact that the city port handles about 40 per cent of India's merchandise foreign trade.

Apart from being the industrial centre of India, Mumbai has also been the financial capital of India. As of December 1996, there were 5999 companies listed on the BSE having a total market capitalisation of over Rs. 4 trillions. Out of 285 financial companies in the CIMM database of Centre for Monitoring Indian Economy (CMIE) in 1993-94, 103 companies have Mumbai as its main office. The head offices of many of the important banks/financial institutions in India including State Bank of India, Industrial Development Bank of India, Housing Development Finance Company, ICICI, Unit Trust of India are located in Mumbai. In addition Reserve Bank of India, the nation's central bank has its head quarters in Mumbai.

The launching of the economic reforms in 1991, if anything, seems to have increased the pace of growth of financial sector in the Mumbai region. Between 1989-90 and 1992-93, the financial sector has grown by 31 per cent (compound) per annum in comparison to a growth of 9 per cent (compound) per annum for the period 1989-90 to 1992-93. This has happened because most of the newly emerging financial companies, domestics well as foreign, have chosen Mumbai as its main office or primary centre of operation so as to gain from the effect of *external economies* operating in Mumbai. Of course, Mumbai has had a start in establishing necessary infrastructure in comparison to other Indian metros for enabling the growth of the

financial sector.

Expectedly, the impact of the expanding financial sector would be first to increase income and employment within the sector itself. Secondly with the growth of this sector, several other allied activities such as custodial services, depositories, stock exchanges etc are also expected to grow. It seems at the first sight that the faster growth of financial sector will lead to increased income and employment generation in the medium to long run. However, it must be realised that the financial sector has grown substantially in the Mumbai region at the cost of the other tertiary sectors. If the financial sector has low linkages on the basis of technological interdependence among producing activities, it can be argued, this shift in favour financial sector may not stimulate a more rapid growth of income and employment.

Keeping this in view, this paper addresses itself to evaluating income and employment linkages. More specifically, it attempts to examine:

- the relative importance of direct, and total (direct plus indirect) output generated by 26 major sectors of the Mumbai economy;
- the strength of backward and forward output and employment linkages;
- the relative importance of direct, indirect and induced or secondary effect on income (or employment) and variation thereof across the various sectors of the Mumbai economy, more particularly of the financial sectors;
- to indicate the extent of leakage of income from various sectors of the Mumbai economy as a result of subsequent rounds of spending out of the initial gains in income; and
- finally, to indicate key sectors for output, income employment generation.

The paper proceeds as follows. Section 2 describes the methodology of estimating income, output, and employment multipliers. It also discusses the methodology of computing backward and forward linkages. Section 3 outlines the procedure adopted by us to prepare an input-output model for the Mumbai economy. The next analyzes the empirical findings while the final section highlight the policy conclusion.

At present, the activities of most of the financial companies are concentrated in Greater Mumbai. However, with the increase in real estate prices and scarcity in office/accommodation

in Greater Mumbai, there is a move by companies to shift their operation base from Mumbai to the other parts of Mumbai Metropolitan Region (MMR).¹ Keeping these factors in view and data limitation, we have decided MMR to be the focus area of our study.

The importance of MMR to state's/national economy can be best understood by comparing the respective domestic products, which measure the income originating from productive activities, and its growth over time. The basic data regarding Domestic Product (DP) of MMR, Maharashtra and India are shown in real terms (constant prices) in Table 1.1 for the years 1980-81, 1989-90 and 1992-93.² As these data show, real DP originating in the primary sector in MMR has increased marginally over the years.³ By contrast, the real DP originating from secondary or tertiary sectors shows significant increase during the period 1980-81 to 1992-93. However, the point to note is the phenomenal growth of banking and insurance sector: it has nearly tripled between the years 1989-90 to 1992-93. In growth terms, Table 1.2 indicates that this sector has grown by 31 per cent (compound) per annum during this period in comparison to a growth of 9 per cent (compound) per annum for the entire period, viz. 1980-81 to 1992-93. At the same time, this sector has registered a negative growth in Maharashtra and a significant but slower growth in India in the post 1989-90 period. Note also that this sector grew at a fast pace both in Maharashtra and India in the pre-1989-90 period. Thus it becomes clear that MMR is increasingly becoming the centre of operations for the banking and insurance sector. Of course, such a phenomenal growth in this sector has resulted from the ongoing financial sector liberalisation.

¹Following the recommendations of the Gadgil Committee, a planning region, Bombay (later renamed as) Metropolitan Region (BMR), was constituted in June 1967 to include Bombay, and its adjoining areas. Presently, it covers an area of 4370 square km. BMR (presently renamed as MMR) includes three municipal corporations, namely Greater Mumbai, Thane, Kalyan, and seven municipal councils.

²We have used implicit deflator for Maharashtra for converting domestic product at current prices originating in Maharashtra or MMR to real terms.

³ The definition of the primary, secondary and tertiary sectors follow usual convention. That is, primary sector includes agriculture and allied activities, and mining and quarrying while secondary sector includes manufacturing, construction, electricity, gas and water supply. Lastly, the tertiary sector is composed of public administration and defence, and all other service sectors including banking and insurance.

As a consequence of the higher growth of banking and insurance sector, we find from Table 1.2 that the tertiary sector, growing by 5 per cent (compound) per annum, registered a faster growth during 1988-92/93 in MMR than in Maharashtra. MMR has done relatively well in comparison to Maharashtra or India in each of the sectors, viz. primary, secondary and tertiary for the above period. As regards sectoral distribution of DP, Table 1.3 indicates that secondary and tertiary sectors contribute nearly 94 per cent of the regional DP of MMR in 1992-93. Note that, the share of the secondary sector in the DP of MMR has increased from 50 per cent in 1980-81 to about 53 per cent in 1992-93 while that of tertiary has remained unchanged during the same period. However, due to the growth of the financial sector in and around Mumbai, the share of banking and insurance sector in the DP of MMR has increased modestly during the period under study. The same trend is also evident for the Indian economy. The share of the secondary sector on the other hand, has increased marginally for Maharashtra and India between the years 1980-81 to 1992-93.

3. The Methodology

There are alternative methods and yardsticks for evaluating the income and employment effects of financial sector's growth in any economy. These can be grouped into three major categories: (a) cost-benefit analysis, (b) partial economic models and (c) economy wide models such as the input-output (I-O) analysis. The I-O analysis has some distinct advantages over its counterparts. Firstly, the I-O analysis captures the forward and backward inter-relationships of any productive sector with the other sectors of the economy. Secondly, it provides a consistent and systematic approach for understanding the economic impact of changes in any productive sector on the overall regional economy. Thirdly, it allows analysis of the impact of growth in one or several sectors on the requirements of inputs including labour and capital. Further, this approach allows the tracing of not only the direct and indirect economic effects of expenditures in the financial sector but also the effects induced by higher incomes as expenditures in the financial sector filter down to various sectors of the economy as income. Since its development, the I-O analysis has been used extensively for regional/local area analysis in other economies. However in India, it has been primarily used for planning at the state or national level. We discuss below the framework along with its implementation for the economy of MMR.

3.1 Input-Output Model

A simple I-O model considers that the output demanded in the economy consists of two parts -- the endogenous or intermediate demand and the exogenous or final demand. The endogenous portion of the demand in these types of model may be obtained on the basis of the information contained in the I-O transaction table. These inter-industry linkages of the I-O flow table enable an analyst to estimate how various types of exogenous disturbances originating in specific sectors will be transmitted throughout the economy. To be specific, the endogenous relationships are used to transfer changes in the exogenous sectors into changes in gross output by sector.

Following the typical mathematical representation, the I-O transactions table can be denoted as:

$$\sum_{j=1}^m x_{ij} + \sum_{k=1}^p y_{ik} = x_i \quad (i=1, \dots, m)$$

x_{ij} = the amount of output produced by sector i and purchased by sector j for production purposes (endogenous)

y_{ik} = the amount of output produced by sector i for final demand of type k (exogenous)

x_i = the total output of sector i (endogenous)

m = the number of sectors

p = the number of final demand sectors (which might include personal consumption expenditure, government expenditure, etc).

In an I-O model, it is assumed that the relationship between inputs and outputs can be specified by fixed I-O coefficients. That is, we assume,

$$x_{ij} = a_{ij}x_j \quad (i, j = 1, \dots, m)$$

Or $a_{ij} = x_{ij} / x_j$

Here a_{ij} signifies the amount of input of commodity i that is required to produce one unit of commodity j .

Substituting a_{ij} in the original equations gives the new set of m equations as follows:

$$\sum_{j=1}^m a_{ij}x_j + \sum_{k=1}^p y_{ik} = x_i \quad (i=1, \dots, m)$$

In matrix notation, this is represented as:

$$AX + Y = X$$

Where A is a $(m \times m)$ matrix of (a_{ij}) coefficients, X is a $(m \times 1)$ vector of output levels of m

sectors, Y is a $(m \times 1)$ vector of level of final demand for each of the m sectors. The matrix A is commonly known as I-O technical coefficients matrix. By definition, a_{ij} entry in this matrix signifies the amount of input of commodity i that is required to produce one unit of commodity j .

The solution to this system is obtained as follows:

$$X - AX = Y$$

Or $IX - AX = Y$, where I is the $(m \times m)$ identity matrix.

Or $(I - A)X = Y$

Or $X = (I - A)^{-1} Y = RY$

Where $R = (r_{ij})$ is a $(m \times m)$ matrix.

The matrix R is known as the Leontief inverse. Here each coefficient r_{ij} represents the amount of output of sector i required to meet the requirement of one unit of final demand for sector j . It includes direct and indirect effects in the sense that to produce one unit of sector i 's output, we require a_{ji} units of each sector j with $j = 1, \dots, m$. But then to produce one unit of sector j 's output, we need a_{ij} units of output of sector i 's output. Thus, r_{ij} capture the direct and indirect effects

3.2 Measures of Income and Employment Effects

The I-O model provides a way to measure various types of income/employment effects. The direct income effect of one rupee value of increase in final demand in sector i is simply the sector's value added coefficient v_i , i.e. ratio of the value added (wages, salaries, capital depreciation, and profits) to the sectoral output. The direct and indirect income change per rupee change of final demand in a sector i is estimated by multiplying each figure in the i th row of the inverted (r_{ij}) matrix by the appropriate value-added coefficients and then summing the product.

Similarly, the direct employment effect of one rupee worth of increase in final demand in sector i is obtained from i th sector's employment to output ratio. The direct and indirect employment change per rupee change of final demand in sector i is estimated by multiplying each figure in the i th row of the inverted (r_{ij}) matrix by the appropriate employment to output coefficients and then summing the product. Employment effects are subject to a larger margin of error as the relationship between output and employment is less rigid in practice than that assumed in the I-O model.

The economic rationale underlying the direct and indirect income/employment effects is that the increase (or decrease) in a local industrial sector's output due to the change in its final demand unleashes forces which affect the output of all those local industrial sectors which directly or indirectly supply this sector. The inter-industry flows of the I-O transactions table make possible the tracing and evaluation of this chain reaction. However, the above unrealistically assumes that the production adjustments do not lead to any change in consumption expenditures or investment expenditures for new plants.

In reality, output changes causes adjustment in consumption expenditure and these, in turn, lead to a chain reaction of inter-industry reactions in income, output and once more on consumption expenditures. To estimate these induced effects, I-O coefficients matrix is expanded to include the private expenditure vector as its (n+1)-th column, and the value added row as its (n+1)th row. The direct, indirect, and induced income change per rupee change of final demand in a sector i is given by the ith entry of the (n+1) column of the inverted expanded matrix.

3.3 Construction of the Input-Output Transactions Table

Our discussion in the earlier section shows that the primary sector contributes only a small portion of the DP of MMR. So, one primary sector would be an adequate representation of these activities in the transactions table for MMR. Since our focus is on financial sector and its linkages, the transactions table for MMR should include sectors, which are expected to have linkages with the financial sector. Also, some of the main manufacturing industries may be included as separate entities. Taking these facts into account and availability of data, we have constructed a 26x26 sectors I-O flow table for the present study. The financial sector is represented in this table by the insurance and the banking sector.⁴

It must be mentioned that an I-O flow or coefficient table may be compiled in various forms, viz. industry x industry table, commodity x industry table or commodity x commodity table. A commodity x commodity table means that rows as well as the columns represent commodities

⁴According to the definition of Central Statistical Organisation (CSO), the banking sector includes (1) commercial banks; (2) banking department of RBI; (3) public non-banking financial corporations; (4) organised non-banking financial companies engaged in trading in shares, investment-holdings, loan finance and the like activities; (5) unorganised non-banking financial undertakings such as professional money lenders and pawn brokers; and (6) post-office banks, saving banks including operations concerning cumulative time deposits, co-operative credit societies. The insurance sector covers life and non-life insurance activities.

whereas an industry x industry table implies that rows as well as the columns represent industries where each industry may consist of several commodities. For our purpose, commodity x commodity table is suitable, as we are interested in obtaining the employment and income effects of financial sector's growth and which in turn is usually specified in terms of demand for a specific commodity. We also need to choose the base year for which the I-O flow table would be constructed. The base year is usually chosen keeping in view the availability of data and a consideration that the year is reasonably 'normal' without sharp changes in the output of one sector relative to another. Keeping these factors in consideration, we have constructed transactions table for MMR for the year 1989-90.

Our preparation of the transactions table starts with the estimation of several structural ratios and parameters of the economy of MMR. The chief amongst them is the MMR's proportion of national employment for each sector. This has been computed using detailed 1991 census data for the districts of Mumbai, Raigard, Thane, and at the national level. In addition, the sectoral employment figures in MMR and India for the year financial 1989-90 are obtained by projecting the 1991 census data backwards by one year. Also the data of ASI of industries located in MMR are analysed to obtain estimate of the ratio of value added to value of output for the industrial sectors. Typically, we have done this for two or three consecutive years (1989-90 to 1992-93) and considered the average value of these ratios as the initial estimates of value added to output ratio. The ASI data are also used to obtain the share of the fuel cost and other input cost to total cost for each of the industrial sectors.

We have conducted a small survey of 55 financial companies located in Mumbai for estimating the input structure of the banking and insurance sectors. Apart from providing information about the present structure and trend in the financial sector in Mumbai, the survey has given us the components of input cost/requirement in terms of: (i) wage cost, labour requirement by type; (ii) cost on communication; (iii) cost on printing, publishing, paper, other disposable; (iv) cost on electricity; (v) cost on travel; (vi) expenditure on advertising, miscellaneous services. The above information is primarily used for obtaining input structure of banking and insurance sector in the present study.

In the preparation of the MMR transactions table, the first step was to obtain the value of gross output for each of the production sectors. In few cases, sufficient data was available for

direct estimation of gross output. However in several cases, data on output for MMR were scarce, and indirect estimation procedures were used. In many sectors, we first estimated MMR's proportion of national employment, value added, etc. These ratios multiplied by the national gross output for each sector provided a range of estimates for the output of MMR's sectors. The differences were reconciled as far as possible to obtain a final estimate of output.

Where information on the distribution of sales or the cost structure (inputs) of MMR was meagre, national I-O coefficients were assumed, as a first approximation. The MMR's gross output estimates multiplied by these national I-O coefficients completed each sector's column. After this first approximation of the MMR's I-O transactions table, the row and the column entries were modified in the light of the distinctive regional production details. In this respect, our survey on financial sector in MMR and the ASI data of industries (at 2-digit industrial codes) located in MMR were useful.⁵

The estimation of the final demand sectors was carried out using slightly different procedure. Household expenditure was estimated by assuming that MMR's consumption pattern was basically similar to the national pattern. The national level value added to consumption relationship was used in conjunction with the MMR's value added to obtain total consumption expenditure.

The government final consumption expenditure in MMR was estimated by multiplying national level government expenditure to public sector employment ratio by estimate of public sector employment in MMR. The later included employment in central government, state government, local bodies and quasi central/state governments. The government expenditure in MMR was then distributed assuming the all-India structure.

The overall capital formation in MMR was estimated using incremental capital -output ratio for Maharashtra and the output increase in MMR over the preceding year. Distribution of this capital formation across sectors was done assuming the all-India structure. The capital formation was distributed into gross fixed capital formation and inventories using national level ratios.

We did not estimate the other two components of final demands, namely sectoral export to

⁵ The ASI data of industries provide us the following components of input costs: fuel consumed, other input cost, wage cost, and total factor payments, etc. The above information is used for modifying the all-India I-O coefficients.

other countries and rest of India and sectoral imports from rest of India/world. Instead, net exports less imports were derived in aggregate so as to ensure that the sum of the intermediate demand and final demands were equal to gross output estimates. In other words, the i 'th entry of this column was obtained by subtracting the sum of household expenditure, government expenditure, inventories, gross fixed capital formation and intermediate demands of the i 'th sector from its gross output estimate.

Lastly, the entries of the row of 'net indirect less subsidies' were also derived residually. The i th entry of this row was obtained by subtracting value added and cost on inputs for i th sector from its gross output estimate.

The I-O coefficients matrix at 1989-90 prices may be derived from the constructed inter-industry transactions table for MMR by dividing the inter-industry flows from i th to j th sector (x_{ij}) by the output x_j of j 'th sector. The I-O coefficients table for MMR at 1994-95 prices was obtained after adjusting the entries of the former table for the inter-sectoral price changes between the years 1989-90 and 1994-95 (see Table 2). This table has been used for estimating income and employment effects for the various sectors in MMR.

4. Analysis of Results

We discuss below our estimates of income and employment effects for the various industries in MMR.⁶ Two sectors namely, public administration and defence, and education, research, etc have been omitted from our discussion here as their inter-industry linkages relatively weak. We have also excluded primary sector from our discussion as the same occupies a marginal position in the economy of MMR.

4.1 Income Effects

The initial impact of an increase in final demand of a sector is an expansion of output by the industry experiencing the change in demand. As a result, the income originating in the concerned industry will rise. The above direct effects for the various industries in MMR are shown in column (1) of Table 3.1. As Table 3.1 indicates, Rs. 1.0 lakh increase in final demand in the banking sector would result in a rise of Rs. 79,783 in income at 1994-95 prices in the same sector. The logic of this process is that, as output increases, a certain proportion of the

⁶All the income effects are estimated at 1994-95 prices.

value of output is paid out to the factors of production and therefore income originating in the industry is affected directly by an increase in output. Note that the insurance sector would experience a higher income increase (Rs. 86,730) for an equivalent change in final demand. The data in table indicates that apart from banking and insurance sectors, the following other service sectors---storage and warehousing, communications, trade, ownership of dwelling--- have high income effects in the range of Rs. 71,000 Rs. 86,000. The manufacturing sectors generally have income effects in the range of Rs. 20,000 to Rs. 40,000. In column (4) of Table 3.1, we show the ranking of the income effects (arranged in descending order) for each of the sectors. As the table shows, the banking sector ranks third in terms of income generation while insurance ranks first for the same.

An increase in one unit of final demand in a sector results in an expansion of output and thereby income in that sector. The increase in production will, of course, set in motion a chain reaction which will result in an increase of outputs of all other industries in MMR that are directly or indirectly linked to the industry experiencing the change in demand. The resulting output increase implies that additional income will be generated in all the industries that are linked directly or indirectly to the industry experiencing the change in demand. In column (2) of Table 3.1, we show the combined direct and indirect income change for one lakh rupees change of final demand for the various industries in MMR. For example, the data for banking sector indicates that the income will rise by Rs. 1.04 lakhs as result of an increase in the demand for banking sector's output by the final consumers by Rs. 1.00 lakh. Similarly, we can see for the insurance sector, the corresponding income increase is to the tune of Rs. 93,450. The direct and indirect effects are generally found to be in the range of Rs. 90,000 to Rs. 1.00 lakh. Note that the highest increase in income occurs in basic metal and alloys followed by textile products, food products, electricity, gas and water supply (see column (5) of Table 3.1). According to our estimates, the ranks of banking and insurance sectors are respectively 6 and 19.

A change in final demand results in two related and mutually interacting events:

- (a) a change in production and thereby a change in income (directly or indirectly),
- (b) a further change in consumption expenditures, via the consumption to income relationship which in turn generates changes in production, income, and so on for successive rounds.

How large is the income effect when the income generation due to successive rounds of consumption spending is also taken into account? Column (3) of Table 3.1 shows the combined

direct, indirect, and induced income effects for each of the industries in turn. As the results show, the direct, indirect and induced income effects are generally in the range Rs. 3.0 lakhs to Rs. 3.8 lakhs. The basic metals and alloys has highest income effect (Rs. 3.85 lakhs) followed by textile products (Rs. 3.78 lakh), food products (Rs. 3.7 lakhs), wool, silk, jute etc (Rs. 3.54 lakhs). The ranks for direct, indirect and induced income effects for the various industries are shown in column (6) of Table 3.1 Note that the rank for the banking sector is 13 while the same for the insurance sector is 17. Among the service sectors, hotels and restaurant and ownership of dwellings are found to have the highest direct, indirect and induced income effects.

4.2 Employment Effects

Similar to three income effects, we have also estimated three types of employment effects for each of the industries in MMR. Here also, we assume that the change in final demand consists of Rs. 1.00 lakh increase in final demand for a given industry' output by the final consumers.

The column (1) of Table 3.2 shows the direct employment effects for each of the industries. A value of 1.16 for banking sector means that employment of about 1.16 man-years is generated in this sector as a result of increase in demand by one lakh rupees for this sector's output by the final consumers. Note that employment to the tune of 1.08 man-years is generated in the insurance sector per Rs. 1.00 lakh change in final demand. The manufacturing sectors are by and large found to have low employment-creating effects (see column (4) of Table 3.2). The ranks of banking and insurance sectors are 9 and 10 respectively.

Column (2) of Table 3.2 shows the direct plus indirect employment impacts as the industries adjust their outputs to the higher level of demand. Thus, 10.55 man-years of employment is generated purely from production adjustments to an increase in demand for food products' by Rs. 1.00 lakh by the final consumers. The employment multipliers for the manufacturing sectors are found to lie in the range to 5- 8 man-years while the service sectors have employment multiplier of about 3.3-4.6 man-years. Among the service sectors, the hotels and restaurants sector has high employment effects. From employment consideration, the other important sectors are food products; beverages related; hotels and restaurants; petroleum products (see column (4) for the corresponding ranks). The ranks of banking and insurance are respectively 19 and 22 respectively.

We have also estimated employment effects associated with the secondary or induced

consumption-income interactions by the similar procedure used to compute the income multipliers. The results show that 4.16 man-years of employment is generated in banking when the computation of employment expansion multiplier takes into account the changes which takes place as a result of the increase in income and consumption (see column (3) of Table 3.2). The corresponding value for the insurance sector is 4.06 man-years. The higher employment effects are found in the following sectors: food products, beverages related, hotels and restaurants, and petroleum products.

4.3 Adjusted Income and Employment Multipliers

We need to see the above results in the light of the changes in industrial structure in MMR. The direct effects show that if banking/insurance sector was to expand relative to others, the level of income generated is among the highest. However, when we take into account the indirect and induced income effects, our results show that banking and insurance sector do not figure among the top income generating sectors in MMR. The above result needs some qualification. The indirect and induced income effects do not necessarily accrue fully to MMR, they may flow to other regions as well. This is particularly true of a sector for which MMR is a net importer. For example, let us consider the primary sector, which is mainly imported into MMR. If this sector's output is required as input in the production process of other sector (say beverages etc), it is more likely that the input requirement will be met by imports from other regions. As a result, the indirect income effects resulting from the increase in income in the primary sector due to its supply to the beverages sector as input will not accrue to the Mumbai region. Similarly, in all other sectors which is imported in MMR, a part of the indirect income generation flows out of the MMR's economy. The same argument also holds for the indirect and induced employment effects resulting from an increase in final demand in a sector. If we take out those indirect income and employment effects, which flow out of the MMR's economy, to what extent our estimates of income and employment effects change? An attempt has made below to estimate income and employment multipliers for the different industries taking into account only that part of income/employment effects, which accrue, fully to the economy of MMR.

Table 3.3 shows our adjusted estimates of income and employment effects.⁷ The estimates

⁷Note that in Table 3.3, we have shown separately the wage component of our estimate of adjusted income effects.

have been computed only for direct and indirect income/employment effects, as it is not technically possible to estimate direct, indirect and induced income/employment effects accruing fully to MMR. While computing these estimates, we have also assumed that indirect income/employment effects resulting from a sector's output expansion flow to other region if MMR is a net importer for that sector. Note that the adjusted income multipliers for the banking and insurance sectors are highest among all the sectors (see column (4) for corresponding ranks). The data indicates that the service sectors have, relatively speaking, higher direct plus indirect income effects than manufacturing sector in MMR if one excludes income effects flowing to other regions.

The adjusted employment multipliers for the different industries in MMR are also shown in Table 3.3. The data indicate that about 1.3 man-years of employment is generated within MMR as a result of an increase in the demand for banking sector's output by Rs. 1.00 lakh by the final consumers. On the other hand, 1.18 man-years of employment is generated for a corresponding increase in the demand for insurance sector's output.

5. Conclusion

Major reforms of India's economic policies have taken place since July 1991, thus launching a new phase of economic development. The new policy initiatives seek to transform the Indian economy into a globally competitive one by opening it up to trade, foreign investment and technology. The economic policy reforms also encompass the financial sector to enable this vital sector play the role of matching domestic and foreign savings with the investment needs.

In the post-reform period, Mumbai's position has emerged stronger because most of the newly emerging financial companies, domestic as well as foreign, have chosen Mumbai as its main office or primary centre of operation so as to gain from the effect of *external economies* operating in Mumbai. As in the case of any productive activity, the impact of the expanding financial sector would be first to increase income and employment within the sector itself. Secondly with the growth of this sector, several other allied activities such as custodial services, depositories, stock exchanges etc are also expected to grow. The growth of the financial sector would also enable acceleration in the growth of the economy by mobilising funds efficiently and in greater volumes. The impact on income and employment due to the growth of the financial sector in any region would be felt all over India. Nevertheless, the direct impact in terms of the income and employment effects would be first felt in the region where the head or main offices

of the financial companies are located. How strong is such an impact? The present study is an attempt to quantify this impact in terms of the level of income/employment generated due to the expansion of the financial sector in MMR.

In order to estimate the income/employment effects, we have adopted the well-known I-O framework that aptly captures the forward and backward inter-relationships of any productive sector with the other sectors of the economy. An I-O coefficient matrix for MMR at 1994-95 prices has been constructed exclusively for this purpose using all-India I-O transactions table, supplementary information from our survey on financial sector in MMR, and other relevant data.

Our results indicate that the banking/insurance sectors have the highest direct income multipliers. However, their position, relative to other sectors, drop considerably when one take into account indirect or induced income effects. This happens because the indirect and induced income effects do not necessarily accrue fully within MMR, they may flow to other regions as well. When we take out these flows, our estimates of the direct and indirect income multiplier for the banking sector is found to be Rs. 98,790 while the same for the insurance sector is Rs. 89,992. It is important to note that the adjusted income multipliers for these two sectors are highest among all the sectors. The same trend is also observed if one looks separately at the wage component of the adjusted income multipliers.

Our results indicate that employment of about 1.16 man-years is generated in the banking sector as a result of increase in demand by Rs. 1.00 lakh for this sector's output by the final consumers. On the other hand, the employment to the tune of 1.08 man-years is generated in the insurance sector for an equivalent increase in final demand. From employment consideration, we find that banking and insurance sectors rank middle among all the sectors. However, the values of the combined direct and indirect employment multipliers or direct, indirect and induced employment multipliers for the various sectors suggest that banking and insurance sectors rank low from the point of employment generation. Their relative positions improve marginally if one excludes the indirect and induced employment effects flowing out of MMR while estimating these employment multipliers.

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Table 1.1 Real Domestic Product (DP) for MMR, Maharashtra and India

SECTORS	DP of MMR			DP of Maharashtra			DP of India		
	1980-81	1989-90	1992-93	1980-81	1989-90	1992-93	1980-81	1989-90	1992-93
Primary	421	483	609	4026	6499	6899	45565	77476	81386
Secondary	2389	4015	5069	4581	9193	10124	25381	54874	60066
Tertiary	1950	3216	3903	5123	8694	9828	39394	65984	79747
Banking & Insurance	221	238	699	812	1751	1604	3409	10269	13467
TOTAL	4760	7714	9581	13730	24385	26851	110340	198335	221199

Table 1.2 Growth rate of Real Domestic Product for MMR, Maharashtra and India

SECTORS	MMR		Maharashtra		India	
	80/81-92/93	89/90- 92/93	80/81-92/93	89/90-92/93	80/81-92/93	89/90-92/93
Primary	3%	6%	4%	2%	5%	1%
Secondary	6%	6%	6%	2%	7%	2%
Tertiary	5%	5%	5%	3%	6%	5%
Banking and Insurance	9%	31%	19%	-2%	12%	7%
Total	6%	6%	5%	2%	6%	3%

Table 1.3 Sectoral Distribution of Domestic Product in MMR, Maharashtra and India

Sectors	MMR			Maharashtra			India		
	1980-81	1989-90	1992-93	1980-81	1989-90	1992-93	1980-81	1989-90	1992-93
Primary	8.8	6.3	6.4	29.3	26.7	25.7	41.3	39.1	36.8
Secondary	50.2	52.1	52.9	33.4	37.7	37.7	23.0	27.7	27.2
Tertiary	41.0	41.7	40.7	37.3	35.7	36.6	35.7	33.3	36.1
Banking & Insurance*	4.7	3.1	7.3	5.9	7.2	6.0	3.1	5.2	6.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note* : The share of the tertiary sector includes the share of banking & insurance sector in total domestic product

Source (1) Govt of Maharashtra, "Statistical Abstract", various issues

(2) MMRDA, "Estimates of domestic Product in MMR." various issues

Table 2 : Input-output coefficient Matrix for MMR at 1994-95 prices

Sectors	1	2	3	4	5	6	7	8	9	10	11	12	13
Primary	0.1550	0.6854	0.3014	0.2280	0.1160	0.0340	0.2322	0.0651	0.1325	0.6735	0.0695	0.0025	0.0048
Food products	0.0049	0.0512	0.0300	0.0016	0.0005	0.0003	0.0001	0.0025	0.0043	0.0000	0.0000	0.0000	0.0001
Beverages related	0.0000	0.0005	0.0361	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000
Cotton textiles	0.0012	0.0027	0.0021	0.1551	0.0648	0.1592	0.0009	0.0021	0.0034	0.0003	0.0002	0.0004	0.0002
Wool, silk, jute etc.	0.0002	0.0045	0.0021	0.0271	0.1917	0.0911	0.0007	0.0041	0.0086	0.0003	0.0002	0.0001	0.0001
Textile products	0.0006	0.0007	0.0011	0.0023	0.0036	0.1143	0.0012	0.0038	0.0012	0.0001	0.0004	0.0004	0.0013
Wood & wood products	0.0004	0.0051	0.0054	0.0022	0.0012	0.0009	0.0474	0.0016	0.0010	0.0003	0.0022	0.0076	0.0065
Paper & Paper products & printing	0.0002	0.0090	0.0306	0.0017	0.0055	0.0065	0.0013	0.2877	0.0253	0.0010	0.0021	0.0049	0.0044
Basic chemicals & chemical products	0.0372	0.0118	0.0169	0.0562	0.1409	0.0522	0.0125	0.0595	0.2804	0.0032	0.0322	0.0265	0.0334
Petroproducts	0.0060	0.0059	0.0052	0.0051	0.0037	0.0038	0.0044	0.0048	0.0107	0.0104	0.0141	0.0069	0.0206
Basic metals & alloys	0.0007	0.0038	0.0187	0.0075	0.0095	0.0042	0.0070	0.0205	0.0203	0.0016	0.3712	0.1825	0.1392
Machinery & equipment	0.0074	0.0033	0.0161	0.0069	0.0115	0.0085	0.0019	0.0053	0.0060	0.0006	0.0078	0.1390	0.0246
Transport & equipment	0.0012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0020	0.0040	0.1469
Construction	0.0126	0.0009	0.0007	0.0007	0.0024	0.0005	0.0008	0.0008	0.0005	0.0002	0.0012	0.0004	0.0031
Electricity , gas , water supply	0.0113	0.0168	0.0128	0.0815	0.0806	0.0288	0.0114	0.0852	0.0829	0.0080	0.1133	0.0313	0.0415
Transportation	0.0076	0.0209	0.0177	0.0344	0.0349	0.0277	0.0168	0.0337	0.0356	0.0101	0.0562	0.0347	0.0242
rest of manufacturing	0.0012	0.0050	0.0105	0.0020	0.0025	0.0183	0.0051	0.0111	0.0173	0.0001	0.0060	0.0141	0.0374
Storage & warehousing	0.0033	0.0072	0.0604	0.0295	0.0388	0.0752	0.0098	0.0493	0.0152	0.0008	0.0301	0.0460	0.0562
Communication	0.0003	0.0018	0.0028	0.0021	0.0037	0.0049	0.0020	0.0065	0.0042	0.0005	0.0053	0.0130	0.0074
Trade	0.0243	0.0970	0.0748	0.0939	0.0850	0.0819	0.0378	0.0626	0.0801	0.0459	0.0777	0.0529	0.0579
Hotels	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006
Banking	0.0121	0.0206	0.0202	0.0323	0.0382	0.0294	0.0204	0.0440	0.0479	0.0179	0.0382	0.0421	0.0301
Insurance	0.0008	0.0089	0.0132	0.0076	0.0085	0.0093	0.0080	0.0157	0.0189	0.0088	0.0125	0.0458	0.0148
Ownership of dwellings	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Education, research, medical, health	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016
Public administration	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 2 : Input-output coefficient Matrix for MMR at 1994-95 prices (contd)

Sectors	14	15	16	17	18	19	20	21	22	23	24	25	26
Primary	0.0919	0.1299	0.0227	0.1401	0.0767	0.0000	0.0016	0.4114	0.0000	0.0000	0.0000	0.0209	0.0000
Food products	0.0000	0.0000	0.0005	0.0001	0.0018	0.0000	0.0001	0.0831	0.0000	0.0000	0.0000	0.0003	0.0000
Beverages related	0.0000	0.0000	0.0001	0.0001	0.0004	0.0000	0.0000	0.0186	0.0000	0.0000	0.0000	0.0000	0.0000
Cotton textiles	0.0001	0.0000	0.0004	0.0019	0.0134	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Wool, silk, jute etc.	0.0014	0.0000	0.0001	0.0144	0.0118	0.0000	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Textile products	0.0000	0.0001	0.0003	0.0073	0.0039	0.0000	0.0005	0.0002	0.0000	0.0002	0.0000	0.0005	0.0000
Wood & wood products	0.0246	0.0001	0.0005	0.0047	0.0063	0.0006	0.0064	0.0021	0.0001	0.0006	0.0000	0.0020	0.0000
Paper & Paper products & printing	0.0014	0.0009	0.0030	0.0067	0.0146	0.0225	0.0145	0.0005	0.0031	0.0091	0.0000	0.0162	0.0000
Basic chemicals & chemical products	0.0297	0.0007	0.0010	0.1068	0.0409	0.0000	0.0016	0.0007	0.0000	0.0000	0.0000	0.1351	0.0000
Petroproducts	0.0006	0.0056	0.1088	0.0247	0.0061	0.0037	0.0010	0.0006	0.0005	0.0028	0.0000	0.0016	0.0000
Basic metals & alloys	0.0812	0.0019	0.0088	0.0612	0.0548	0.0005	0.0066	0.0000	0.0001	0.0005	0.0000	0.0003	0.0000
Machinery & equipment	0.0352	0.0113	0.0100	0.0131	0.0189	0.0214	0.0023	0.0016	0.0003	0.0017	0.0000	0.0004	0.0000
Transport & equipment	0.0008	0.0003	0.0643	0.0049	0.0122	0.0010	0.0007	0.0001	0.0001	0.0010	0.0000	0.0004	0.0000
Construction	0.0034	0.0185	0.0258	0.0049	0.0068	0.0357	0.0083	0.0056	0.0044	0.0004	0.2226	0.0070	0.0000
Electricity , gas , water supply	0.0055	0.2214	0.0311	0.0784	0.0437	0.0199	0.0209	0.0761	0.0133	0.0056	0.0000	0.0077	0.0000
Transportation	0.0327	0.0411	0.0367	0.0530	0.0243	0.0153	0.0871	0.0256	0.0124	0.0091	0.0000	0.0161	0.0000
Rest of manufacturing	0.0694	0.0018	0.0300	0.0796	0.0394	0.0006	0.0032	0.0030	0.0009	0.0014	0.0000	0.0089	0.0000
Storage & warehousing	0.0026	0.0044	0.0265	0.0272	0.0544	0.0155	0.0671	0.0068	0.0138	0.0086	0.0000	0.0042	0.0000
Communication	0.0064	0.0022	0.0134	0.0092	0.0049	0.0096	0.0068	0.0005	0.0039	0.0167	0.0000	0.0024	0.0000
Trade	0.0558	0.0279	0.0370	0.0816	0.0467	0.0072	0.0051	0.0691	0.0007	0.0024	0.0000	0.0355	0.0000
Hotels	0.0015	0.0020	0.0054	0.0000	0.0029	0.0027	0.0050	0.0011	0.0101	0.0045	0.0000	0.0050	0.0000
Banking	0.0245	0.0313	0.0367	0.0517	0.1328	0.0005	0.0424	0.0015	0.0651	0.0036	0.0000	0.0001	0.0000
Insurance	0.0110	0.0031	0.0330	0.0159	0.0103	0.0005	0.0053	0.0018	0.0186	0.0014	0.0000	0.0000	0.0000
Ownership of dwellings	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Education, research, medical, health	0.0001	0.0000	0.0144	0.0000	0.0003	0.0167	0.0000	0.0000	0.0000	0.0000	0.0000	0.0110	0.0000
Public administration	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 3.1 Income Multipliers in rupees for different industries in MMR

Sl No.	Sectors	Income Multipliers (Rs.)			Rank for	Rank for	Rank for
		Direct Effect	Direct & Indirect Effect	Direct, Indirect & Induced Effect	Col (1)	Col (2)	Col (3)
		(1)	(2)	(3)	(4)	(5)	(6)
1.	Food products	9711	113400	370770	22	3	3
2.	Beverages related	25613	100780	329510	15	12	11
3.	Cotton textiles	27927	102800	336100	14	9	8
4.	Wool, silk, jute e.t.c.	21669	108460	354610	19	4	4
5.	Textile products	22169	115710	378320	18	2	2
6.	Wood & wood products	25045	75350	246360	16	23	23
7.	Paper & Paper products & printing	22409	100300	327950	17	13	12
8.	Basic chemicals & chemical products	21022	98390	321680	20	15	15
9.	Petroproducts	8380	86400	282490	23	21	21
10.	Basic metals & alloys	14742	117800	385160	21	1	1
11.	Machinery & equipment	29500	96200	314550	13	17	18
12.	Transport & equipment	34779	101680	332450	9	11	10
13.	Construction	38920	87570	286320	8	20	20
14.	Electricity , gas , water supply	33859	79040	258420	10	22	22
15.	Transportation	48580	97050	317320	6	16	16
16.	rest of manufacturing	30000	107710	352170	12	5	5
17.	Storage & warehousing	40391	102440	334940	7	10	9
18.	Communication	79451	95800	313220	4	18	19
19.	Trade	71129	98960	323560	5	14	14
20.	Hotels	32673	103080	337020	11	8	7
21.	Banking	79783	104000	327100	3	6	13
22.	Insurance	86730	93450	315000	1	19	17
23.	Ownership of dwellings	84349	103840	339510	2	7	6

Table 3.2 Employment Multipliers in man-years for different industries in MMR

Sl No.	Employment Multipliers			Rank for	Rank for	Rank for
	Direct Effect	Direct & Indirect Effect	Direct, Indirect & Induced Effect	Col (1)	Col (2)	Col (3)
	(1)	(2)	(3)	(4)	(5)	(6)
1. Food products	1.2718	10.5497	15.7471	8	1	1
2. Beverages related	3.3696	8.9723	13.3925	1	2	2
3. Cotton textiles	1.5813	6.4298	9.5974	7	5	5
4. Wool, silk, jute e.t.c.	1.0148	5.7300	8.5529	11	7	7
5. Textile products	0.5581	5.2402	7.8218	21	8	8
6. Wood & wood products	0.7096	4.6701	6.9708	17	10	11
7. Paper & Paper products & printing	0.9253	4.7120	7.0334	14	9	9
8. Basic chemicals & chemical products	0.3487	4.4643	6.6664	22	13	13
9. Petro-products	0.6267	8.1463	12.1595	19	4	4
10. Basic metals & alloys	0.6707	5.8415	8.7194	18	6	6
11. Machinery & equipment	0.6083	3.3107	4.9418	20	21	20
12. Transport & equipment	0.9970	3.8907	5.8075	12	15	15
13. Construction	0.9304	3.5428	5.2882	13	17	17
14. Electricity , gas , water supply	0.8634	3.5806	5.3447	16	16	16
15. Transportation	1.8803	4.4133	6.5875	5	14	14
16. rest of manufacturing	0.3466	4.5414	6.7788	23	12	12
17. Storage & warehousing	1.7625	4.6747	6.9777	6	10	10
18. Communication	2.6480	3.3990	5.0735	2	18	18
19. Trade	2.1475	3.3140	4.9467	4	20	19
20. Hotels	2.5420	8.6615	12.9286	3	3	3
21. Banking	1.1635	3.3240	4.1638	9	19	21
22. Insurance	1.0798	3.3040	4.0625	10	22	22
23. Ownership of dwellings	0.9038	1.6924	2.5262	15	23	23

Table 3.3 Income in rupees and Employment in man-years accruing to different industries in MMR for an increase in final demand by Rs 100,000 for each sector

Sl No.	Sectors	Direct and Indirect Effect			Rank for	Rank for	Rank for
		Income (Rs)	Wage Component (Rs)	Employment (Man-years)	Col (1)	Col (2)	Col (2)
		(1)	(2)	(3)	(4)	(5)	(6)
1.	Food products	35909	21960	2.0118	22	19	13
2.	Beverages related	55331	21510	4.2519	18	20	1
3.	Cotton textiles	64200	39920	2.7566	16	13	5
4.	Wool, silk, jute e.t.c.	71979	41480	2.5682	12	10	8
5.	Textile products	84317	41360	2.5979	6	11	7
6.	Wood & wood products	40868	19330	1.1463	21	22	22
7.	Paper & Paper products & printing	69824	40670	2.3765	14	12	11
8.	Basic chemicals & chemical products	62972	25620	1.4428	17	18	17
9.	Petroproducts	22629	12120	1.0134	23	23	23
10.	Basic metals & alloys	74440	38890	2.5612	8	14	9
11.	Machinery & equipment	72080	38490	1.8631	10	15	14
12.	Transport & equipment	73549	49390	2.1569	9	7	12
13.	Construction	66133	51020	1.6824	15	6	15
14.	Electricity , gas , water supply	49948	19890	1.3015	20	21	19
15.	Transportation	71733	43850	2.5590	13	9	10
16.	Rest of manufacturing	72056	33980	1.4977	11	16	16
17.	Storage & warehousing	79115	47390	2.7653	7	8	4
18.	Communication	88889	55310	2.9313	5	4	3
19.	Trade	90271	55830	2.7280	3	3	6
20.	Hotels	50431	30950	3.0601	19	17	2
21.	Banking	98790	54810	1.3355	2	5	18
22.	Insurance	89992	55850	1.1818	4	2	21
23.	Ownership of dwellings	99069	63790	1.2783	1	1	20

