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Assessing Manufacturing Growth in India: An Alternative View

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This paper attempts to assess the manufacturing growth performance in India. Instead of dealing with total factor productivity growth indices the focus is on the creation of more productive employment opportunities. The attention is on achieving the sophistication in intermediate goods production. What distinguishes the underdeveloped countries from the developed ones is the degree and sophistication of the intermediate goods production. The vast network of auxiliary industries which we can take for granted will not be available in small economies. Their educational institutions will be unable to supply narrowly specialized personnel; they will lack the specialists who can improve raw materials and products, argues the author.

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Introduction

The present paper is an attempt to asses the manufacturing growth performance in India, following the Youngian perspective (Young, 1928) on economic progress. Instead of focusing on total factor productivity growth indices below, the present focus is on the creation of more productive employment opportunities. More specifically, the creation of more productive employment opportunities could reflect the initiation of division of labour, which, in turn, forms the basis of economic growth that reflects the increased scope of industrial differentiation. The focus therefore is on achieving the sophistication in intermediate good production. Interpreting Young, as Stigler (1951) noted, what distinguishes the underdeveloped countries from the developed ones is the degree and sophistication of the intermediate goods production (see also, Huang, et al 2004). To quote (Stigler, 1951: 192-3) "By a now overly familiar argument, we (American production methods) shall often be a seriously inappropriate model for industrialization on a small scale. Our processes would be too specialized to be economical on this basis. The vast network of auxiliary

industries which we can take for granted here will not be available in small economies. Their educational institutions will be unable to supply narrowly specialized personnel; they will lack the specialists who can improve raw materials and products."

Stigler goes on to highlight an important insight, which is important for the present paper: "At best, the small economies that imitate us can follow our methods of doing things in this year, not our methods of changing things next year" (Stigler, 1951: 193). This highlights the importance of a prior existence of division of labour in an economy that becomes the agent of change. Rodriquez-Clare (1996: 4-5) also noted the importance of local production of intermediate goods. Imports of such goods can be costly and risky. Porter (1992) also emphasizes that the domestic suppliers of such goods is the most important determinant of comparative advantage that has accrued to the developed nations. It provides rapid, timely, efficient accesses to cost-effective inputs.

There is growing evidence that shows that the competitiveness of the manufacturing sector is based on such industrial differentiation (say, the increased incidence of inter and intra firm trade in international trade amongst the developed countries). In addition, sophisticated division of labor also permits a cyclical pattern that explains the incidence of higher wages (Huang et al, 2004). Rodriquez-Clare (1996) also shows that the very existence of a sophisticated division of labor in a developed country permits both higher returns and higher wages to induce capital formation that maintains the developed status of such a few countries.

The present paper however adopts a framework for a developing country where the focus is not on the existence of such a sophisticated production structure but is on the initiation of division of labor, which in turn can create such a production structure. Though the initiation of division of labor involves the introduction of substantial fixed capital, the successful initiation also depends on the creation of new employment opportunities. This implies that the division of labor has to permit both higher wages to such new employment opportunities and higher returns to firms. The paper tries to show that this in turn is dependent on two conditions. First, division of labor allows intermediate goods/material cost reduction as volume of production is enlarged. Second, division of labor also allows for stickiness of prices of final products (Basu, 1995; Huang et al, 2004) as output is increased. Both the conditions permit higher nominal value added per unit of output, as output is increased, and, in turn, permits both higher wages and rate of return. This induces further division of labor. In other words, such changes become an index of new employment opportunities embodied in division of labor, crucial for achieving the developed status.

This particular perspective is relevant because Indian manufacturing is associated with higher material ratio, which is a legacy of the particular type of import

substitution in India that replicated a diversified manufacturing base of the advanced countries (whether such diversification was to be justified in terms of higher per capita income base of the country or not). The focus therefore should be on the empirical issues relating greater dynamism of the intermediate goods production.

The Young Perspective

In the Young (1928) perspective, the focus is on the phenomenon of division of labor that targets large volume of production and allows for the sub-division of production process, which in turn permits the introduction of specialized machinery for the purposes of intermediate cost reduction through specializations. The basic purpose is that such cost related advantages translates into trade related advantages (larger market for larger production base), which in turn permits higher returns.

Such initiatives highlight the creation of specialized employment opportunities. It should be noted that the cost reduction permits the firm to undertake additional functions (better employment opportunities or informal human capital) that are firm specific and permits the firm to be seen as a collection of distinct but complementary processes (also see, Stigler, 1951). The functions, targeting larger volume of production - would involve (i) arrangement of informal finance, (ii) informal creation of exact specification of machinery for industrial differentiation, (iii) purchase and storing of materials, (iv) transforming materials into semi-finished goods and semi finished goods into final products, (v) undertaking modern transport, marketing, creation of communication channels, extension of credit to buyers, etc. All these informal human capital formation, i.e. additional employment opportunities beyond production related activities, having the ingredients of formal human capital in latent forms, is entirely a function of the growth of a firm.

The successful initiation of division of labor (and trade related advantages) creates important dynamic externalities.

More importantly, such employment creation, especially targeting more specialized trading activities that increase the market share of the firm (permitting economies associated with larger production), forms the basis of increasing returns, which in turn forms the basis of a generalized adoption of division of labor in the economy, which in turn permits the scope for industrial differentiation. To elaborate, according to Young (1928) the successful initiation of division of labor (and trade related advantages) creates important dynamic externalities. The emphasis is on the fact that division of labor creates technological externalities: to quote, “Every important advance in the organization of production, regardless of whether it is based upon anything which, in a narrow sense or technical sense, would be called a new “invention”, or involves a fresh application of the fruits of scientific progress to industry, alters the conditions of industrial activity and

initiates responses elsewhere in the industrial structure which in turn have a further unsettling effect. Thus change becomes progressive and propagates itself in a cumulative way" (Young, 1928: 533). This comes close to Scitovsky's (1954: 297) third example of direct (and non-market) interdependence between producers where adoption of new methods (roundabout methods of production) is made available to others without charge (and is not impeded by patents)[1]; here the focus is not on Adam Smithian emphasis on specialized machinery, but on simple and standardized process that permits technological externalities. Therefore, for Young (1928), the initiation of division of labor in any line of production, targeting large volume of production, is also associated with increased production in other lines (increases in market size), permitting division of labor to be introduced there, and consequently increases in aggregate production.

Even if division of labor leads to cost reduction, if the larger market share (and higher returns) to the firm is based on demand diversion from others (say through price reduction), money expenditure remaining the same, it will not induce similar practices elsewhere (that also needs higher market share). Therefore, following Kaldor (1972)'s suggestion, division of labor has to be seen as an aspect of induced investment (accumulation of capital), facilitated by finance, which leads to increase in aggregate money expenditure. If so, different firms adopting division of labor would provide larger market for each other, leading to profitable opportunities for generalized division of labor in the economy. That is, it permits higher returns to division of labor, which provides the necessary higher savings (return to finance). Such prior increase in money expenditure therefore is crucial for the total production to increase (increase in the size of the market), which induces still further division of labor.

What is however important is that once there is the generalized adoption of division of labor and creation of new employment opportunities, there is the scope for learning by doing that forms the basis of a dynamic capital goods sector. This provides opportunities for coming up of new activities, new industries, specialized intermediate goods production, etc. In fact, the specialized production of intermediate goods (and possible reduction in price), according to Chandra and Sandilands (2005; 2006) kick starts competitive forces based on pecuniary external economies, which leads to starting of a growth process that induces higher capital accumulation, leading to further division of labor and so on – leading to a cumulative causation process.

At the same time, the introduction of division of labor entails demand for skilled labor that would demand higher wages. The firms adopting division of labor also depend on additional employment to undertake trading/marketing expenses to target larger market. This means that

[1] It is clear that large scale production possibilities (with given preferences and endowments) cannot create such externalities that highlight the importance of resource creating initiatives.

manufacturing productivity supports more productive 'service sector'. Therefore, division of labor – manufacturing – as an engine of growth depends on a capital accumulation process in efficient capacities that permit both higher returns and higher wages (possibility with higher employment opportunities in service related areas).

However, the possibility of higher rate of return to fixed costs with higher wages (and higher employment) – division of labor as an engine of growth - has to be dependent on material (intermediate goods) cost reduction. If price of the final product is sticky (Basu, 1995; Huang et al, 2004), this permits higher money value added per unit of output (in nominal terms), which in turn permits the firm to obtain higher profits and recoup higher costs. To elaborate, the evolution of profit margin is given by

$$R/O = Y/O - wL/O$$

Here, Y stands for value added; O is the gross output, L is the labor force and w is the wage rate; variables in italics denote value measures at their current prices.

The evolution of Y/O $(= 1 - M/O)$ can be derived from Divisia index (Sims, 1969), which is given as

$$DY/Y = \{(DO/O) - (DM/M)\ (M/O)\}/(Y/O)$$

Where Y stands for value added (to be derived); O is the gross output, M is the intermediate inputs. Variables without italics denote measure of the variables at their base year prices and variables in italics denote value measures at their current prices.

Further, taking $M = P_m$ (M), $O = P_w$ (O) and $Y = P_y$ (Y) (where P_m stands for price of intermediate inputs, P_w stands for price of the product (output) and P_y stands for the price of value added, and M stands for intermediate inputs), the Divisia index can be rewritten as

$$(DY/DO)(P_y/P_w) = \{1 - (DM/DO)(P_m/P_w)\}$$

In the above equation, by definition, we have (DY/DO) as the measure of changes in the real value added per unit of output – reflecting changes in the intermediate input costs (say, decrease in price of materials reflecting increase in efficiency of the production of intermediate inputs). Therefore, if the change in the product price remains the same (or the change is not proportionate to) in the face of a decrease in incremental intermediate input cost (change in P_m with an unchanged M/O =DM/DO), it permits an increase in P_y in relation to P_w. The economic meaning of such increase is that it permits realization of higher money value added per unit of output as output is increased; in other words, the mark up over the intermediate inputs costs is a mark up on value added. This permits the money value added to increase more than proportionate to the increase in output and, given the expected level of profits (expected higher rate of return), can also permit the real wages to increase.

Material cost reduction, or an increase in Y/O, therefore is central to the manufacturing led engine of growth thesis.

Material cost reduction, or an increase in Y/O, therefore is central to the manufacturing led engine of growth thesis. Capital accumulation process targeting industrial differentiation and material cost reduction permits higher returns (even allowing for higher wages, higher trading/selling costs) at unchanged product prices. This not only whets the appetite for more profits through capital accumulation but also form the basis of internal finance for speedy capital accumulation. Therefore, the focus is not on capital accumulation per se (and in any case, it would be difficult to allow capital to accumulate per se). The focus is on the possibility of capital accumulation that targets further division of labor, which in turn forms the basis of further capital accumulation and the high rate of investment also permits increasing expenditure on invention, without foregoing 'immediate' and traditional needs.

In the present discussion, therefore, an increase in nominal Y/O (or decrease in nominal M/O) signifies higher 'real' trade gains that increases overall size of the real market. Such an increase in Y/O however has to be based on material cost reduction at a given product price (or even lower price). This, for empirical purposes, has to be distinguished from that of the possible increase in Y/O that signifies pecuniary (or static) trade gains, i.e. the price of the product increases more than unchanged material costs. The latter, in so far as reflects static monopoly power, cannot form the basis of engine of growth thesis. In fact, the endogenous growth literature, based on aggregate production function, recognizes the importance of market power in the context of technological progress but the focus is on increasing returns to scale phenomenon to explain technological progress – in so far as it comes with higher fixed costs, it involves market power (Romer, 1991). In a sense, significant economies of scale come with higher fixed costs (relative to variable costs, especially labor costs) and could involve market power. For example, the price deregulation in the cement industry permitted the firms to aim for higher scale of operation, which, in turn, permitted them to adopt dry methods, instead of the wet method, leading to increasing energy cost savings. However, the price deregulation was a necessary condition: increasing the scale of operation comes with higher fixed costs that requires higher rate of return at higher prices. The scale phenomenon assumes that the technology, preferences and endowment remain the same, and does not reduce the material use per unit of output. The increase in prices can therefore permit significant differential increase in prices but with-

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out any reduction of material costs. Such market power tied up with scale effect, amounts to static monopoly power and cannot form the basis of demand led growth processes.

Empirical Analysis

The purpose of the paper is to asses manufacturing growth performance from 1973-74 to 2010-11. The source of the relevant data for the manufacturing sector for 1973-74 to 2003-04 is Annual Survey of Industries provided by EPW Research Foundation (2007), which deletes some of the 2-digit industries to arrive at the manufacturing sector. The same procedure is followed to obtain the subsequent data for 2004-05 to 2010-11, using the Annual Survey of Industries provided by mospi.nic.in. The period has been subdivided into four, 1973-74 to 1980-81, 1980-81 to 1993-94, 1993-94 to 2004-05, and 2004-05 to 2010-11, taking into account changing base periods for which price data (and related data set, say the index of industrial production) is available in India.

The data refers to the manufacturing sector. However, the focus is not exclusively on the (Adam Smithian) firm specific division of labor (for such studies, see Chanay & Ossa, 2012). The focus, especially, shifts to division of labor within manufacturing sector seen as an interrelated whole. As Young (1928) noted: "The successors of the early printers, it has often been observed, are not only the printers of today, with their own specialized establishments, but also the producers of wood pulp, of various kinds of paper, of inks and their different ingredients, of type-metal and of type, the group of industries concerned with the technical parts of the producing of illustrations, and the manufacturers of specialized tools and machines for use in printing and in these various auxiliary industries. The list could be extended, both by enumerating other industries which are directly ancillary to the present printing trades and by going back to industries which, while supplying the industries which supply the printing trades, also supply other industries, concerned with preliminary stages in the making of final products other than printed books and newspapers." "New products are appearing, firms are assuming new tasks, and new industries are coming into being. In short, change in this external field is qualitative as well as quantitative." Kaldor (1966) also echoes the same. To quote (Kaldor, 1966: 288), "….as Allyn Young emphasized, increasing returns is a "macro phenomenon" – just because so much of the economies of scale emerge as a result of increased differentiation, the emergence of new processes and new subsidiary industries, they cannot be "discerned adequately by observing the effects of variations in the size of an individual firm or of a particular industry".

The basic hypothesis is that an increase in nominal value added per unit of output (Y/O) should indicate higher real value added growth performance, reflecting higher industrial differentiation – seen as an interrelated whole. Table 1 shows that the value added growth in the subperiod 1980-81 to 1993-84 is higher at 7.19

per cent per annum, which is higher than the growth rate of the same in the previous growth phase and is associated with an improvement in Y/O (i.e. a positive growth rate as compared to negative growth rate recorded for the previous period). A sharp decline in Y/O thereafter in the next growth phase saw a deceleration of growth of value added. Further, if there is an improvement of Y/O in the last growth phase (i.e. decrease in the negative growth rate), it is associated with a phenomenal growth rate of value added (12 per cent per annum). In fact, the phenomenal acceleration in growth rate of value added (18 per cent per annum) occurred during 2004-05 to 2007-08, which was associated with an increase in Y/O. Thereafter there is a deceleration of the growth rate (during 2007-08 to 2010-11) -8 per cent per annum that is associated with a decrease in Y/O.

Table 1 Growth Rates of Real Value Added (Output), Nominal Value Added per Unit of Output, Deflated Value Added per Unit of Output, and Price Index of Manufacturing

GrowthPhases	Growth of Net Value Added	Growth of Output	Growth of nominal value added per unit of output	Column 4 deflated by price	Growth of price
1973-74 to 1981-82	5.20	8.16	-2.61	-9.50	7.61
1981-82 to 1993-94	7.19	7.25	0.18	-7.13	7.86
1993-94 to 2004-05	4.9	8.00	-2.2	-5.9	3.9
2004-05 to 2010-11	12.37	13.05	-0.74	-5.12	4.61

Note: The author has calculated the real value added growth rate beyond 2003-04 based on data for manufacturing sector by deleting the 2 digit industry groups that have been deleted by EPW data set.
Source: EPW Research Foundation; mospi.nic.in and rbi.org.in

This association, however, can be misleading on various counts. What needs emphasis is that an increase in the Y/O can be due to an increase in price more than proportionate to the changes in material costs – permitting pecuniary trade gains without any increase in real trade gains (increase in the size of the aggregate real market). The focus therefore has to be on an increase in the Y/O more than the increase in the price of the product, which amounts to an increase in real value added per unit of nominal output. Table 1 reports the growth of the price index and the growth of the Y/O deflated by the price index. What the data shows is that no growth phase records positive growth rate of the Y/O deflated by price, though there is some improvement over the growth phases (i.e. a decrease in the negative growth rate of the same over successive growth phases). At the same time, the growth of the price shows an increase in 1981-82 to 1993-94 as compared to the previous year and, therefore, the improvement in the deflated Y/O in this period may show some serious material cost re-

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duction. The improvement of the deflated Y/O between 1993-04 to 2003-04 however could be due to a sharp decrease in the growth of price (and therefore can explain the deceleration of the growth rate of real value added). Again in the next growth phase (2004-05 to 2010-11), deflated Y/O improved, despite a slight acceleration in the growth of price (and therefore can explain the acceleration of the growth rate of real value added).

The basic focus has to be on material cost reduction, which permits higher capital accumulation (that guides fuels) and higher services at a constant product price.

Second, the value added figure is arrived at by deducting total inputs from output and total inputs includes, besides materials (M), fuels (F) and other industrial services (S). Even if material costs decrease, total inputs may increase due to increase in fuels and services. As Table 2 shows, this is what has taken place in first and last growth phases (as per Table 2, i.e. 1973-74 to 1981-82 and 1993-94 to 2003-04). What needs emphasis is that the basic focus has to be on material cost reduction, which permits higher capital accumulation (that guides fuels) and higher services at a constant product price. To some extent this has taken place in the last growth phase which shows that the increase in the service component has taken place allowing for a lowering of the growth of price index (but material cost reduction is not enough to permit an increase in Y/O). Table 2 also highlights the growth of materials in relation to real output growth if the focus is on reduction of material costs at constant product price. There is no evidence of a decrease in the same though the growth recorded in the last phase is moderate (showing improvements). It is this improvement that permits the acceleration with respect to services that is associated with deceleration in the growth of the price index.

Table 2 Growth Rates of (Nominal) Materials to Output, Fuels to Output, Services to Output of the Manufacturing Sector and the Growth Rate of Material to Real Output Ratio

Growth phases	Growth of M/O	Growth of F/O	Growth of S/O	Growth of M/real output
1973-04 to 1981-02	-0.16	4.41	6.44	7.26
1981-02 to 1994-05	0.17	0.28	-1.55	8.06
1994-05 to 2003-04	-0.11	-0.33	5.82	3.76

Note: The table does not report the data beyond 2003-04 because the data available in website of MOSPI reports total input data without separately reporting material/fuel/services data.
Source: EPW Research Foundation

Third, material cost reduction should reflect increase in the share of intermediate goods that in turn should highlight increased dynamism of intermediate goods production. The dynamism of the intermediate goods sector can be inferred from the change in weights given to intermediate goods for the construction of use based index of industrial production. The relevant data shows that the weights

given to intermediate goods was 20.51 in 1980-81, which increased to 26.51 in 1993-04, but thereafter it decreased to 15.69 in 2004-05. Table 3 also highlights the use based index of industrial production, the growth of intermediate goods and its growth in relation to that of the growth of overall manufacturing and that of the growth of durable consumer goods (that use more of intermediate goods). That data shows that the growth of intermediate production increased from 5.66 to 6.97 in the growth phase 1993-4 to 2004-05 and was associated with improvement with respect to its growth rate in relation to the growth of manufacturing sector and consumer durables. However, the last growth phase (2004-05 to 2011-12) shows a drastic change. Not only the growth rate of intermediate goods declined but also that its growth rate in relation to overall manufacturing and consumer durable showed negative growth.

Table 3 Growth of the Index of Intermediate Goods and Its Growth in Relation to Growth of Manufacturing and Growth of Consumer Durable Goods

Growth phases	Growth of intermediate	Growth of intermediate in relation to growth of overall manufacturing	Growth of intermediate in relation to growth of durable consumer goods
1980-01 to 1993-04	5.66	-1.20	-4.96
1993-04 to 2004-05	6.97	0.22	-2.78
2004-05 to 2011-12	5.51	-3.18	-10.53

Source: rbi.org.in

The data analysis supports the basic hypothesis that changes in Y/O – indicating differential increase in price of product and material costs - has a positive association with the growth of real value added – and explains the changing pattern of growth rates of real value added in different growth phases. The impact of any serious material cost reduction, or dynamism of intermediate goods production, however is not much evident. The higher value added growth rate recorded in the growth phase 1980-81 to 1993-94 is associated with an increase in growth rate of price, and if it is in relation to change in material cost, it can increase Y/O and real value added. For, example, the growth phase was permissive towards achieving higher scale, say through government policy initiatives in terms of price deregulation and other relaxations, which can permit increases in both prices and real value added (in the face of demand shocks). Similarly, the evidence pertaining to the growth phase 1993-94 to 2003-04 needs explanation. This growth phase saw improvements (i.e. decline in negative growth rates) with respect to the deflated Y/O, material ratio to real output and the index of intermediate goods (and its growth in relation to overall manufacturing and durable goods), but it saw a deceleration of growth rate of real value added. One reason could be that the growth rate is calculated taking into account the 'abnormal' decrease in production data in 2000-01 and 2001-02, (as compared to

the picture from other sources), whereas the other sources on registered manufacturing (say, IIP and others: see, Kolli, Sharma & Deswal, 2011: 123) recorded 'normal increases. The growth rate would improve if one adopts CAGR method (7 per cent per annum) or takes a longer period taking in to account later periods (that corresponds well with production data before 2000). What is more important is that the 'improvements' might not be indicating greater efficiency that comes through greater industrial differentiation (and narrow specialization). For example, vertical integration (or vertical mergers) in the period could be responsible for a lower material ratio[2], which does not indicate greater differentiation. The improvement in deflated Y/O could be due to decrease in the growth of price (say due to greater import competition), and despite this decrease, there is no increase in Y/O. Last, even if the index with respect to intermediate goods showed improvements, it could be induced by the growth of the construction 'industry' or the service sector in India, without reflecting greater differentiation within the manufacturing sector as such. Also, the weights given to intermediate goods in overall index decreased in this period (reflecting less dynamism of the sector). In fact, the last point is important because the next growth phase saw a drastic reduction in growth rate of intermediate inputs, especially with respect to its growth in relation to overall demand for such goods.

In addition, there are the empirical issues. There are viewpoints that maintain that the 'trade gains' through domestic specialization in intermediate goods is not relevant. This issue also maintains that growth performance can be improved (or is improved) by relying more on imports of intermediate goods (and there is the case of increased substitution of imports through trade policies). These issues are taken up below in the following section.

Empirical Issues

In the literature, it is accepted that the real value added, calculated using the single deflation method, would include 'trade' gains (Cassing, 1996) and one should correct it if the exclusive focus is on the contributions of capital and labor (and its redistribution) and of productivity shocks to such primary inputs. The literature, accordingly, suggest alternatives – the double (price) deflation method or the Divisia double deflation method. These suggestions however are based on the particular assumption that trade gains (or losses) are entirely caused by unexplained 'exogenous' monetary shocks, allowing for changes in price of the product in relation to price of materials. In other words, it dismisses the possibility that 'real trade gains' can be inferred from differential increase in price of the product and material costs (as hypothesized in the present paper), which in turn can be attributed to increased productivity of capital and labor targeting industrial differentiation. The empirical

[2] In the Annual Survey of Industries (EPW Research Foundation, 2007), the "intermediate products", i.e. those products which are produced by the factory but are subject to further manufacturing processes, are not included in the definition of "materials" consumed.

issues involved therefore needs elaboration.

The double deflation method accepts the existence of trade gains or losses and considers them ubiquitous.

To start with, the double deflation method accepts the existence of trade gains or losses and considers them ubiquitous. However, the methodology views them to be caused by exogenous (monetary) changes in prices, unrelated to the use of capital and labor (as primary inputs). Accordingly, to arrive at the true contribution of capital and labor (and for the true measure of productivity growth attributable to capital and labor), it provides a measure of real value added that does not contain such trade gains. In other words, it (not curiously) entirely abstracts from the possibility of access to cost-effective inputs (and developed status and competitive advantages) that comes through specialization in intermediate goods production and the use of specialized capital and labor inputs. It ignores such specializations, which, otherwise, could be the chief source of primary input augmenting productivity growth (as hypothesized in the present paper).

Divisia index methodology, on the other hand, does not allow for the possibility of any such trade gains (or loses). It is based on the assumption that the relative price changes would always lead to adjustments in the production processes. There are two routes. One, Bruno (1984) recognizes that the decrease (or increase) in the real price of materials, allowing for the optimum utilization of materials, is a reflection of technical progress (regress). In this approach, therefore, technical progress amounts to substitution of materials in production, requiring the use of Divisia index to calculate the proper growth of value added, which in turn would reflect the contribution of such technical progress (or regress). However, as Grubb (1986), in response, noted, there is no empirical evidence of such substitution of materials in production (allowing for the same production processes with unchanged capital and labor inputs) and, in the production function approach, the differential increase in prices should be viewed as exogenous changes, amounting to monetary phenomenon, requiring the double deflation method.

The other (more plausible) methodology (OECD, 2001) considers that the relative price changes leads to substitution of materials, but there is also a change in the organizational efficiency that allows for changes in capital and labor. For example, a decrease in material costs would lead to outsourcing (of materials) that reduces the need for capital (and labor), leading to higher value added growth (arrived through using the Divisia index to calculate the value added). In other words, as against the present adopted empirical hypothesis, this approach holds that a decrease in Y/O would be associated with higher value added growth, reflecting the related organizational efficiency improvement. In fact, as the review by OECD (2001: 26-7) notes:

TFP (V) = (O/Y) TFP (O)

Where, TFP (V) is the total factor productivity growth based on value added measure and TFP (O) is that of the measure, based on output measure. Here, a decrease in Y/O means an increase in value added TFP. The latter is not a reflection of higher technical progress but reflects higher efficiency in the organization of production (outsourcing) that permits production of output with less primary inputs.

This however means that there is no increase in aggregate market size that can be attributed to capital and labor. The capital and labor released in response to outsourcing flows into production of intermediate goods (other sectors), using lower intermediate goods, which leads to decrease in value added growth – and lower TFP (V) growth (decrease in the efficiency of organization) in these sectors (OECD, 2001: 28), without any change in the overall 'efficiency'. That is, overall Y/O remains the same.

This has an important implication. It is to be expected that trade liberalization in India, say pronounced in its effect in terms of the tariff cuts for capital and intermediate goods, would lead to outsourcing and would result in higher productivity growth, if measured in value added (Divisia indexed) terms. Therefore, it is not surprising that most of the studies on such trade liberalization (especially with respect to imported intermediate goods with higher incidence) would adopt the empirical framework that shows it to be associated with higher observed productivity growth[3] (Goldar & Kumari, 2002). What is however important is that the studies adopt a methodology that does not allow for any increased efficiency in the production of intermediate goods (or trade gains through more specialization). Second, if the released primary inputs move away from manufacturing to be employed elsewhere (assuming CRS technology), there is no increase in overall efficiency as such. Third, if the imports of intermediate goods are in response to changes in trade regimes, tax regimes etc., (without greater domestic specialization/reduction in material use), it may result in higher service related expenditure[4] (increase in total inputs) and there would be a tendency to maintain higher inventory (Rodriguez-Clare, 1996:5). (And, also, hedging against possible fluctuations in the value of foreign currency without having the ability to influence it).

This means that supply side economics that emphasizes increased variety to generate higher exports (with lower import intensity) for higher growth performance (see, Krugman, 1989) would not materialize. One has also to take into account the possibility that balances of payment constraint, if operative, would lead to reduced growth performance of

[3] Apart from the methodology to measure the real value added, the empirical framework should remove the outsourcing effect (decrease in Y/O) to measure the other effects of imports.

[4] The study by Goldar and Banga (2007) does not distinguish between domestic material induced service expenditure and imports induced increase in such expenditure. In the latter case, as noted above, increased incidence of outsourcing can result in measured TFP growth.

Supply side economics that emphasizes increased variety to generate higher exports (with lower import intensity) for higher growth performance would not materialize.

the economy from the demand side (for a review, see, MacCombie & Thirlwall, 1997). On the other hand, if one allows from the fact that imports of intermediate goods is complementary to greater specialization elsewhere, i.e. released capital and inputs are employed for greater specialization in intermediate goods production (and greater variety), the material cost reduction with a given price can permit higher trade related gains (or exports or greater variety). However, then, the focus has to be on the data set discussed above and the picture does not suggest a robust growth performance of Indian manufacturing. The (relevant) statistics are just not encouraging.

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