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NO EASY BALANCING ACT: REDUCING THE BALANCE OF PAYMENTS CONSTRAINT; IMPROVING EXPORT COMPETITIVENESS AND PRODUCTIVITY; AND ABSORBING SURPLUS LABOR- THE INDIAN EXPERIENCE

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Abstract

As per the balance of payments constraint hypothesis, in an open economy, achieving a high long-run rate of growth would require a country to reduce its balance of payments constraint through an improved export performance, and the production of import substitutes, which would lower the income elasticity of demand for imports. While a reduction of the balance of payments constraint is crucial for developing countries, in these countries, a sustainable and inclusive process of growth and development also requires the generation of high productivity activities, quality employment, and greater domestic value-added. By focusing on the Indian case, this paper shows that even if a developing country manages to reduce its balance of payments constraint, concentrated improvements in productivity and employment may remain at the industrial level. Consequently, active policy efforts to generate quality employment on a wide scale and to improve the productivity in different industrial and agricultural activities would remain crucial. Furthermore, as has been the case in India, this paper also shows that a reduction of the balance of payments constraint may be more the result of an improvement in the net exports of services, than an improvement in the external competitiveness of merchandise exports. As such, a country may exhibit trade balance deficits over a long period of time, thereby showing an increase in its external debt obligations. This then raises the question of whether a higher rate of growth facilitated by a reduction of the balance of payments constraint can be sustainable in the long-run. Even if the ability to service the external debt shows an improvement over time, such a services-led reduction of the balance of payments constraint may not necessarily address the more crucial problem of generating quality employment to make the process of growth more inclusive.

Keywords: : Balance of payments constraint; export dynamics; technology gaps; import content of exports; structural heterogeneity; services-led growth.

JEL Classification: F14 ; F41; F43; O11; O12; O14

1. Introduction

Central to the discussions pertaining to the role of export-led growth[1] is the balance of payments. That the balance of payments can act as an important demand constraint to the growth performance of an open economy has been emphasized in the Kaldorian demand-oriented growth theories, e.g. Harrod (1933), Prebisch (1959), Kaldor (1970), Thirlwall (1979) and McCombie and Thirlwall (1994). As per the balance of payments constraint hypothesis, in the long-run, a country will tend to grow at a rate consistent with its balance of payments equilibrium. It can be shown (Thirlwall, 1979; McCombie and Thirlwall, 1994) that the growth rate consistent with balance of payments equilibrium depends on the ratio of the growth rate of exports to the income elasticity of demand for imports. Consequently, achieving a higher long-run rate of growth would require a country to reduce its balance of payments constraint through an improved export performance (by making its exports more competitive) and through the production of import substitutes (which would lower the income elasticity of imports). Empirical studies have shown that for developed countries, the balance of payments constraint hypothesis provides a close approximation to the actual growth performance of these economies. In the case of developing countries, the results are more mixed, but there nevertheless exists evidence supporting the basic hypothesis.

Besides raising the balance of payments constraint, in developing countries, a growth and development process that is both sustainable and inclusive also requires a transformation of the productive base of the economy, or the generation of high productivity activities, quality employment, and greater domestic value-added. Even if a

[1] Although it may not be always explicitly stated, but implicit in arguments centered around productivity, efficiency in resource allocation, etc.

country is able to reduce its balance of payments constraint, concentrated improvements in productivity and employment, and a reduction in domestic value added may remain at the industrial level. In such a scenario, despite a reduction in the balance of payments constraint, since many developing countries have large amounts of surplus labor, and high instances of open and disguised unemployment, active policy efforts to generate quality employment on a wide scale, and to improve the productivity in different industrial and agricultural activities would still be crucial.

Furthermore, as has been the case in India, there is the possibility that an observed reduction of the balance of payments constraint may be more the result of an improvement in the net exports of services, rather than an improvement in the external competitiveness of merchandise exports. As such, despite a reduction in the constraint, a country may continue to exhibit trade balance deficits over a long period of time, thereby showing an increase in its external debt obligations. This then raises the question of whether a higher rate of growth facilitated by a reduction of the balance of payments constraint can be sustainable in the long-run. Even if the ability to service this external debt (reflected through a reduction in the ratio of debt services to exports) shows an improvement over time, there would still remain the question of whether such a services-led reduction of the balance of payments constraint can address the more crucial problem of generating quality employment to make the process of growth more inclusive.

The purpose of this paper is to take a closer look at the above structural dynamics for developing countries characterized by structural heterogeneity (the simultaneous co-existence of high productivity and low productivity activities) and high instances of open and disguised unemployment, with many people engaged in precarious forms of

employment. For purposes of analysis, the paper focuses on the Indian experience in the pre-liberalization and post-liberalization periods.

The analysis begins by examining whether the balance of payments constraint in India has been lifted in the post-liberalization period.

Next, the extent to which the lifting of the constraint is accompanied by favorable dynamics- improvements in export performance, productivity performance, a reduction in the import content of exports and more employment- at the disaggregated level (in different manufacturing activities) of the Indian economy is explored. These findings will be used to examine and evaluate certain stylized facts associated with the link between improved trade performance and improved productivity and employment and economic growth.

Third, the evolution of the trade and current account balance (as a percentage of GDP) is examined, along with the evolution of India's debt structure over time. The extent to which the observed trends in the current account balance have been driven by services is also examined at an aggregate, and disaggregated[2] level.

Finally, the paper will discuss the policy implications of these findings in general terms for developing countries faced with the problems of structural heterogeneity, open and disguised unemployment and surplus labor.

The rest of this paper is organized as follows. Section 2 briefly reviews the differences between the way the role of trade is addressed in trade theories that rest on supply-oriented models of growth, and in those based on the demand-oriented theories. Section 3 reviews the current literature related to export-led growth and the balance of payments constraint, and discusses the contribution that this paper expects to make. Section 4

[2] For the disaggregated level, the trends in the net receipts in different service activities are examined.

presents the findings of the analysis, and evaluates some of the stylized facts associated with export performance, productivity, employment and trade. The policy implications and conclusions suggested by these findings are discussed in section 5.

2. The Role of Trade: The Supply-Oriented versus Demand-Oriented Theories of Growth

Broadly speaking, the various theories of economic growth can be classified into two categories- *the supply-oriented* or the *neoclassical growth theories*; and the *demand-oriented* or the *heterodox growth theories*. The supply-oriented models view the output growth of a country as depending primarily on the country's endowments or supplies of different resources (land, labor, capital) and on the productivity of these resources. Output growth is thus viewed to be *supply-determined,* and little attention is devoted to the possibility that the supply of certain factors, notably labor and capital, may depend on the demand for them. Besides treating the growth of output as being determined by exogenously given resource endowments, the supply-oriented theories assume the full employment of all available resources[3].

The supply-oriented theories of growth underlie both the classical Ricardian theory of trade based on comparative advantage, and the Hecksher-Ohlin trade theory. In the classical Ricardian model with two commodities, two countries, and two factors of production, viz. labor and capital, factors of production are assumed to be immobile between countries. Further, the factor endowments of each country are exogenously given. Given these assumptions along with the assumptions of full employment and the quantity theory of money, the Ricardian theory argues that even if a country is absolutely inefficient (or has higher per unit production costs) relative to the other country in all

[3] Some (but not all) of the supply-oriented theories also rest on the quantity theory of money.

spheres of production, it would stand to benefit from trade by specializing in the production of that commodity in which it is least inefficient. This prediction rests on the assumption that with trade, prices will adjust in a manner consistent with the quantity theory of money. Given that price adjustments occur in this manner, with trade, over time, it will be possible for the absolutely inefficient country to undersell the more efficient country in the production of at least one of the two commodities.[4]

The Hecksher-Ohlin extension of the classical Ricardian theory goes a step further, linking the comparative advantage of a country to its factor endowments. The theory also assumes that in autarky, factor prices depend on factor endowments. Thus, a country in which labor is more abundant relative to capital (or in which the wage rate is lower) will have a comparative advantage in the production of the labor-intensive commodity, whereas a country in which capital is more abundant relative to labor (or in which the rate of interest is lower) would have a comparative advantage in the production of the capital-intensive commodity. Besides the assumption of the relation between factor prices and endowments, the predictions of the Hecksher-Ohlin theorem assume the satisfaction of two other crucial relationships (Metcalfe and Steedman (1979). *F*irst, the price ratio of the two commodities is a monotonically decreasing function of the rate of interest, or the price of capital. *S*econd, the rate of interest is a monotonically decreasing function of the capital-labor ratio (or of the capital intensity) in the production of each commodity.

There are certain practical difficulties surrounding the ability of comparative advantage- based trade to generate a sustainable path of growth, particularly in developing countries. These will be discussed in the next section. However, even at a

[4] This commodity will be that in which the productivity of the absolutely inefficient country is higher relative to the productivity of the absolutely efficient country (or the commodity in which the absolutely inefficient country has a comparative advantage).

theoretical level, the mutually beneficial nature of trade predicted by both the Ricardian and Hecksher-Ohlin theories runs into difficulties once certain crucial assumptions of the theories are abandoned. Brewer (1985) has shown that once we allow for capital mobility, cost reductions could be such that a country may be undersold in both commodities, with trade being determined on the basis of absolute, rather than comparative advantage. Trade would thus no longer be mutually beneficial. Furthermore, with fixed wages, capital mobility could also give rise to unemployment when firms shift production activities to a country with the lower wage, and workers in the home country refuse to accept a reduction in wages. Even if capital is immobile between countries, Metcalfe and Steedman (1979) show that if we allow for heterogeneity in capital goods, the two crucial monotonic relationships between relative prices and the rate of interest; and between the rate of interest and capital intensity no longer hold. As such, with heterogeneous capital goods, Hecksher-Ohlin theorem has no predictability with respect to the pattern of trade.

Unlike the Ricardian and Hecksher-Ohlin theories, the predictions concerning the role of trade under the demand-oriented growth theories do not rest on crucial assumptions. The *demand-oriented* theories of growth emphasize that barring natural resources such as land and minerals, the supplies of factors of production are not exogenously given, but depend to a great extent on the demand for them. This demand for factors in turn depends on the demand for output, as reflected in the expenditures of an economy, or in its *effective demand*[5]. The supplies of factors such as different types of labor and machinery, are likely to adapt to the demand in an economy, making the

[5] These theories also emphasize that the level of effective demand, and hence the level of economic activity may be such that it does not lead to a full utilization of resources.

growth of output demand-determined. Allocation is thus not based on relative scarcity. In such a scenario, trade would be driven by absolute advantage, and countries could be undersold all around.

The primary components of the demand for the output (GDP) of a country can be broken up into consumption demand, investment demand, government expenditures and net foreign demand (or the value of exports minus the value of imports). Given that consumption and imports are a function of income, the demand-oriented theories show that output will be determined as a multiple of autonomous demand or spending, i.e. spending independent of the level of income. In an open economy, exports are an important component of this autonomous demand, and therefore have an important influence on the economy's growth performance. Thus, the balance of payments is an important demand constraint that must be accounted for when analyzing the growth performance of an open economy. The influence of the balance of payments constraint was first captured by Harrod (1933) by means of the *foreign trade multiplier*.

The balance of payments constraint captures the fact that a country's performance in external markets, and the response of other countries and financial markets to that performance could restrict its economic growth to a level below one compatible with internal conditions, such as the rate of unemployment and capacity utilization (McCombie and Thirlwall, 1994). Thirlwall (1979) and McCombie and Thirlwall (1994) derive the balance of payments constraint equation by beginning with the basic equation of balance of payments equilibrium, which requires that the value of exports, (measured in home currency) equal the value of imports, (also measured in home currency).

Using this basic identity, one can arrive at the following equation that captures the balance of payments constraint to growth (for details, see Thirlwall, 1977 and McCombie and Thirlwall, 1994) :

$$\dot{y}_B = \frac{\dot{x}}{\varepsilon} \quad (1)$$

where $\dot{y}_B$ is the growth rate of output consistent with balance of payments equilibrium; $\dot{x}$ is the growth rate of export volume and ε is the income elasticity of demand for imports. The above balance of payments constraint equation is the dynamic extension of Harrod's foreign trade multiplier.

Equation (1) implies that for a country to grow faster on a sustainable basis, it would first need to lift the balance of payments constraint on demand by raising the growth rate consistent with its balance of payments equilibrium. Some of the ways this can be achieved include policy efforts aimed at making exports more attractive, and at lowering the income elasticity of imports. The equation therefore implicitly suggests that it is possible for policies of export-led growth and import substitution to simultaneously co-exist. This has, in fact, historically been the case. In other words, these two economic phenomena may not necessarily be mutually exclusive, or in conflict with each other, as is often suggested in the conventional literature favoring export-led growth.

3. The Role of Trade in an Open Economy: Comparative Advantage, the Income Elasticity of Imports and the Balance of Payments Constraint

When discussing the potential advantages of a strategy of export-led growth, the conventional literature e.g. Balassa (1988) and Krueger (1990) has argued that such a strategy facilitates resource allocation based on comparative advantage; enables

developing countries to overcome the limitations of their domestic markets, and thereby allows them to utilize their full production capacity and exploit economies of scale. Export-led growth strategies also permit economies of scale associated with horizontal and vertical specialization. Furthermore, such economies of scale can be realized in an environment of effective competition. Additionally, it has been argued (e.g. in Krueger, 1990) that export-orientation constrains government policies in a manner that is more conducive to improving standards of living and to rapid economic growth. The costs of "inappropriate" policies become known much earlier under a strategy of export-led growth, and hence corrective measures can be taken in a timelier manner.

However, these arguments neglect the constraint imposed by effective demand on the production activities of a country. Greater export-orientation per se may not facilitate a better utilization of domestic production capacity in developing countries unless their exports face a relatively strong demand in external markets. With specialization mainly on the basis of comparative advantage, many developing countries would tend to specialize in primary commodities, and in commodities that intensively use natural resources. However, as pointed out by Prebisch (1959), the income elasticity of imports for primary commodities tends to be less than that for manufactured goods. Consequently, a successful pursuit of export-led growth would require developing countries to lift the balance of payments constraint by improving their external competitiveness in non-primary goods. This would help to address the problem of financing the import requirements (capital goods) of development and growth without running into serious balance of payments difficulties. In other words, a successful strategy of export-led growth may also require policy efforts aimed at improving export

competitiveness in manufactured goods and at encouraging the production of domestic substitutes for non-essential (from the point of view of the requirements of development and growth) imports. Looking at the East Asian experience that is often provided as an example of the superiority of an export-led growth strategy to import substitution, studies such as those of Amsden (1989), Wade (1990) and Rodrik (1994) have emphasized the role played by government intervention (e.g. through subsidies, trade restrictions, administrative guidance, the establishment of public enterprises and the allocation of credit) in directing the comparative advantages of these countries in the right direction.

Thirlwall (1979) develops a formal model that captures how the balance of payments acts as an important demand constraint on growth in an open economy. If a country encounters a balance of payments deficit before reaching the full utilization of its existing production capacity, correcting the deficit would require it to curtail demand. This would discourage investment, slow down technological progress, and make domestic goods less desirable relative to foreign goods. The last factor would further worsen the balance of payments, and thus slow down growth and employment, through a vicious circle. As against this, if a country were able to expand domestic demand to a level consistent with its existing production capacity, without encountering balance of payments difficulties, the resulting pressure of demand is likely to act as an incentive to increase investment, allowing production capacity to be expanded to meet this effective demand. This would facilitate a higher rate of output growth and technological progress, and the transfer of resources from low-productivity to high-productivity activities. A strong demand is also likely to raise the demand for labor, thereby generating more employment.

Adopting the procedure discussed in the previous section, Thirlwall arrives at equation (1), which shows that if balance of payments equilibrium is to be maintained, a country's long-run growth rate will be determined by the ratio of its rate of growth of exports to its income elasticity of demand for imports.

In the case of several developed countries, there is evidence to suggest that the balance of payments equilibrium growth rate provides a close approximation to the actual growth performance of these countries during the post-War period e.g. Thirlwall (1979); McCombie and Thirlwall (1994) and Alonso and Garcimartin (2004). For developing countries, the results have been more mixed, but nevertheless provide some evidence to support the balance of payments constraint hypothesis (see for example, Bairam and Dempster, 1991; McCombie and Thirlwall, 1994 and Perraton, 2004).

The above literature does suggest that in an open economy, raising the actual rate of growth on a sustainable basis would first require a country to lift its balance of payments constraint, i.e. raise the growth rate consistent with balance of payments equilibrium. What appears to be missing from the current literature is an adequate consideration of dynamics operating at a more disaggregated or sectoral level of an economy. [6] Particularly in the case of developing countries, problems of structural heterogeneity (or the existence of high-productivity and low-productivity activities); concentrated employment growth; and jobless improvements in productivity may not be satisfactorily addressed, even if there is a reduction of the balance of payments constraint that facilitates higher rates of growth. Thus, the problems of open and disguised unemployment and hence of absorbing surplus labor productively may persist.

[6] In the development literature, one exception may be found in the work of Hirschman, who emphasized the importance of forward and backward linkages at the sectoral level in generating a sustainable path of growth and development.

Furthermore, as discussed in the introduction, the reduction of the constraint may be primarily led by an improvement in the export performance of services, mainly those employing skilled labor, rather than an improvement in the competitiveness of merchandise exports.[7] In such a scenario, a country may continue exhibit trade balance deficits, which raises questions about the long-run sustainability of a higher rate of growth, induced by the reduction of the balance of payments constraint. Consequently, even if export-led growth is able to lift the balance of payments constraint, it may still not be capable of generating a process of growth and development that is more inclusive and sustainable unless it is complemented by active policy efforts to address these problems. The rest of this paper seeks to take a closer look at these dynamics, and discuss their policy implications by focusing on the Indian experience.

4. Good News and Bad - A Reduced Balance of Payments Constraint, Some Export Dynamism and Greater Domestic Value Added; but Highly Concentrated Improvements in Productivity and Employment, and Rising Trade and Current Account Deficits

[7] Looking at the sustainability of services-led growth in India, Rakshit (2009) has shown that the employment growth in this sector has been dismal over time. From a growth rate of 4.89 per cent between 1983-84 and 1987-88, the growth rate of employment in the services sector has consistently fallen over time, and was about 1.6 per cent during the period from 1999-2000 to 2004-05. This raises strong doubts over the sustainability of such a path of services-led growth in a poor and large country like India. Rakshit further argues that despite the growing share of services in India's GDP growth over time, there still remain the questions of meeting the needs for food, clothing, investment and of industrial products that must constitute a large part of consumption before a sufficiently high standard of living can be attained.

The Balance of Payments Constraint

The balance of payments constraint equation specified by equation (1) is estimated for India for three time periods: the whole period from 1960 to 2005; the pre-liberalization period from 1960 to 1990, and the post-liberalization period from 1991 to 2005. The data for this part of the analysis are obtained from the *International and Financial Statistics (IFS) database* of the IMF and from the *Bank for International Settlements (BIS).* For details of the procedure used to estimate the various components of the balance of payments constraint equation, and for the calculations pertaining to real GDP growth, please see the Appendix.

The estimation results for the balance of payments constraint are shown in Table 1.

TABLE 1: THE BALANCE OF PAYMENTS CONSTRAINT FOR INDIA[8,9]

[8] In the table, figures in italics for the periods 1960-2005 and 1991-2005 correspond to calculations involving income elasticity estimates that were corrected for autocorrelation by taking first differences of the relevant variables-real imports, real GDP and real exchange rate (lagged by one year).
For the pre-liberalization period 1960-90, it was not possible to obtain a statistically significant estimate for the income elasticity of imports after correcting for autocorrelation (see table A5 in the appendix). Thus, for this sub-period, Table 1 only reports the estimates that were obtained without correcting for autocorrelation.
Admittedly, for 1960-90, the reported estimate of the income elasticity of imports is therefore not wholly unbiased. However, a comparison of the two sets of income elasticity estimates for the remaining two sub-periods does not reveal a huge difference between the estimates not adjusted for autocorrelation, and those adjusted for autocorrelation (for the period 1960-2005, the difference is about 0.50, and for 1991-2005, it is

Time Period	Growth Rate of Exports ($\dot{x}$)	Income elasticity of Imports (ε)	Balance of Payments Equilibrium Growth Rate (y_B)	Actual Growth of Real GDP (2000 = 100)
Whole period (1960-2005)	*63. 54%* 63.54%	*2.33* 1.83	*27.27%* 34.72%	14.58%
Pre-Liberalization (1960-90)	11.66%	1.73	6.74%	7.2%
Post-Liberalization (1991-2005)	*33.18%* 33.18%	*1.89* 2.09	*17.56%* 15.88%	9.09%

The results of table 1 do suggest that the balance of payments constraint has been reduced during the post-liberalization period. As can be seen in Table 1, for the post-liberalization period, the average annual long-run growth rate consistent with balance of payments equilibrium is around 17.5 per cent per annum, compared to 6.7 per cent per annum during the pre-liberalization period. These findings suggest that India's exports have become more competitive in the last ten to twelve years. This improved competitiveness has been strong enough to offset the impact of a high income elasticity of imports, which

about 0.20). So, the income elasticity estimate for the pre-liberalization period 1960-90 may still be treated as a first approximation to the actual elasticity.

[9] All the growth rate figures shown in the table are average annual ones.

increased from around 1.73 in the pre-liberalization period to about 1.89 in the post-liberalization period[10]. Table 1 also shows that during the post-liberalization period, the actual average annual growth rate of real GDP has been a little over 9 per cent per annum, compared to 7.2 per cent per annum for the pre-liberalization period. This in turn suggests that the relaxation of the balance of payments constraint in the post-liberalization period has made it possible for India to grow at a higher rate during this period.

Thus, at the aggregate level, the evidence suggests that India has been successful in relaxing the balance of payments constraint over time, making a faster rate of growth possible.

The next part of the analysis examines the extent to which the reduction of the balance of payments constraint been accompanied by favorable dynamics in terms of export performance, productivity improvements, employment generation, a reduction in the import content of exports in different manufacturing activities, and the evolution of the trade and current account balances over time.

Export, Productivity and Employment Dynamics in Different Industrial Activities

Based on data availability, the pre-liberalization period for this part of the analysis covers the years from 1977 to 1990[11] and the post-liberalization period covers the years from 1991 to 2002. The data for exports and imports are from the *COMTRADE database* of the United Nations. The GDP data used to calculate productivity performance in different manufacturing activities is obtained from the *Central Statistical Organization (CSO)*

[10] A higher income elasticity of imports is to be expected, given the rapid growth of India's real GDP.
[11] For the analysis that deals with the export performance and import content of exports, the pre-liberalization period runs from 1978 to 1990.

website www.mospi.nic.in, the official website of the Ministry of Statistics, Government of India. Employment data for the different manufacturing activities are obtained from the official website of the *International Labor Organization (ILO).*

For analyzing productivity performance, *technology (or productivity) gaps* are first constructed using productivity indices and by treating the US as the technology frontier. These technology gaps are then used to determine the average rate of technological catch-up in the pre- and post-liberalization periods for each manufacturing activity. For a detailed discussion of the procedure used to construct the productivity indices and the technology gaps, please see the appendix.

The employment performance is analyzed by looking at the average rate of employment growth in the pre- and post-liberalization periods for each manufacturing activity.

Export performance (or export dynamics) for the various manufacturing activities is analyzed by calculating the ratio of the growth rate of exports in the pre-liberalization period to the growth rate of exports in the post-liberalization period. Letting "XD" denote export dynamics, for each activity,

$$XD = \frac{X_{G,i78-90}}{X_{G,i91-02}}$$

where $X_{G,i,78-90}$ = Growth rate of exports in the pre-liberalization period for activity i and $X_{G,i,91-02}$ = Growth rate of exports in the post-liberalization period for activity i.

If $X_{G,i\ 78-90} > X_{G,i\ 91-02}$, then exports grew faster in the pre-liberalization period than in the post-liberalization period, and XD would be greater than one.

On the other hand, if $X_{G,i\ 91-02} > X_{G,i\ 78-90}$, then exports grew faster in the post-liberalization period than in the pre-liberalization period, and XD would be less than one.

Thus, when XD is less than one, it would suggest that export performance has been better in the post-liberalization period.

The import-to-export ratio, M/X, is used as a proxy to measure the import content of exports. A Hodrick-Prescott (HP) filtered trend is then fitted to the ratio for the period 1978-2002. An increasing trend in the M/X ratio for any activity would suggest that the import content of exports has been increasing over time (or that domestic value-added has been decreasing over time). The graphs depicting the trends in each manufacturing activity are shown in the Appendix.

Table 2 shows the above dynamics for thirteen manufacturing activities.

TABLE 2: EXPORT, PRODUCTIVITY AND EMPLOYMENT DYNAMICS, AND THE IMPORT CONTENT OF EXPORTS (Activities showing productivity improvements are indicated in bold)

Activity	**Average Rate of Catch-Up**		**Average Rate of Employment Growth**		**Export Dynamics** $XD = \frac{X_{Gi,78-90}}{X_{Gi,91-02}}$	**Trend in M/X Ratio over 1978-2002**
	Pre-Liberalization	**Post-liberalization**	**Pre-Liberalization**	**Post-liberalization**		
1.Food and beverages and tobacco	6.07%	1.98%	1.2%	2.3%	0.47	Decreasing
2. Chemicals	6.07%	3.6%		1.9%	2.47	Decreasing

and Related Products, nes			1.46%			
3. Leather, leather manufactures, nes, and dressed furskins	**-3.09%**	**57.76%**	**4.2%**	**3.05%**	**4.76**	**Increasing**
4. Cork and wood, cork manufactures	**1.52%**	**5.84%**	**0.053%**	**-2.03%**	**-0.11**	**Increasing**
5. Paper, paperboard, and articles of pulp, of paper or of paperboard	6.3%	-2.3%	1.1%	-0.63%	0.048	Decreasing
6. Textile yarn, fabrics, made-up articles, nes, and related products	2.27%	-2.76%	-0.048%	-1.55%	1.23	Increasing
7. Rubber manufactures, and petroleum	3.57%	0.407%	5.1%	1.6%	3.09	Decreasing

TABLE 2 (CONTINUED): EXPORT, PRODUCTIVITY AND EMPLOYMENT DYNAMICS, AND THE IMPORT CONTENT OF EXPORTS (Activities showing productivity improvements are indicated in bold)

Activity	Average Rate of Catch-Up		Average Rate of Employment Growth		Export Dynamics XD= $\frac{X_{Gi,78-90}}{X_{Gi,91-02}}$	Trend in M/X Ratio over 1978-2002
	Pre-Liberalization	Post-liberalization	Pre-Liberalization	Post-liberalization		
8. Non-metallic Mineral manufactures	6.73%	5.82%	1.44%	-1.46%	1.19	Decreasing
9. Electric machinery, apparatus	6%	0.69%	2.8%	-0.43%	0.6	Decreasing
10. Motor vehicles and other transport	**4.87%**	**6.3%**	**1.92%**	**-0.36%**	**0.99**	**Decreasing**
11. Miscellaneous manufactured articles	10.16%	4.48%	-1.96%	10.67%	2.23	Increasing
12. Basic metals	**1.57%**	**3.57%**	**2.3%**	**1.26%**	**-0.005**	**Decreasing**
13. Manufactures of metals nes and machinery	7.23%	2.49%	-1.15%	0.24%	0.53	Decreasing

1)Productivity and Export Performance

Of the four activities that have shown an improvement in productivity performance, three activities have an XD ratio of less than one:

1) Cork and Wood; 2) Motor vehicles and Other transportation (although the XD ratio is very close to one); and 3) Basic Metals. This provides some evidence to support the stylized fact emphasizing the positive link[12] between productivity and trade performance that is often put forth in arguments favoring export-led growth.

However, Table 3 also shows that export performance has improved in four activities that have not shown an improvement in productivity:
1) Food and Beverages and Tobacco; 2) Paper, Paperboard and Articles of Pulp;
3) Electrical machinery, Appliances and Apparatus; and 4) Manufactures of Metals, nes and Machinery.

These mixed results therefore suggest that problems of structural heterogeneity may remain despite improvements in export performance. Consequently, policies aimed at improving export performance may need to be accompanied by policies aimed at improving productivity. This is discussed in more detail in the next section.

2) Export performance and employment

Table 3 indicates that the average rate of employment growth has shown an improvement in only four activities: 1) Food, Beverages and Tobacco; 2) Chemicals and Related Products, nes; 3) Miscellaneous Manufactured Articles; and 4) Manufactures of Metals, nes and Machinery.

Of the activities that have shown an improvement in export performance, we find that the average rate of employment growth has shown an improvement in just two of these: 1) Food, Beverages and Tobacco; and 2)Manufactures of Metals, nes and Machinery.

[12] By positive link, the author means the movement of productivity and trade performance in the same direction. No assertions are being made about the direction of causality.

It may be noted that none of these four activities (showing employment growth) has shown improvements in productivity performance.

This brings us to a second stylized fact associated with export-led growth: better export performance helps to generate additional employment opportunities. The evidence presented in the above table suggests that improvements in export performance alone may not guarantee this. In developing countries with large amounts of surplus labor, the problem of absorbing this labor may remain a critical problem, despite a better export performance. Without active policies aimed at employment generation, translating the benefits of growth resulting from a better export performance into a more inclusive development process will remain.

3) Export Performance and the Import Content of Exports

Of the activities that have shown an improvement in export performance, the M/X ratio has shown an increasing trend in only one activity, viz. cork and wood. Thus, overall, in India, the improvement in export performance has not involved a reduction in domestic value-added, or a rising import content of exports. This may be regarded as a positive feature of India's improved export-performance in manufacturing activities that distinguishes it from the Latin American experience where greater export performance has involved a reduction in domestic value-added, and in some cases like Mexico, the creation of maquiladoras in the manufacturing sector.

4) The trade balance and the current account

Figure 1 shows the evolution of the trade balance-to-GDP ratio (BT/Y) over the period 1975-2006.

Figure 1: Trade Balance/GDP Ratio (BT/Y) in India, 1975-2006

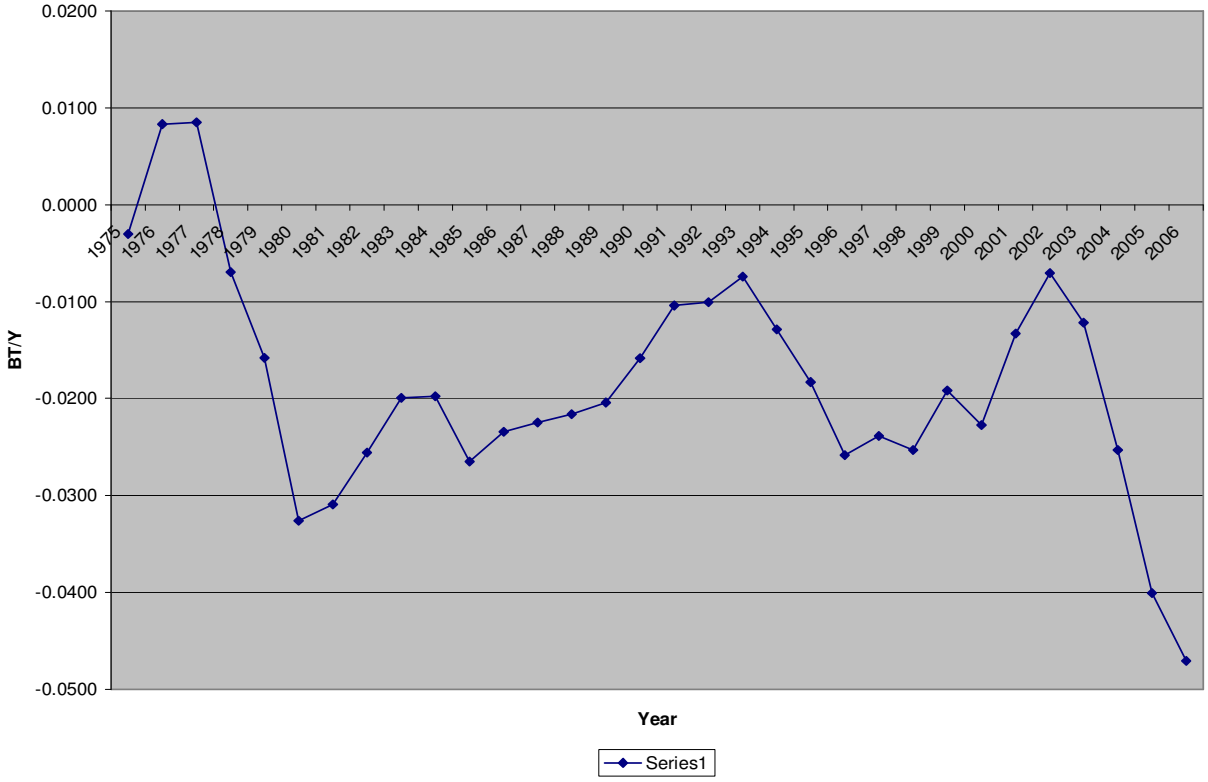


Figure 1 shows that barring a brief period of trade balance surpluses in the mid-1970s, India's trade balance has been in a deficit for the major part of the period. The absolute magnitude of the deficit (as a proportion of GDP) has also increased over time, going from roughly 1.5 per cent of GDP in 1979 to around 4.7 per cent of GDP in 2006. These findings suggest that overall, the competitiveness of merchandise exports has not shown a significant improvement over time. The lifting of the balance of payments constraint is therefore more likely to be the result of an improved performance in the export of services. To see whether this is the case, the evolution of India's current account (as a proportion of GDP) is shown in Figure 2.

Figure 2: Current Account/GDP Ratio (CA/Y) in India, 1975-2006

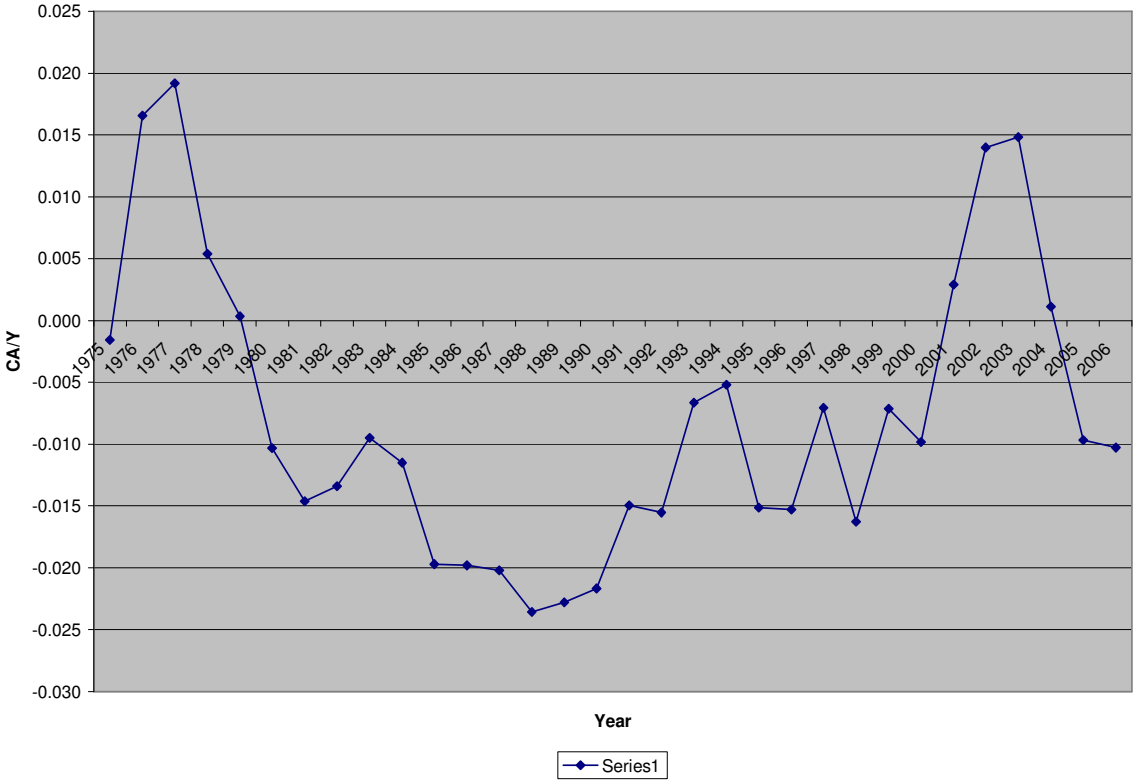
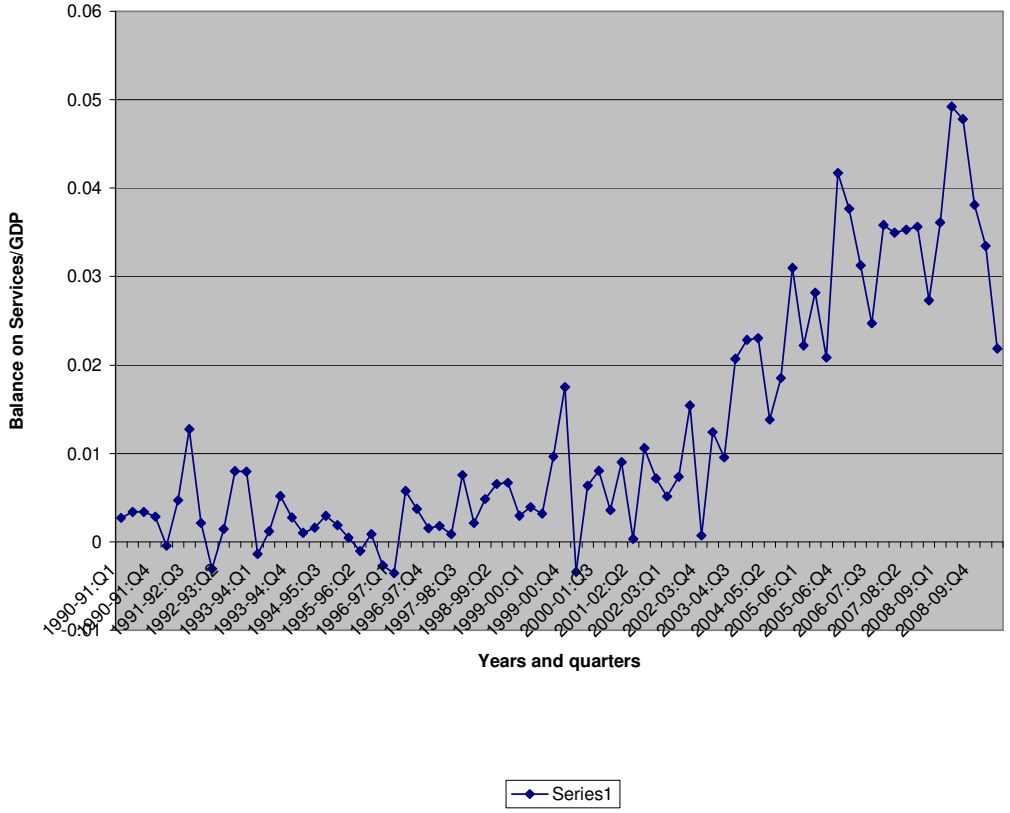


Figure 2 shows that for the period under consideration, India's current account was in a surplus till around 1978, but then moved into a deficit during the 1980s and 1990s, with the absolute size of the deficit being the greatest between 1985 and 1990. The magnitude of the current account deficits (as a proportion of GDP) during the 1990s was less compared to the 1985-90 period, but nevertheless showed volatility. The period from 2001 to 2004 showed current account surpluses, although the magnitude of the surpluses (as a proportion of GDP) appears to be smaller than those attained during the mid-to-late 1970s.

The surpluses of the 1970s and during the 2001-04 period, along with the reduction in the magnitude of the current account deficit in the 1990s suggest that an improvement in the exports of services may have had some role to play in reducing the balance of payments constraint. Figure 3 shows the evolution of India's balance of payments on services, as a proportion of GDP on a quarterly basis for the period 1990-91 to 2009-10[13].

Figure 3: Balance on Services/GDP



[13] The data for the balance of payments on services is from the Database on the Indian Economy of the Reserve Bank of India (RBI). This is to maintain consistency with the data used for the next part of the analysis where the evolution of the balance of payments for different service categories is examined. The International Financial Statistics (IFS) database of the IMF, used for the previous part of the analysis of the trade balance and current account, does not have disaggregated data for the different service categories. The RBI data is reported quarterly from the year 1990-91 onwards till the second quarter of 2009-10. The Indian financial year goes from the 1st of April to the 31st of March.

As seen in Figure 3, the aggregate net receipts on services has shown an upward trend for the major part of the period. This provides some evidence to support the previous claim that the reduction of the balance of payments constraint has been mainly service-led.

To see which of the service categories have been the primary drivers of this improvement at the aggregate level, the evolution of the balance of payments for the various service categories (as a proportion of total services) are now examined in Figures 4 to 11. Based on the availability of data, the evolution of net receipts on business, finance, and communications services is shown on a quarterly basis from the financial year 2004-05 onwards.

Figure 4: Balance on Travel Services/Total Services

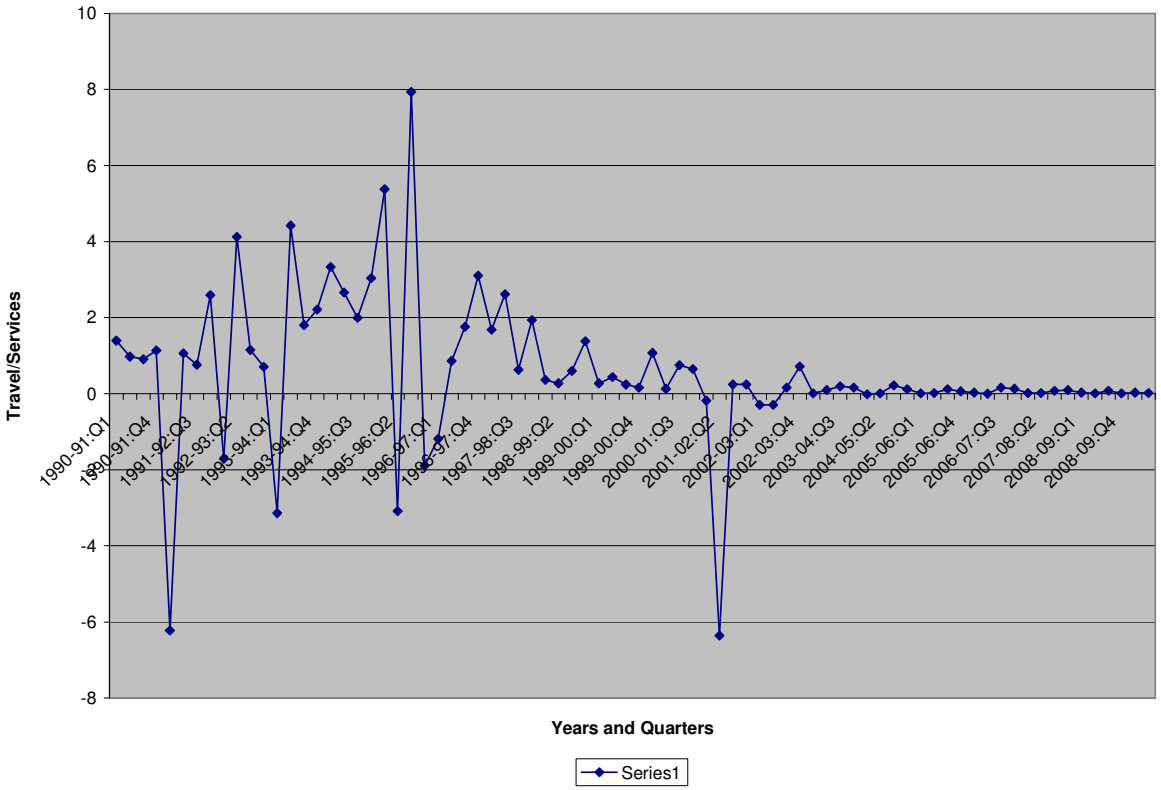


Figure 5: Balance on Transportation Services/Total Services

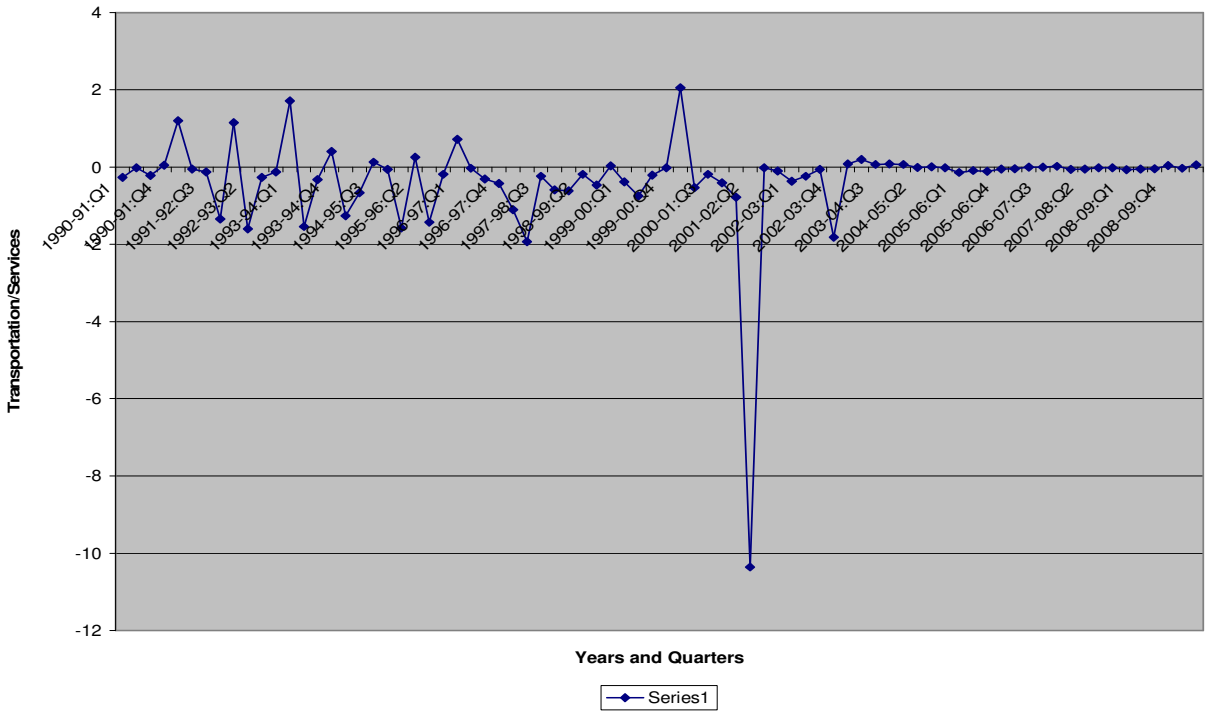


Figure 6: Balance on Insurance Services/Total Services

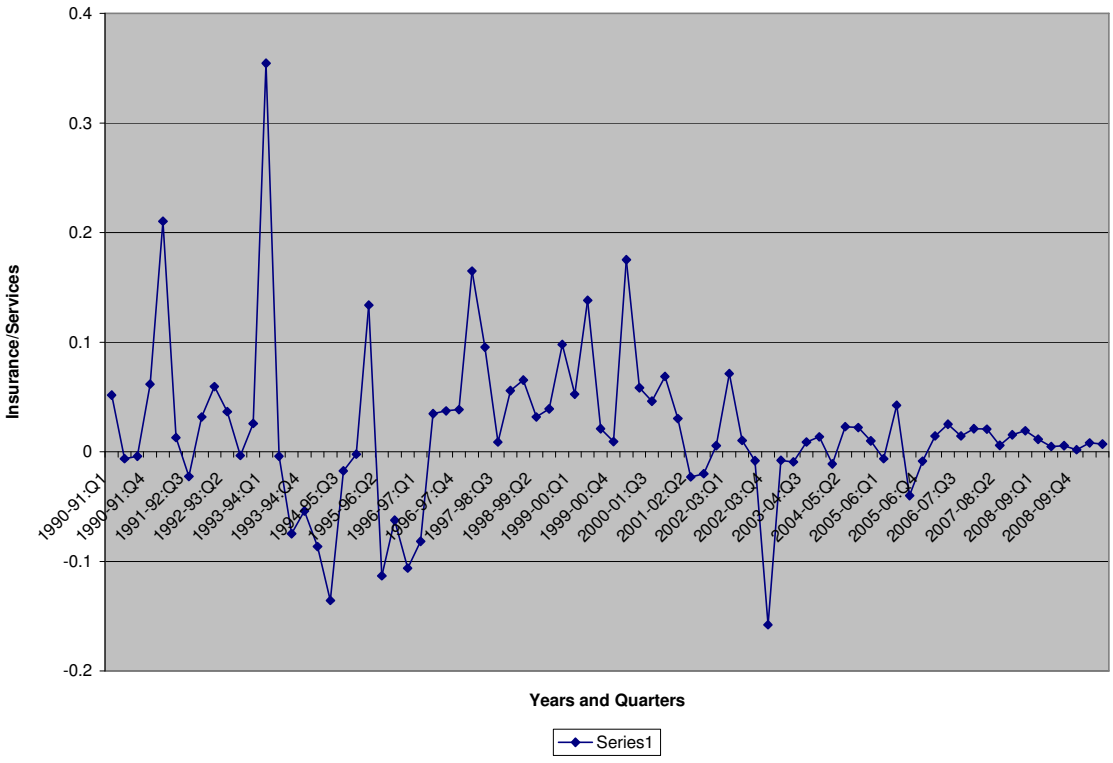


Figure 7: Balance on Government not Included Elsewhere (GNIE) Services/Total Services

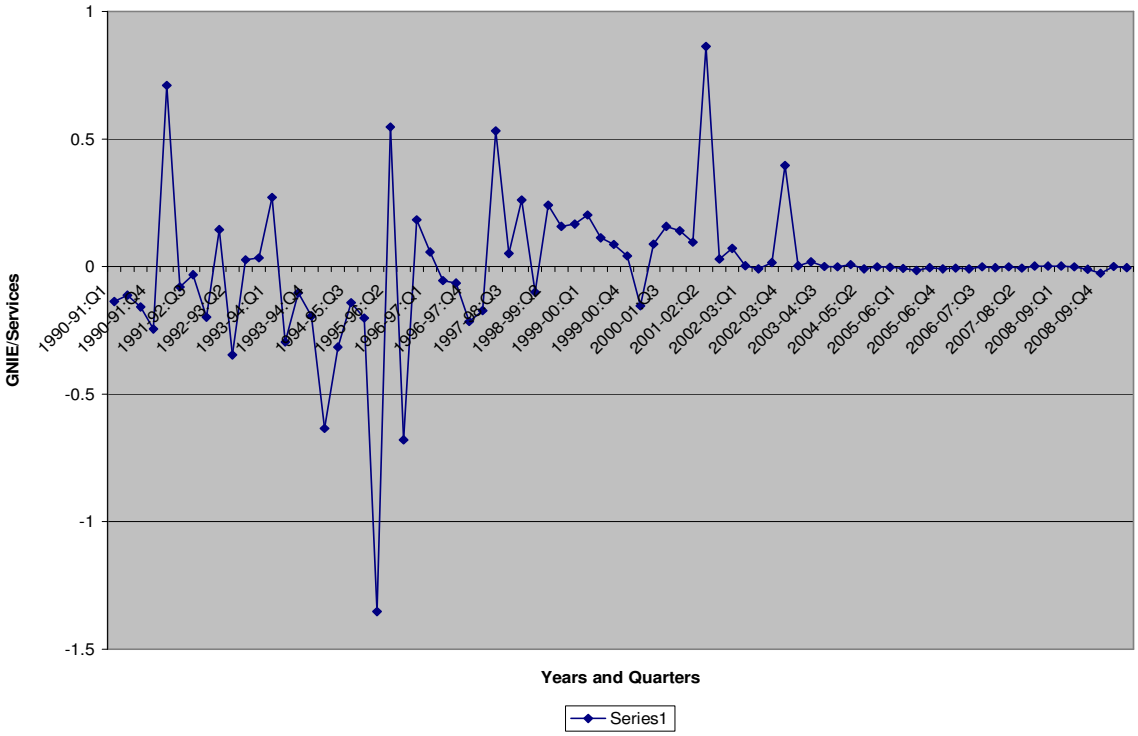


Figure 8: Balance on Software Services /Total Services

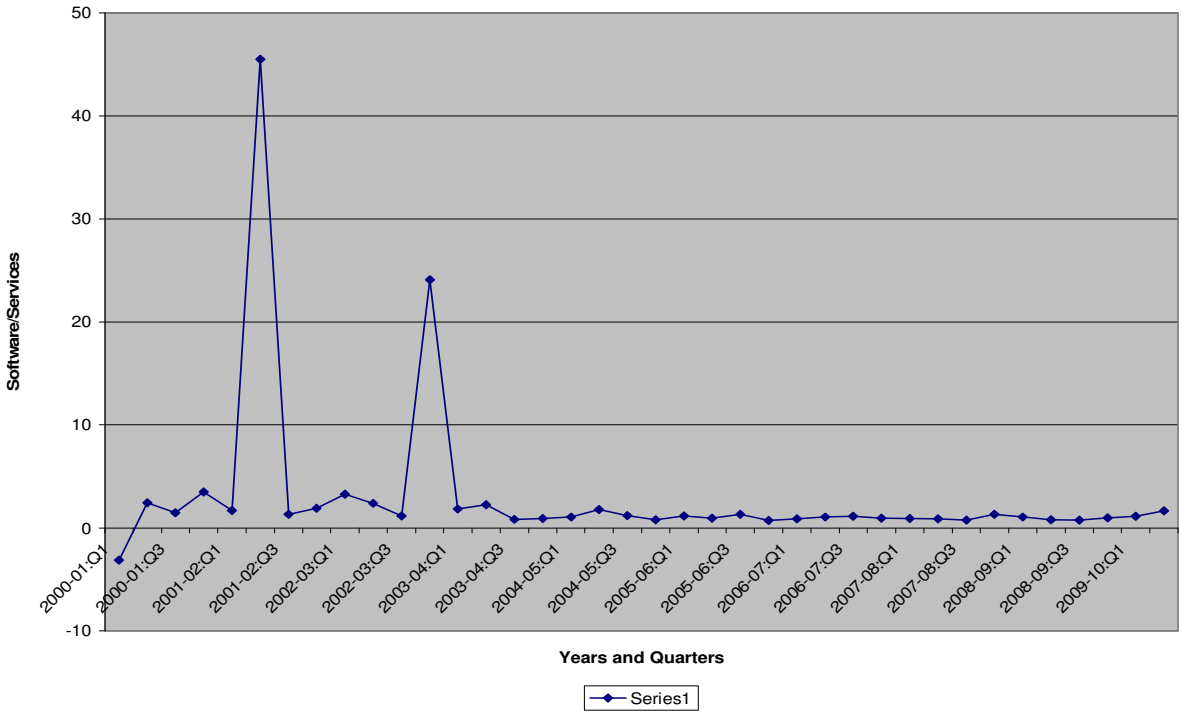


Figure 9: Balance on Business Services/Total Services

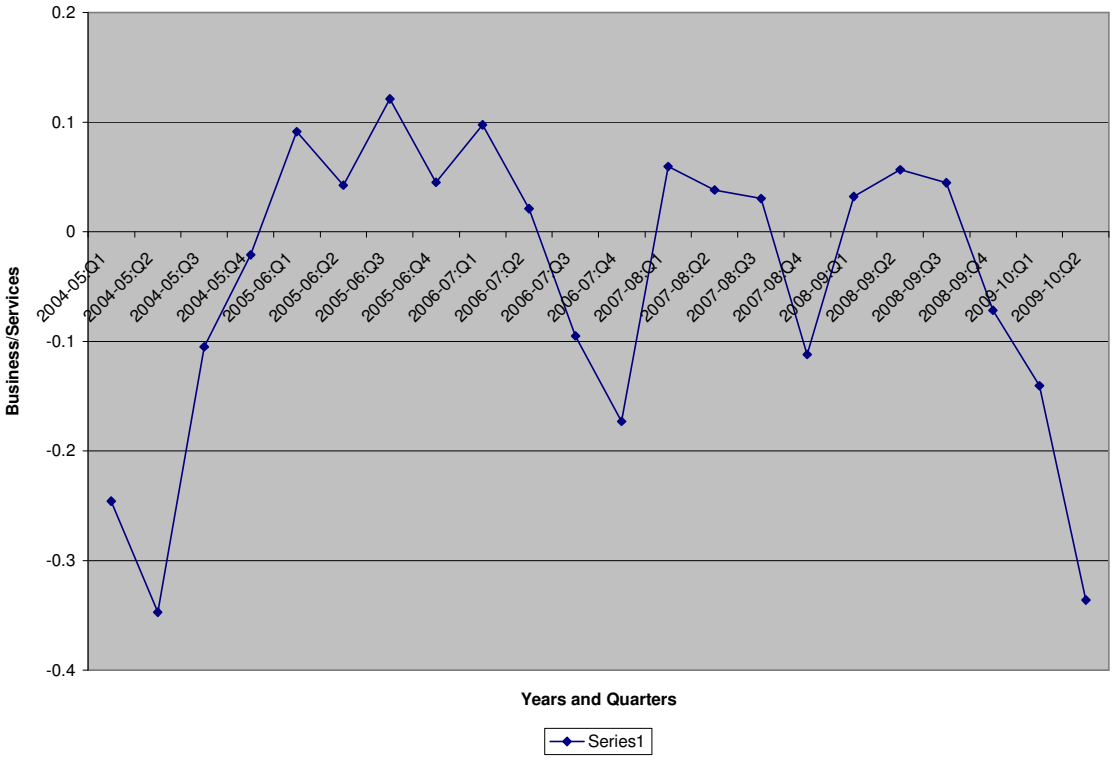


Figure 10: Balance on Financial Services/Total Services

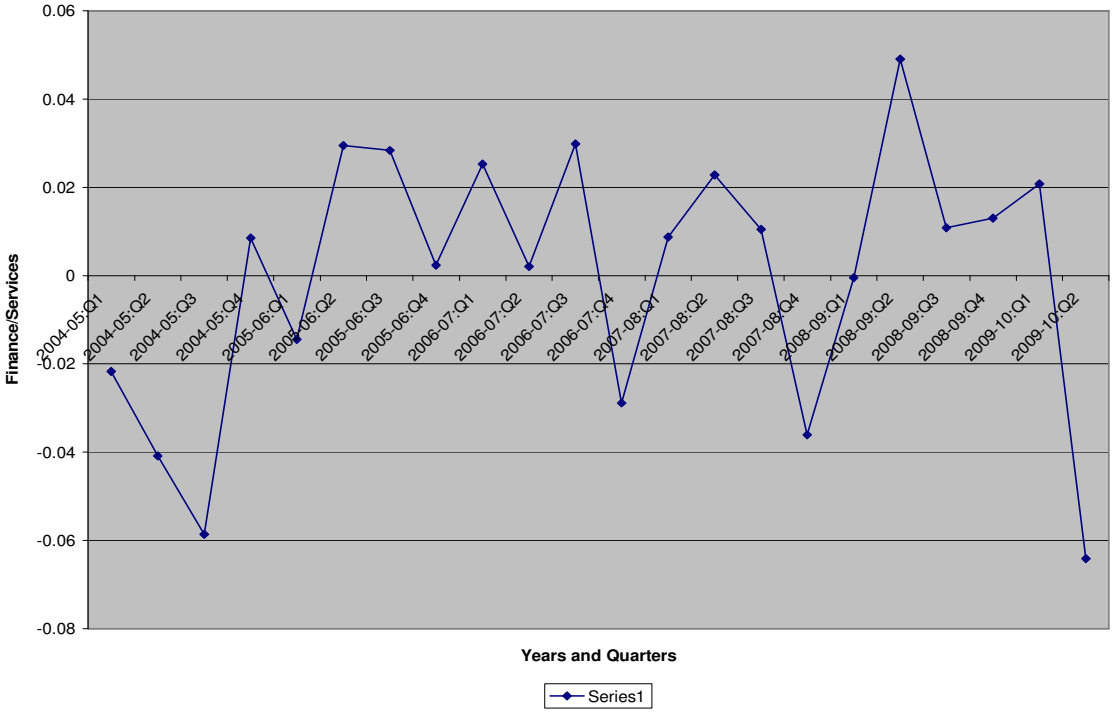
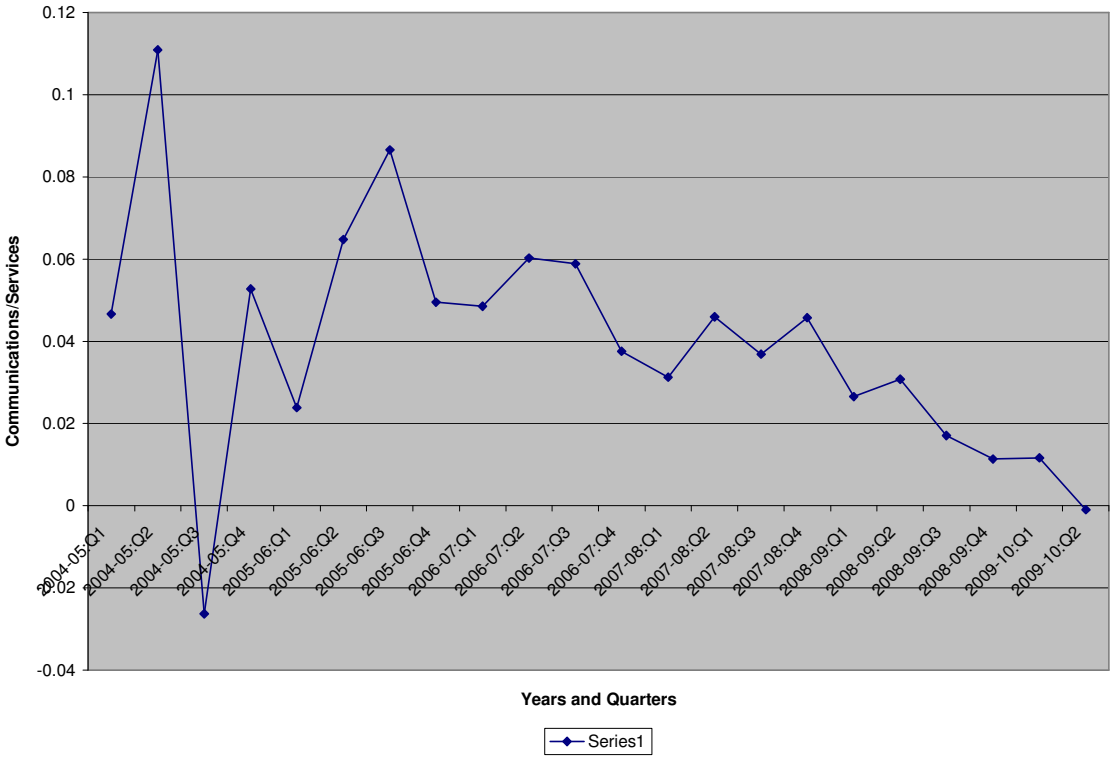


Figure 11: Balance on Communication Services/Total Services



An examination of the graphs on the preceding pages suggests that in the 1990s, travel, insurance and GNIE services were the three main contributors to the net receipts on services. But since the mid-2000s, the main contributors to the net receipts on services have been business; finance and communications, with communications being the biggest contributor. The trends in communications are consistent with the growth of the telecommunications sector in India since the late 1990s, and policy initiatives to promote the growth of that sector. However, it is also worth noting that despite the growth of the Indian software industry in the last decade, barring the second quarter of 2001-02, and the fourth quarter of 2003-04, the net receipts on software services have remained fairly modest.

5) Sustainability of the reduction of the balance of payments constraint: Trade balance and current account deficits and the evolution of India's debt structure

The fact that India's trade balance and current account have been in deficits for a major part of the period suggests that its debt obligations would be considerable. This raises the question of the sustainability of a higher rate of growth, facilitated by the reduction of the balance of payments constraint. Table 3 shows India's debt services to exports ratio and the ratio of total external debt to exports for selected years.

TABLE 3: DEBT SERVICES –TO-EXPORTS RATIO AND THE EXTERNAL DEBT-TO-EXPORTS RATIO FOR INDIA

Year	Debt services-to-exports ratio (%)	Ratio of total external debt to exports of goods and services (%)
1980	9.4	137.2
1990	31.9	325.4
2000	14.5	131.8
2006	7.7	75.7

Source: Global Development Finance Reports (World Bank), 2004 and 2009.

As seen in Table 3, both the debt services-to-exports ratio and the external debt-to-exports ratio were at their highest in 1990. This is not surprising, given that this was the year right before the foreign exchange crisis of 1991 that led to the liberalization of the Indian economy on a scale that had not been previously attempted by the Indian government. Since 1990, both debt ratios have declined over time, suggesting that India's ability to service its debt obligations has improved. The debt figures therefore appear to suggest that the reduction in the balance of payments constraint is sustainable.

However, it should be noted that although the two ratios have shown a decline, they are, by no means, small, with the debt services to exports ratio standing at 7.7 per cent, and the external debt to exports ratio at 75.7 per cent in 2006. Whether this will have any adverse impact in the future remains to be seen.

Furthermore, as seen in the preceding part of the analysis, even if the higher rate of growth induced by a reduction of the balance of payments constraint is sustainable, the problems of structural heterogeneity, low employment growth, and hence the problems of absorbing surplus manpower, and making the process of growth inclusive, and accompanied by quality development continue to remain.

6. Policy Implications, Sustainability and Conclusions

There are primarily *two* issues which the analysis of the previous section draws attention to. The *first* is the problem of structural heterogeneity. The above analysis shows that in the case of India, the Indian economy continues to experience concentrated productivity and employment growth. This is despite the fact that the balance of payments constraint has been reduced over time, and export performance in certain manufacturing activities has shown an improvement. These findings therefore suggest that in a developing economy, even with a reduction in the balance of payments constraint and improvements in export performance in certain manufacturing activities, the problems of transforming the productive base and absorbing surplus manpower, and thereby reducing open and disguised unemployment may remain. In other words, the question of achieving a growth and development path that is sustainable and inclusive would remain despite improvements in export performance. It is significant to note that this question remains relevant, even if one assumes that economic growth is supply-constrained. Since under

the supply-constrained growth theories, productivity increases facilitate higher economic growth, these theories suggest that without productivity increases, a higher rate of growth will not be possible. The findings of the previous section therefore also highlight the limitations of conventional arguments that improved export performance will lead to a virtuous path of economic growth that allows a country to exploit economies of scale, and fully utilize its production capacity.

Consequently, in developing countries, active policy efforts aimed at improving the technological capabilities of production, e.g. through credit policies, expenditures on infrastructural development and subsidies to firms for investing in R&D to improve technology may be necessary. In addition, concrete and active policy efforts will need to be directed towards the generation of quality employment. While the specific components of these policies are beyond the scope of this paper, broadly speaking, employment generation policies must involve the generation of jobs with a decent wage, gender equity, humane working conditions and work hours. Furthermore, certain provisions that specifically seek to promote the welfare of workers' families should be incorporated. Without this, in developing countries where a majority of the population is engaged in precarious forms of self-employment and acute income inequalities exist, a reduction of the balance-of-payments constraint and an improved export performance per se will have a very limited (if at all) positive impact of the lives of most people.

The *second* issue pertains to the factors underlying the lifting of the balance of payments constraint in India. The previous section showed that India's trade balance has constantly exhibited deficits, while the current account balance recorded surpluses only in the late-1970s, and during the period from 2001-04. An examination of the net exports of

services suggested that the reduction of the balance of payments constraint has been more the result of an improvement in the export performance of services, than an improvement in the external competitiveness of manufacturing exports. India's debt services (as a percentage of the total exports of goods and services) has revealed a decrease over time, suggesting that the higher rate of growth recorded in recent years is not debt-constrained, despite the trade balance and current account deficits.

However, the more crucial question that arises from this second finding is the ability of this services-led path of growth to address the employment problem, and the problem of absorbing labor into high-productivity jobs. In India, around 78 % of the labor force continues to be rural, with the agricultural sector accounting for around 60% of total employment, despite a very low productivity. As against this, the industrial sector accounts for 18% of total employment, and the services sector for around 22% of total employment. In industry and services, the urban formal sector employs only around 7% of the workforce. The remaining employment in industry and services is in the urban informal sector, with wages and work conditions much poorer compared to the organized sector, and closer to those in the rural areas[14]. The low share of formal sector employment in services could partly be explained by the fact that in India, the major drivers of the rapid growth of the service sector have tended to be services that require skilled labor- business, finance, communications and software. Since a major part of the labor force continues to be unskilled, the services-led growth path may not adequately

[14] Anant, Hasan, Mohapatra, Nagaraj, and Sasikumar (2006), Labor Markets in India: Issues and Perspectives in *Labor Markets in Asia: Issues and Perspectives* edited by Jesus Felipe and Rana Hasan (2006).

address the problem of generating adequate quality employment.[15] This again reinforces the exigency of concrete and active policy efforts aimed at the generation of quality employment, and at raising the productivity of both agriculture and industry. In the absence of this, the scenario in a developing country like India will resemble a bizarre one in which high growth rates, improved export performance, etc. appear to be pursued more as ends in themselves, rather than as the means to generating quality employment improving productivity, and thereby making the process of development more inclusive.

[15] For a more detailed discussion on the limitations of services-led growth as a development strategy in India, see Rakshit (2009).

APPENDIX A: ESTIMATION OF THE INCOME ELASTICITY OF IMPORTS AND EXPORT QUANTITIES

Income Elasticity of Imports

The income elasticity of imports was first estimated by using the following regression equation for each of the three periods:

$\log(realm) = \alpha_0 + \alpha_1 \log(y) + \alpha_2 \log(rexchr) + \varepsilon$ (1).

where realm = real imports; y = real GDP; and rexchr = real exchange rate.

The estimated value of α_1 would then give an estimate of the income elasticity of imports. However, the regression results suggested the presence of autocorrelation. To correct for this, the first differences of realm, y and of $rexchr_{t-1}$ were used to estimate the following regression equation:

$\Delta realm = \alpha_0 + \alpha_1 \Delta y + \alpha_2 \Delta(rexchr_{t-1}) + \varepsilon$ (2).

In the second equation, the estimate of α_1 would give an estimate of the marginal propensity to import (MPM). Once the estimates of the MPM have been obtained for the three periods, the income elasticities of imports are estimated as 1/MPM, since the Harrod foreign trade multiplier is the reciprocal of the marginal propensity to import.

The results obtained by running both regressions for the various time periods are given below.

Table A1: Regression results using equation (1) for the period 1960-2005

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.019306	0.751965	-5.345068	0.0000
LOG(Y)	1.825358	0.149227	12.23206	0.0000
LOG(REXCHR)	-0.445736	0.275537	-1.617701	0.1130

R-squared	0.963021	Mean dependent var	2.060742
Adjusted R-squared	0.961301	S.D. dependent var	0.955258
S.E. of regression	0.187919	Akaike info criterion	-0.442617
Sum squared resid	1.518484	Schwarz criterion	-0.323358
Log likelihood	13.18019	F-statistic	559.9098
Durbin-Watson stat	0.413063	Prob(F-statistic)	0.000000

Table A2: Regression results using equation (1) for the period 1960-1990

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.463284	1.460545	-1.001875	0.3250
LOG(Y)	1.732121	0.204296	8.478492	0.0000
LOG(REXCHR)	-0.907345	0.450683	-2.013266	0.0538

R-squared	0.867878	Mean dependent var	1.507627
Adjusted R-squared	0.858441	S.D. dependent var	0.518617
S.E. of regression	0.195127	Akaike info criterion	-0.338571
Sum squared resid	1.066082	Schwarz criterion	-0.199798
Log likelihood	8.247854	F-statistic	91.96256
Durbin-Watson stat	0.573432	Prob(F-statistic)	0.000000

Table A3: Regression results using equation (1) for the period 1991-2005

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.860624	1.198261	-3.221856	0.0073
LOG(Y)	2.090708	0.067420	31.01022	0.0000
LOG(REXCHR)	-0.725882	0.257562	-2.818283	0.0155

R-squared	0.991244	Mean dependent var	3.203848
Adjusted R-squared	0.989785	S.D. dependent var	0.528476
S.E. of regression	0.053414	Akaike info criterion	-2.844644
Sum squared resid	0.034236	Schwarz criterion	-2.703034
Log likelihood	24.33483	F-statistic	679.2424
Durbin-Watson stat	1.928761	Prob(F-statistic)	0.000000

Table A4: Regression results using equation (2) for the period 1960-2005

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.785768	0.372717	-2.108214	0.0412
D(Y)	0.427776	0.044537	9.605052	0.0000
D(REXCHR(-1))	-0.078007	0.028189	-2.767300	0.0084

R-squared	0.719068	Mean dependent var	1.497067
Adjusted R-squared	0.705364	S.D. dependent var	3.094813
S.E. of regression	1.679877	Akaike info criterion	3.941064
Sum squared resid	115.7014	Schwarz criterion	4.062713
Log likelihood	-83.70341	F-statistic	52.47136
Durbin-Watson stat	2.027336	Prob(F-statistic)	0.000000

Table A5: Regression results using equation (2) for the period 1960-1990

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.139897	0.136351	1.026011	0.3143
D(Y)	0.064279	0.037765	1.702061	0.1007
D(REXCHR(-1))	-0.026769	0.012377	-2.162794	0.0399

R-squared	0.183382	Mean dependent var	0.277365
Adjusted R-squared	0.120565	S.D. dependent var	0.503638
S.E. of regression	0.472302	Akaike info criterion	1.435303
Sum squared resid	5.799809	Schwarz criterion	1.576747
Log likelihood	-17.81189	F-statistic	2.919321
Durbin-Watson stat	1.455100	Prob(F-statistic)	0.071820

Table A6: Regression results using equation (2) for the period 1991-2005

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.927859	1.820838	-1.058776	0.3105
D(Y)	0.528259	0.133612	3.953683	0.0019
D(REXCHR(-1))	-0.062992	0.070982	-0.887438	0.3923

R-squared	0.696117	Mean dependent var	3.855159
Adjusted R-squared	0.645470	S.D. dependent var	4.457695
S.E. of regression	2.654221	Akaike info criterion	4.967036
Sum squared resid	84.53869	Schwarz criterion	5.108646
Log likelihood	-34.25277	F-statistic	13.74442
Durbin-Watson stat	2.397560	Prob(F-statistic)	0.000787

Export Quantities

The International Financial Statistics (IFS) database of the IMF has data on the value of exports of goods and services, and on export unit values.

Since the value of exports = (Export unit value)·(Quantity of Exports), export quantities were estimated as

$$\frac{Value of \text{ exp} orts}{Export unit value}$$

for the years 1960, 1990, 1991 and 2005.

Appendix B: Calculation of the technology (or productivity) gaps

The method adopted to construct the technology gaps relies partly on the theoretical framework developed by Cimoli and Correa (2002) to explain the poor productivity performance of Latin America in the post-liberalization period.

The *technology gap* is defined as the ratio of the productivity growth rate in the developing country to the productivity growth rate in the developed country, or what the authors call, the *technological frontier*.

So, if π = the productivity growth rate in the developing country;

and π^* = the productivity growth rate in the developed country;

then the technology gap, ψ, is defined as

$$\psi = \frac{\pi}{\pi^*}$$

If productivity in the developing country is growing faster than productivity in the developed country, i.e. $\pi > \pi^*$, the value of ψ would be greater than one.

On the other hand, if productivity in the developing country is growing slower relative to productivity in the developed country, i.e. $\pi < \pi^*$, the value of ψ would be less than one.

Thus for any sector or manufacturing activity, if the above ratio changes from less than one to greater than one over time, it would indicate that productivity of the developing

country for that particular sector is catching up with the productivity observed in the same sector at the technological frontier.

The analysis in this paper departs slightly from the above method by using productivity levels rather than growth rates to construct the productivity indices used to calculate the technology gaps.

The calculation of the average rate of productivity catch-up involves four steps.

First, the productivity levels are calculated for the different activities for India and the US for every year.

Second, by treating 1990 as the base year (1990=100), the productivity indices are constructed.

Letting *PRODY* denote productivity, the productivity indices are calculated as follows:

1) For t ≥ 1991:

Productivity index for year t

$$PI_t = PI_{t-1} \times \left[1 + \frac{PRODY_t - PRODY_{t-1}}{PRODY_{t-1}} \right]$$

2) For t < 1990:

Productivity index for year t

$$PI_t = PI_{t+1} \times \left[1 + \frac{PRODY_t - PRODY_{t+1}}{PRODY_{t+1}} \right]$$

Third, the technology gaps, ψ_{it} are calculated as:

$$\psi_{it} = \frac{PI_{it}(India)}{PI_{it}(US)}$$

where PI_{it} (j) = country j's productivity index for activity i in year t; j = India, US; and ψ_{it} = technology gap for activity i in year t.

Fourth, to analyze relative productivity performances for different activities for the pre-liberalization and post-liberalization periods, the average rates of technological catch-up are calculated for the two periods for each activity.

For each activity i, the rate of catch-up for each year is calculated as:

$$g_{\Psi i} = \frac{\psi_{it} - \psi_{i,t-1}}{\psi_{i,t-1}}$$

For the pre-liberalization period (1977-90), the average rate of catch-up for each activity is then calculated as:

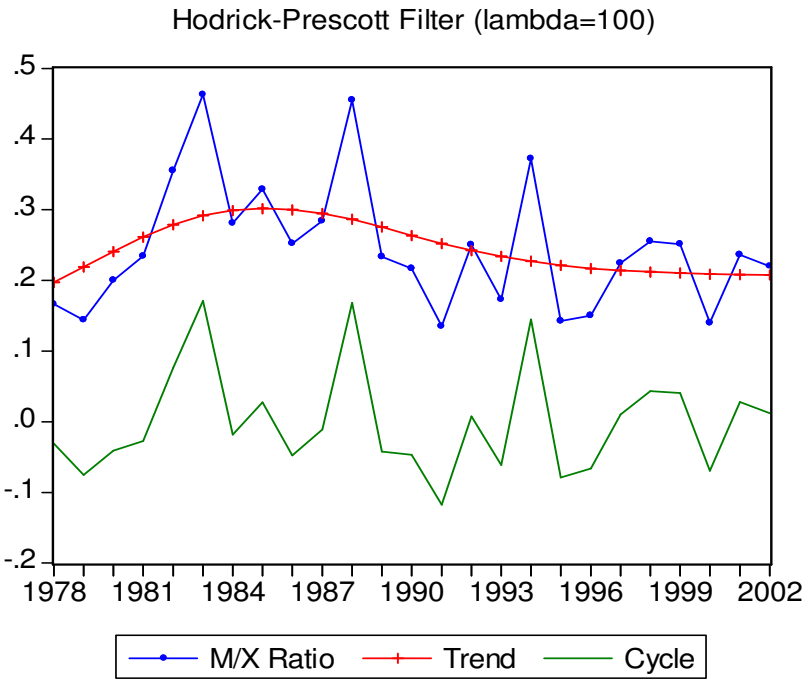
$$\frac{\sum_{t=1978}^{1990} g_{\psi i}}{13}$$

Similarly, for the post-liberalization period (1991-2002), the average rate of catch-up for each activity is calculated as:

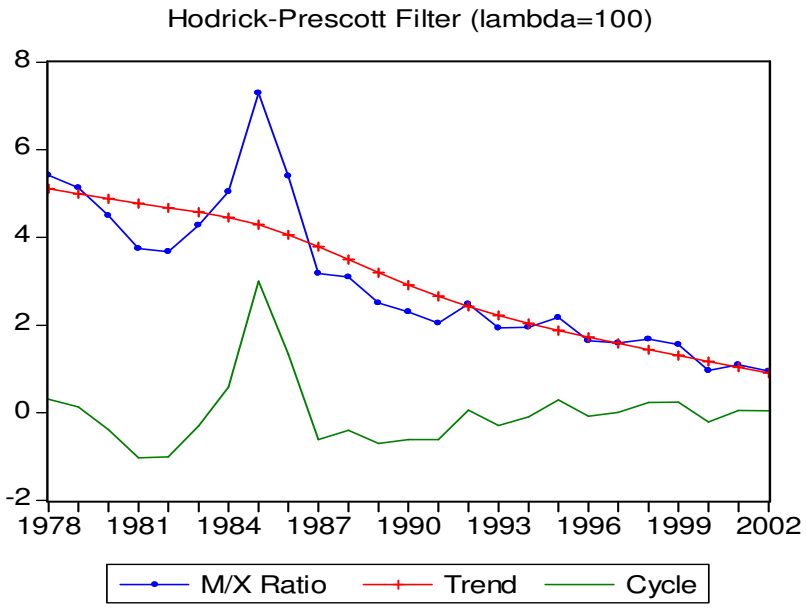
$$\frac{\sum_{t=1991}^{2002} g_{\psi i_i}}{12}$$

APPENDIX C: TREND (USING HODRICK-PRESCOTT FILTER) IN THE IMPORT/EXPORT (M/X) RATIO FOR DIFFERENT MANUFACTURING ACTIVITIES, 1978-2002

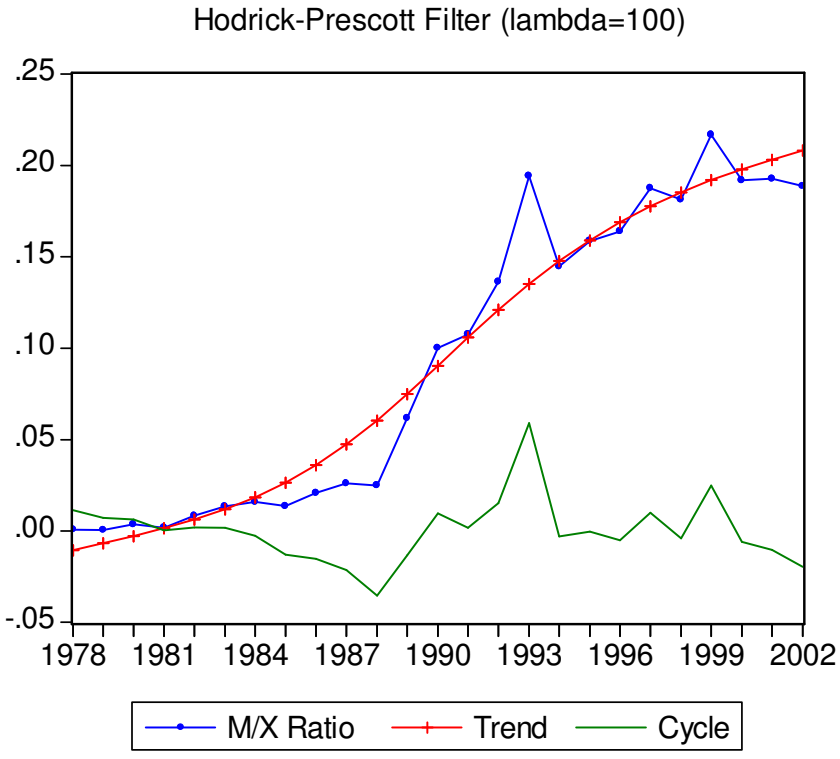
C1. Food and beverages and tobacco



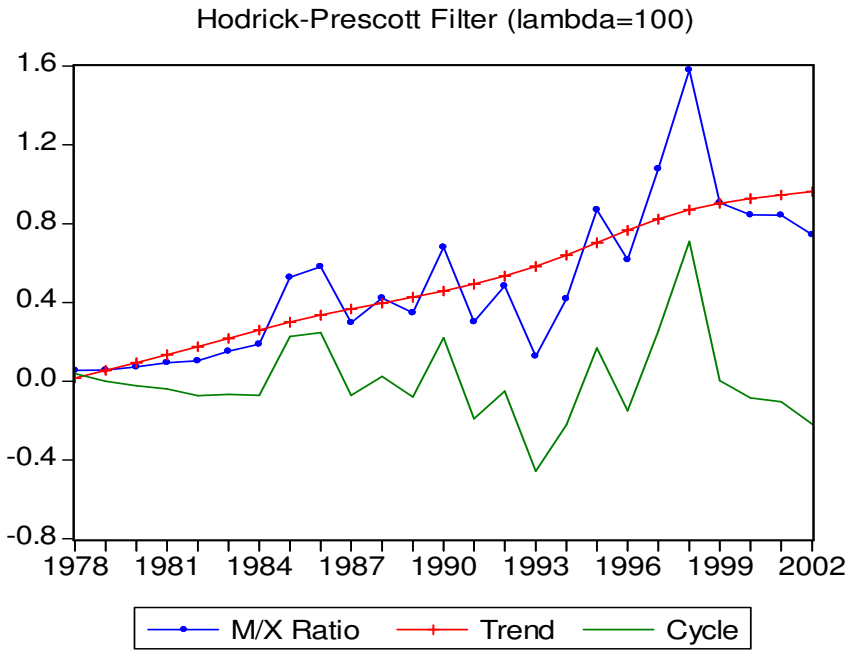
C2. Chemicals and Relates Products, nes



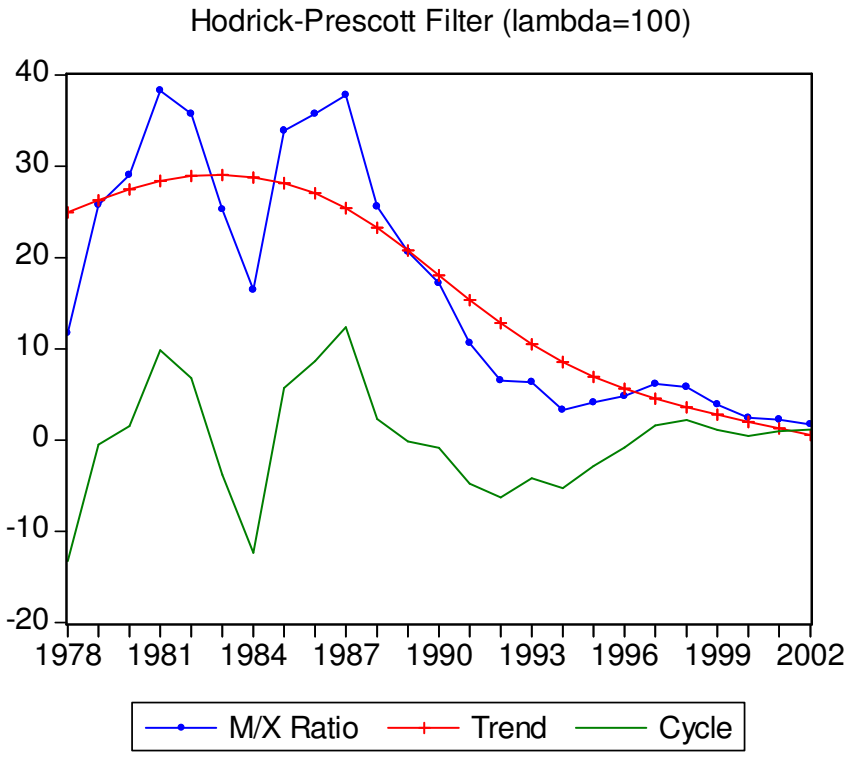
C3. Leather, leather manufactures, nes, and dressed furskins



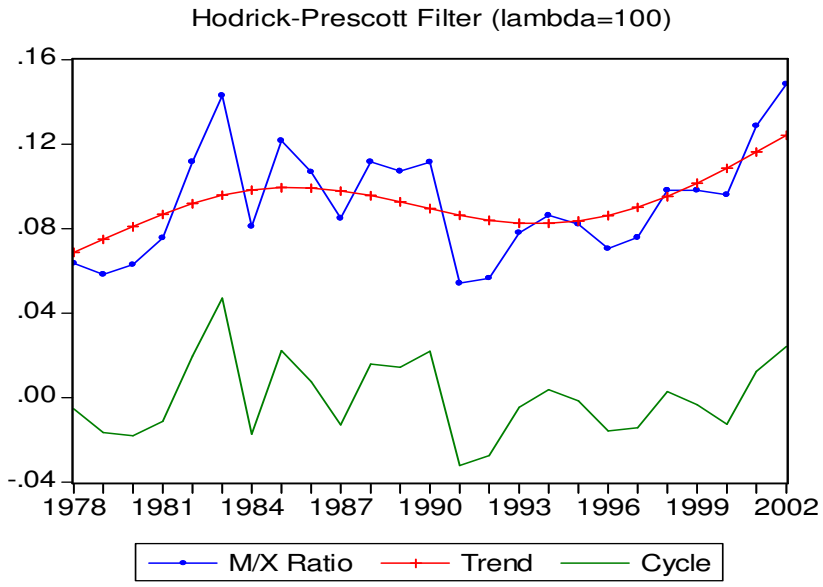
C4. Cork and Wood, Cork Manufactures



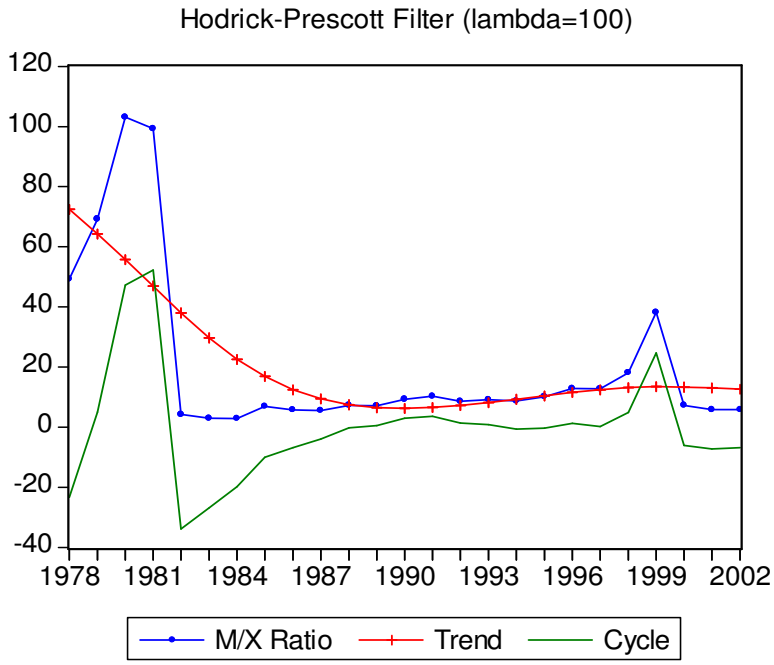
C5. Paper, paperboard, and articles of pulp, paper or paperboard



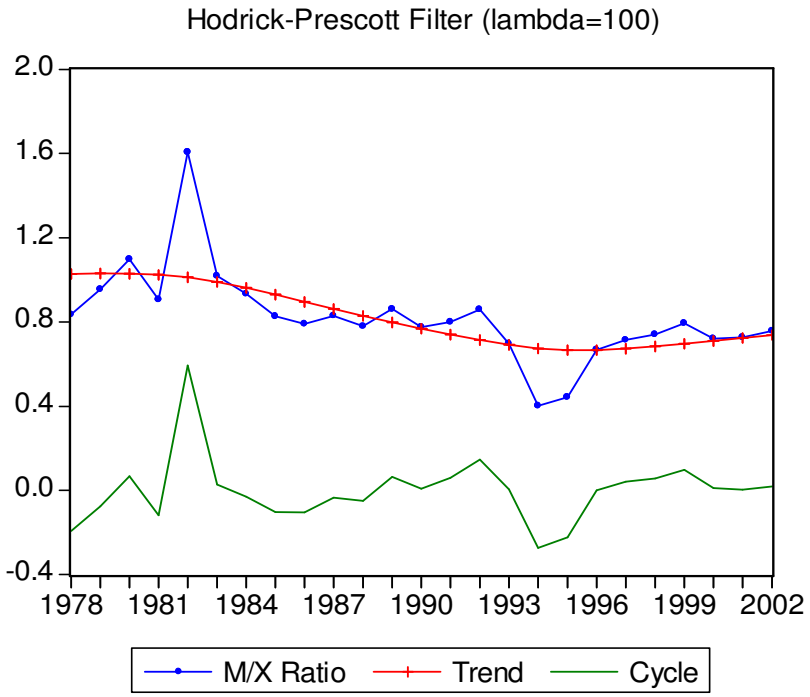
C6. Textile Yarn, Fabrics, Made-Up Articles, nes, and Related Products



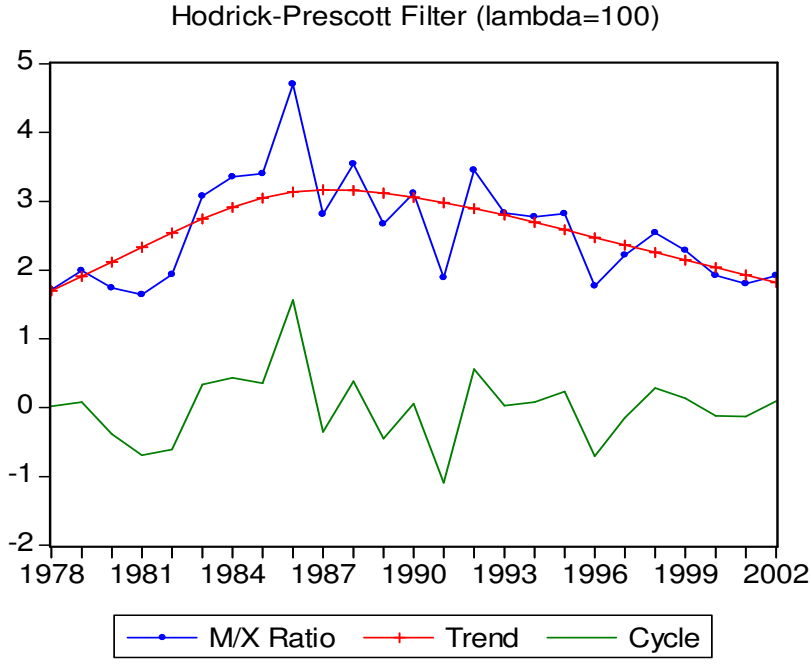
C7. Rubber manufactures and petroleum



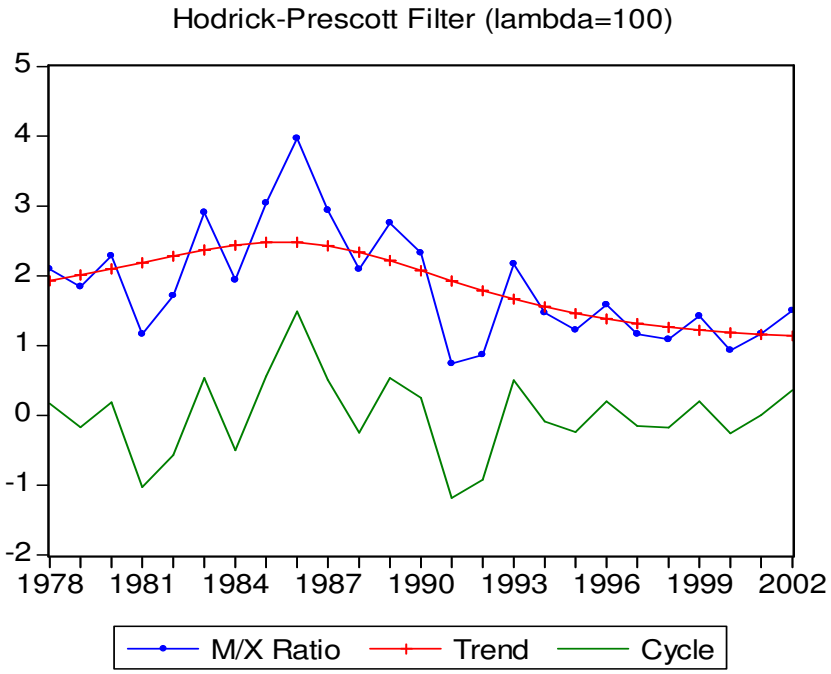
C8. Non-Metallic Mineral Manufactures, Nes



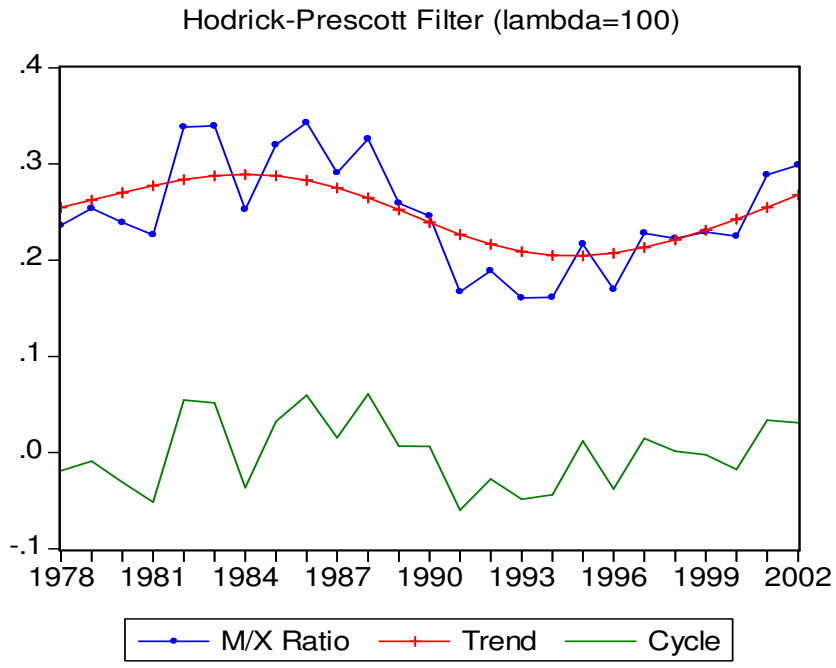
C9. Electrical Machinery, Apparatus and Appliances, nes, and Parts, nes



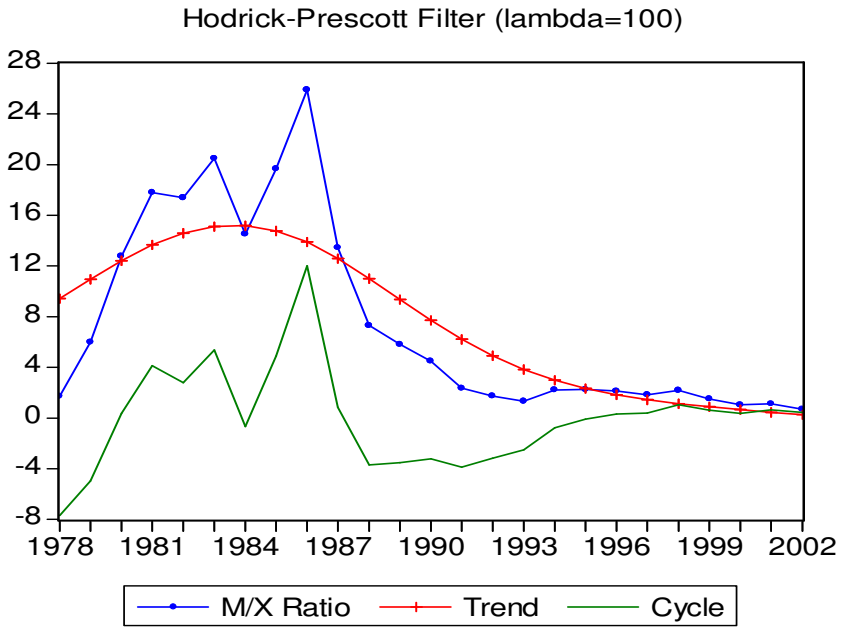
C10. Motor vehicles and other transportation



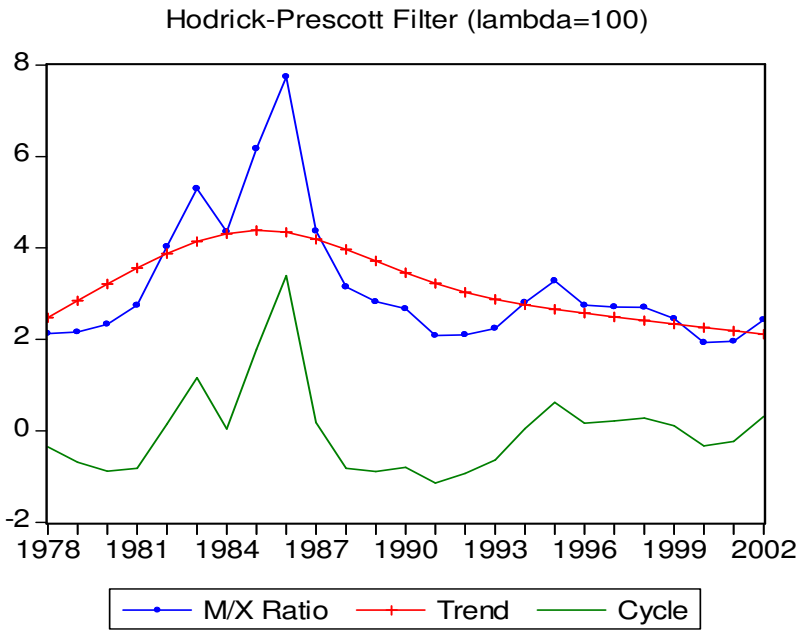
C11. Miscellaneous Manufactured Articles



C12. Basic Metals



C13. Manufactures of Metals, nes and Machinery



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