NBER WORKING PAPER SERIES

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Working Paper 16757
http://www.nber.org/papers/w16757

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 2011

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NBER Working Paper No. 16757
February 2011
JEL No. O0,O1,O5

ABSTRACT

While India is distinctive among developing countries for its fast-growing service sector, sceptics have raised doubts about the quality and sustainability of this service-sector growth and its implications for economic development. We show, consistent with the views of the sceptics, that while growth of the sector has been unusually rapid, it started 15 years ago from unusually low levels. That the share of services has now simply converged to the international norm raises questions about whether it will continue growing rapidly. In particular, whether service-sector output and employment continue to grow in excess of international norms will depend on the continued expansion of modern services (business services, communication and banking) but, also, on the application of modern information technology to more traditional services (retail and wholesale trade, transport and storage, public administration and defense). The second aspect obviously has more positive implications for output than for employment.

We also show that the modern services that are growing most rapidly are now large enough where their future performance could have a significant macroeconomic impact. The expansion of modern service-sector employment is not simply disguised manufacturing activity. Finally, we show that the mix of skilled and unskilled labor in manufacturing and services is increasingly similar. It is no longer obvious therefore that manufacturing is the main destination for the vast majority of Indian labor moving into the modern sector and that modern services are a viable destination only for the highly-skilled few. We conclude that sustaining economic growth and raising living standards will require shifting labor into both manufacturing and services.

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1. Introduction

Among fast growing developing countries, India is distinctive for the role of the service sector. Where earlier developers grew by exporting labor-intensive manufactures, India has relied to a greater extent on services. Although there are other emerging markets where the share of services in GDP exceeds the share of manufacturing, India stands out for the dynamism of its service sector.

But sceptics have raised doubts about both the quality and sustainability of the increase in service-sector output.[1] They have observed that employment in services is concentrated in the informal sector, personal services and public administration, activities with limited spillovers and relatively limited scope for productivity improvement. They downplay information technology and communications-related employment on the grounds that these sectors are small and use little unskilled and semi-skilled labor, the implication being that a labor-abundant economy cannot rely on them to move people out of low-productivity agriculture. They worry that the rapid growth of service-sector employment reflects the outsourcing of activities previously conducted in house by manufacturing firms – in other words, that it is little more than a relabelling of existing employment. They question whether shifting labor from agriculture directly to services confers the same benefits in terms of productivity growth and living standards as the more conventional path of shifting labour from agriculture to manufacturing in the early stages of economic development.

Our purpose in this paper is to evaluate these claims. The resulting picture is mixed. On the one hand, we find, consistent with the views of the sceptics, that while growth of the sector has been unusually rapid, it started 15 years ago from unusually low levels. That the share of services has now converged to international norms raises questions about whether it will

[1] See e.g. Acharya (2003) and Panagariya (2008).

continue growing so rapidly. In particular, whether service-sector output and employment continue to grow in excess of international norms will depend on the continued expansion of modern services (business services, communication and banking) but, in addition, on the application of modern information technology to more traditional services (retail and wholesale trade, transport and storage, public administration and defense). The second aspect obviously has more positive implications for output than employment.

At the same time, we show that the "modern services" that are growing most rapidly are now large enough where their future performance could have a significant macroeconomic impact, contrary to the sceptical view. The expansion of modern service-sector employment is not simply disguised manufacturing activity, again at odds with prevailing scepticism about the existence of significant macroeconomic effects. Finally, we find that the mix of skilled and unskilled labor in manufacturing and services is increasingly similar. Thus it is no longer obvious that manufacturing is the main destination for the vast majority of Indian labor moving into the modern sector and that modern services are a viable destination only for the highly-skilled few. To the extent that modern manufacturing and modern services are both constrained by the availability of skilled labor, this just underscores the importance for India of continuing to invest in labor skills.[2]

We conclude that sustaining economic growth and raising living standards will require shifting labor out of agriculture into both manufacturing and services and not just into one or the other. The argument that India needs to build up labor-intensive manufacturing and the argument that it should exploit its comparative advantage in services are often posed in opposition to one another. We argue that these two routes to economic growth and higher incomes are in fact complements, not incompatible alternatives.

[2] Though manufacturing perhaps relies more on infrastructure and is affected more by labor laws than services.

2. India's Service-Sector Growth in International Perspective

Figure 1 displays the shares of agriculture, industry and services in GDP. It shows how the share of agriculture (the dashed line) has fallen from 55 per cent in 1950-51 to less than 17 per cent in 2008-09.[3] The steadiness of the decline is its most eye-catching feature. The rise of industry, by comparison, has been episodic. The manufacturing share rose rapidly in the first 15 post-independence years, reflecting Nehru's emphasis on heavy industry, but more modestly from the mid-1960s through the early 1990s. Following an increase at the outset of the 1990s, reflecting a first wave of liberalization, the share of industry then stagnated. Meanwhile, the share of services increased from 30 per cent of GDP in 1950 to 57 per cent in 2008-09, rising at an accelerating pace as the period progressed. The average growth rates of agriculture, services, industry over these periods show clearly how the growth of services has accelerated while that of agriculture has declined.[4]

To put this performance in perspective, we show the shares of services and industry in GDP in different countries. We estimate the relationship of the share of services in GDP and per capita income as a quartic polynomial in log per capita income for a sample of some 80 countries for 1950-2006.[5]

The average relationship, shown in Figure 2 for the periods 1950-69, 1970-89, and 1990-2006 along with the corresponding two-standard-deviation bands, suggests the existence of two

[3] CSO, the main source of data for GDP and sectoral growth rates, defines agriculture as including forestry and fishing; and industry as encompassing manufacturing, electricity, gas and water, mining and quarrying and construction. Year 2008-09 refers to April 2008-March 2009 or fiscal year 2008.

[4] Contrary to the perception of poor industrial sector performance, the growth of industry has in fact averaged 6-7 per cent since 1990, and even higher since the turn of the century. Manufacturing (industry net of mining and quarrying, electricity, gas, water and construction) has grown by a robust nearly 8 per cent a year during 2000-2008.

[5] Regressions include country fixed effects, and allow for different intercepts in 1970-1989 and in 1990-2006; and a different slope in 1990-2006 (for details see Eichengreen and Gupta (2009)). The data are from the *World Development Indicators*, which defines, consistent with the CSO, agriculture as agriculture, forestry and fishing; and industry as manufacturing, electricity, gas and water, mining and quarrying and construction.

waves of service-sector growth. In the first wave, the share of services in output rises at a decelerating pace, leveling out at a per capita income of $1,800 in year 2000 US purchasing-power-parity dollars. The services share then begins climbing again at a per capita income of $4,000 before leveling off a second time. The evidence also suggests that the second wave starts at lower incomes after 1990 than before.[6]

Next we superimpose the observations for India (in dots). The striking finding is that the the Indian service sector was stunted all through the 1950-1990 period, with the gap widening after 1960. The gap in the first part of this period can perhaps be explained by Nehru's heavy-industry drive, but one would have to attribute an unusually long-lived legacy of those policies for them to explain the fact that the service sector remained undersized in the 1970s and 1980s. Whatever the explanation for earlier performance, after 1990 there was then rapid convergence to the international norm. By 2005, the share of India's service sector increased to a level slightly above that predicted by the international cross section.[7]

The question is whether this behaviour is properly characterized as convergence toward the international norm or as a distinctive pattern of structural transformation. If it is simply structural convergence – India correcting the earlier anomaly of a stunted service sector – then

[6] The evidence also shows that this two-wave pattern and specifically the greater importance of the second wave in medium-to-high-income countries is most evident in democracies, in countries that are close to major financial centers, and in economies that are relatively open to trade (and especially to trade in services). See Eichengreen and Gupta (2009).

[7] An analogous relationship has been established for industry in Eichengreen and Gupta 2009. (There the estimated size of share of industry in GDP is based on a cubic polynomial relationship between the industry share and log per capita income. As before, regressions include country fixed effects and allow for different intercepts in 1970-1989 and in 1990-2006; and a different slope in 1990-2006. The behavior of agriculture's share in GDP in India is unexceptional. It is right on top of the predicted downward sloping relationship with respect to income. To save space we do not show the figure for the share of agriculture here.) They show that the share of industry rises rapidly at low incomes, peaking at around 40 per cent of GDP and an income level of $8,000 (in year 2000 US purchasing power parity dollars). In addition, they find that the share of the industrial sector has tended to peak at lower levels of per capita income over time. The observations for India suggest that until the mid-1990s, the industrial sector was larger than the international norm. Since then, industry has grown at the same as overall GDP. The relatively low share of manufacturing in India has been blamed for failing to provide an alternative to agriculture and from Figure 2 it seems that services have helped to pick up the slack.

one should be sceptical about whether the continued rapid growth of this sector will persist. If on the other hand this is a distinctive pattern of structural transformation – consistent with the observation that the share of output in GDP in India is now significantly above the international norm – then there are grounds for thinking that recent performance may continue.

3. Where is Service-Sector Growth Concentrated?

A starting point for understanding which interpretation is correct is to look more closely at what activities dominate the sector's recent growth. We distinguish three groups of services.[8] Group I is traditional services – retail and wholesale trade, transport and storage, public administration and defense – which tend to be slow growing in the sense that their share in GDP has fallen in more advanced countries. Group II is a hybrid of traditional and modern services consumed mainly by households – education, health and social work, hotels and restaurants, and other community, social and personal services – whose share in GDP has risen in step with per capita income. Group III is made up of modern services – financial intermediation, computer services, business services, communications, and legal and technical services – whose share in GDP in the OECD countries has risen significantly fater than per capita income.[9]

Productivity growth has been highest in Group III, as expected (Table 1). But productivity increases have also been surprisingly rapid in Group I, some of whose components,

[8] Gordon and Gupta (2004) working on similar Indian data divided the services sector into two groups, the trend growers and the fast growers. The group of trend growers matched roughly with services included in group I here and fast growers included activities in groups II and III here.
[9] For details on the growth and shares of different activities in OECD countries in these three groups, see Eichengreen and Gupta (2009).

such as retailing and wholesaling, have made extensive use of IT.[10] Evidently, the decline in the share of output accounted for by Group I reflects a relatively low income elasticity of demand and not simply increases in their relative cost. It is in Group II where the the low productivity growth sometimes thought to be characteristic of services is most serious.

In India's case, service-sector growth is widespread across activities (Figure 3). But the fastest growing activities are business services, communication and banking, all of which are in Group III. [11] Business services include computer-related services, machinery rental, research, and accounting, legal, and technical services (where the well-known data-entry and call centers are located). Computer services, which accounted for more than four-fifths of business services in 2008-09, is the single fastest-growing member of this group. Financial services include banking and insurance, with banking being the largest and fastest growing. But there are also other rapidly growing service sectors not included in Group III, among them hotels, restaurants, education, health (Group II), and trade and transport (Group I). The transport sector includes road transport, railway transport, air transport and water transport, the most dynamic of which is road transport, which has increased six-fold since early 1990s.[12] The stagnant service sectors have been public administration and defense and miscellaneous other personal services (Table 2).[13]

[10] Suggestively, Group II ranks lowest in terms of the application of information technology. It also has the least tradability, suggesting that limits on international competition and scope for specialization may be further factors in its low productivity growth.

[11] Dehejia and Panagariya (2010) use firm level data rather than sectoral aggregates from the CSO but find patterns broadly in line with ours.

[12] The rapid growth of trade and transport, which are placed in Group I on the basis of the experience of other countries, suggests that this is presumably an effect of post-1991 reforms.

[13] Interestingly, the share of GDP accounted for by personal and other services continues to rise strongly in the OECD countries, in contrast to India where it has been falling (for reasons not entirely clear to us). The services included in this segment are entertainment, recreation, T.V. radio, and personal services. Anecdotal evidence would suggest that with rising per capita incomes and an upcoming middle class, these services have grown quite rapidly. Jain and Ninan (2009) show that the entertainment and media sector has grown at around 19 per cent a year in the last few years. The declining share of these services in GDP could very well be a reflection of poor data.

Note that the share of Group I services appears to have stagnated following an early period of rapid growth. This is consistent with the convergence-to-the-norm interpretation, where the period of rapid growth simply reflected the fact that these services were underprovided in the early independence years. That the share of Group II has continud to rise is again consistent with the experience of other countries and therefore with the convergence interpretation. What is unusual, then, is the marked acceleration in the rise in the share of modern Group III services after 1990. If services continue to support rapid economy-wide growth, it would appear=s, this would have to be on the basis of this group of services.

Some observers have dismissed the growth of modern services on the grounds that these activities constitute only a small share of output and therefore contribute only modestly to the growth of GDP. To investigate this, we multiply the share of each service category in GDP by its growth rate. The results show that the contribution of communications, business services, and financial services has in fact risen to the point where it contributes more to growth of GDP than manufacturing.[14] In particular, communications, business services, financial services, education, health and hotels accounted for roughly half of total growth of the service sector in 2000-08.[15] These activities alone explain most of the post-1990 acceleration in service sector growth.

4. International Comparisons

We now compare the growth of our three categories of services in India and the OECD using EUKLEMS data.[16] We distinguish Korea from the other OECD countries, given its status,

[14] Details of these calculations available from the authors on request.

[15] In the 1990s, modern services contributed nearly as much to aggregate growth as agriculture or manufacturing and much more in recent years. Since 2000, communications alone has contributed more to GDP growth than agriculture.

[16] The EU KLEMS release of 2008 spans the period 1970-2005 for the 15 founding (pre-2004) EU member states and for the US, South Korea, Japan and Australia. Series from 1995 onwards are available for the new EU member

like India, as a late-developing (albeit higher income) economy. Its experience, therefore, provides something of a bridge between India and the rest of the OECD.[17]

While the share of Group I services is still rising in India, it has either stagnated or is in decline in the high-income countries (see Panel A of Figure 5). EUKLEMS does not provide evidence for the period when the OECD countries had per capita incomes comparable to India's today, although the data for Korea suggest that the share of Group I services in India is in line with the international norm. Panel A clearly shows that the share of Group I services started tapering off at a per capita income level of $3,000 in South Korea (in 1974, when the share of Group I reached 28.2 per cent).[18] This is close to India's 2008 per capita income of $2,900, as is the current share of Group I services (roughly 26 per cent both in India in 2008 and South Korea in 1974). Assuming that India continues to track the international norm, the share of Group I services is likely to stabilize relatively soon.[19] Jain and Ninan (2009) suggest that retail trade is the main Group I activity with significant potential to grow.[20] This sector has been sheltered from foreign competition and remains dominated by mom-and-pop stores. Like others, they suggest that consolidation and increased competition from foreign retailers, together with the application of modern information technology, have the potential to significantly increase the sector's efficiency. Of course, to the extent that capital and technology are substituted for labor

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states that joined the EU on 1 May 2004. Industries are classified according to the European NACE revision 1 classification, but the level of detail varies across countries, industries and variables owing to differences in national statistical procedures. For our analysis, we do not include the new member states and further drop Luxembourg and Portugal. Thus, we use the data on Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Netherlands, Spain, Sweden, United Kingdom, and United States.

[17] Korea is well known as being characterized by a relatively low level of service-sector productivity. But this problem is pervasivein middle-income countries. It can thus be argued that Korean experience is more broadly representative of the situation in countries with the middle-income status to which India aspires.

[18] All figures are in year 2000 constant U.S. purchasing-power-parity-adjusted dollars unless otherwise stated.

[19] Assuming real per capita income growth around five per cent.

[20] The other main activity in this group is public administration and defense, which seems to be declining (see above).

in, inter alia, retailing, this has more positive implications for the growth of output than the growth of employment.

The share of Group II services is similarly unexceptional. International comparisons suggest that some activities within this group, such as healthcare and education, have considerable scope for expansion, reflecting increases in demand as per capita incomes rise. While it is widely acknowledged that India needs to invest more in education and that enrolments are likely to rise with per capita income, the sector will have to be liberalized for this to happen.[21] Similarly for health care. One can imagine the education and healthcare sectors, having learned by doing for the domestic market, then becoming net exporters, just as IT has become an export industry. The country's Institutes of Technology could attract foreign students, and India could become a destination for medical tourists. The experience of other countries suggests that a country becomes a net exporter of education, healthcare and similar services only when its per capita income exceeds $5,000.[22] This is a level that will take India ten years to reach, assuming a real per capita income growth rate of five per cent.

The last panel confirms that Group III services have been the fastest growing in India and that their take-off began at much lower incomes than in the OECD countries. This, clearly, is a unique aspect of Indian growth experience.

5. How Much Service-Sector Output Just Outsourced Manufacturing Activity?

We now distinguish growth attributable to the intermediate demand for service inputs from that attributable to final demand. Intermediate demand may simply reflect recategorization as service-sector employment of activities previously conducted in-house by manufacturing

[21] A comprehensive analysis of the deficiencies in the Indian education system is in Panagariya (2008); an agenda for reform is in Kapur and Mehta (2008).
[22] Again in year 2000 US purchasing power parity dollars.

firms that are now outsourced to the service sector. If this practice has been widespread, it would imply a less favorable view of the net employment creating potential of the sector.

Let S refer to value added in services, A to value added in agriculture, I to value added in Industry, X to exports (i.e. the value added component in exports), $i_{a,s}$ to the input-output coefficient of agriculture for services inputs, and $i_{i,s}$ to the input-output coefficient of industry for services inputs (both defined as the use of service input per unit of value added in agriculture and industry respectively) and C to consumption, which is the residual (the difference between value produced and other uses).[23] Then:

$$S = i_{a,s} * A + i_{i,s} * I + X + C \qquad (1)$$

We can also express the above as:

$$\frac{\Delta S}{S} = \frac{\Delta(i_{a,s} * A)}{S} + \frac{\Delta(i_{i,s} * I)}{S} + \frac{\Delta X}{S} + \frac{\Delta C}{S} \qquad (2)$$

$$\frac{\Delta S}{S} = (\Delta i_{a,s} * \frac{A}{S}) + (i_{a,s} \frac{\Delta A}{A} * \frac{A}{S}) + (\Delta i_{i,s} * \frac{I}{S}) + (i_{i,s} \frac{\Delta I}{I} * \frac{I}{S}) + (\frac{\Delta X}{X} * \frac{X}{S}) + (\frac{\Delta C}{C} * \frac{C}{S}) \qquad (3)$$

[23] Input-output coefficients are defined in terms of the use of domestically produced services per unit of value added in agriculture and industry. Thus, we first convert the input-output coefficients for per unit of output available from different input-output matrices into the coefficients for per unit of value added. We assume that the same coefficient applies to services domestically produced and to imported services for industry. We further assume that in agriculture, only domestically produced services are used. Export data are usually available in terms of value of output; we assume that the ratio of value added to value of output for export of services is the same as that for total services.

Equations 2 and 3 tell us that, for given input-output coefficients, the growth of services equals the weighted average of the growth of various sectors, the weights being the relative size of each sector relative to the size of the service sector as a whole. Beyond that, changes in input-output coefficients, whatever their cause, can also affect the demand for services.

Operationalizing this framework requires data on services used in industry and agriculture, on the growth rates of value added in agriculture, industry and exports, on the sizes of the respective sectors, and on the growth of services themselves. We take input-output coefficients from input-output matrices for India for 1993, 1998, and 2003. The size and growth rate of each sector are available from the CSO, while data for exports is available from the Reserve Bank of India. Final consumption is the residual.[24]

Calculating the use of services per unit of value added in agriculture and industry using the three input-output matrices, as in Table 3, does not suggest that the intensity with which services are used in industry has changed much over time. The implication is that growth in the intermediate demand for services from industry is due mainly to increasing output rather than increasing outsourcing of in-house manufacturing-sector activities to the service sector.

Combining the coefficients in Table 3 with value added growth in industry suggests that intermediate demand from industry accounts for about a third of value added in services. Since the coefficients have not changed and since industry has grown more slowly than services, the share of value added in services accounted for by intermediate demand from industry has

[24] We find that input-output coefficients of industry for services inputs are similar during these years (the values are 0.68, 0.64, and 0.74 respectively in the years 1993-94, 1998-99, and 2003-04). We assume the value to be 0.70 during the sample period. The input-output coefficient for value added in agriculture changes little during these years and is assumed to be the same through the period at 0.07.

evidently declined (from 40 per cent in 1991 to the 31 per cent in 2007).[25] Similar calculations show that the share of services value added used in agriculture is just two per cent in 2007, down from five per cent in 1991.

In contrast, the share of services that is exported has risen from about three per cent in 1991 to ten per cent in 2007 (Figure 6). This is a clear indication that exports and net domestic demand, and not just relabelled manufacturing activity, are behind the growth of service sector.[26]

Note that the analogous input-output coefficients have been stable in the U.S., while in other advanced countries, they rose until roughly 2000 and stabilised subsequently. However, rising coefficients did not necessarily translate into a higher share of value added for the service used as an intermediate input. Value added in industry and agriculture is not growing fast enough to drive the overall growth rates for services. As Figure 7 shows, U.S. industry uses only about 15 percent of services value added, and that share has declined over the years. Exports also constitute a relatively modest five per cent of U.S. value added in services (their share has been rising slowly). In the U.S., then, three-quarters of services are for final consumption.[27]

Exports have contributed significantly to the growth of services, modern Group III services in particular. India's share in global exports of services rose from 0.8 per cent in 1998 to 1.3 per cent in 2003 and 2.6 per cent in 2008 (see Figure 8). It is mainly modern services (referred to as "miscellaneous services" in data published by the Reserve Bank of India) that have been driving this export performance (Figure 9). Further decomposing miscellaneous

[25] In Appendix D, we show the correlation between the growth rates in services and manufacturing. If indeed the intensity of use of services as an intermediate input were increasing, then we would see the correlation between services and manufacturing growth to be increasing over time. On the contrary, we find the correlation between growth in manufacturing and services to be declining overtime.

[26] As a robustness test, we use the average input-output coefficient for industry from the EUKLEMS countries to calculate the share of services used in industry in India. The overall pattern is found to be similar to the one reported here.

[27] The numbers are similar for the other OECD countries where, on average, services sector supplies about 18-20 per cent of its value added to industry and 1-2 percent to agriculture.

services into software, communications, business and financial services reveals that exports are dominated by software services.

Figure 10 shows that growth of private final demand accounts for about half of the growth of service-sector output. The other half is split between exports and outsourcing by industry, with exports of services accounting for a growing share in recent decades.[28]

The thrust of these calculations is thus inconsistent with the claim that the growth of the service sector is simply disguised manufacturing activity. Only a relatively small fraction of the growth of demand for services reflects outsourcing from manufacturing. Most production that does not go towards exports, in fact, derives from final demand at home. As emphasized in our introduction, the growth of service sector employment does more to add to total employment outside agriculture than outsourcing arguments would lead one to expect.

6. Proximate Determinants of Service Sector Growth

We now attempt to shed more light on the relative importance of convergence to the international norm, on the one hand, and factors distinctive to India, such as its policies of product-market regulation, the tradability of its service-sector mix, and the heavily unskilled nature of its labor force, on the other, in the growth of its service sector. Using annual data for 1980-2007, we estimate an equation of the form:

$$\text{growth}_{it} = \alpha(\text{Size}_{\text{EUKLEMS, initial}} - \text{size}_{\text{ind,t-1}}) + \beta\,\text{PCY}_t + \eta\ \textit{tradable services}_i + \lambda\ \textit{skilled labor}_i + \rho\ \textit{liberalization}_i + \tau\ \textit{correlation with ind}_i + \varepsilon_{it} \quad (4)$$

[28] We divide the post-reform liberalization period somewhat arbitrarily into three subperiods: 1991-1997, 1998-2002, 2003-2008. The first period is the years after the reforms started when the GDP growth averaged 5.5 percent and it was broad-based growth. Industrial growth slowed down during the next sub-period 1998-2002 (from 6.3 per cent in 1991-1997 to 4.5 per cent in 1998-2002) but exports of services were just picking up. Thus, based on the pickup in exports growth, the services sector continued to grow robustly even when industry did not grow at the same fast pace in this second period. The last sub period, 2003-2008 is the one in which the services sector growth accelerated handsomely. The growth was aided by revival in the industrial sector (which grew at an average annual growth rate of 8.2 per cent), as well as growth in exports.

The dependent variable is the growth in value added of service i in year t. The first explanatory variable is the difference between the share of service i in other countries and India.[29] This captures catch-up, orthe extent to which an activity is likely to grow if its initial share is unusually small. Other explanatory variables are per capita income, the tradability of the service in question, whether the sector has been liberalized, its skilled-labor intensity, and whether the activity in question is correlated with industrial growth (this is our proxy for outsourcability).[30] Since the liberalization index and size gap are highly correlated, we also include them one at a time in the regressions.

In Table 4, we pool annual data for real growth rate of different services over the period 1980-2007. The service activities included are trade, hotels and restaurant, transport and storage, communication, banking and insurance, business services, public administration and defense, and education and health. CSO data are used for services output; sources for the rest of the data are in Appendix C.

The results confirm that the growth of value added in services increases with per capita income.[31] Consistent with the catch-up hypothesis, the growth rate is higher for services that have an unusually small share to start with relative to their share in the advanced countries. For every one percentage point of GDP that an activity's share is lagging, its growth is about 0.40 per cent higher.

[29] The gap is calculated as the difference between the share of respective services in GDP in the EUKLEMS sample (in 1980 for the period upto 1989 and in 1990 for the period since 1990) and one-year lagged share in India.
[30] The correlation variable is based on the correlation coefficients between services growth and growth in manufacturing, calculated over different time periods. The correlation coefficients are consistently and significantly different from zero for three services: trade, hotels and restaurants and transport. Tradability is indicated by a dummy variable, which takes a value of one if the service is considered to be tradable and zero otherwise. This indicator is based on Jensen and Kletzer. Details are in Appendix C.
[31] The results presented in Table 4 are robust to including a trend variable or year fixed effects (and not including per capita income), including the data only from the 1990s, and including a dummy for services that use skilled labor intensively in the regressions.

Tradable services have grown four percentage points a year faster than nontradable services, other things equal. This is important for explaining past performance: while the share of services exports in value added was not exceptionally high for India up until the mid-2000s, since then there has been a sharp increase in the exports of services making India an outlier in the share of exports in servcies value added. Similar patterns are seen in the share of services exports in GDP.

Services that have been liberalized have also grown significantly faster. This change has been quantitatively important as well: where essentially all services were heavily regulated in 1970, the majority have since been partially or wholly deregulated. The services segments which were both liberalized and tradable grew 7-8 percentage points higher than the control group (non tradable/ non liberalized services). All this implies that there are likely to be substantial future gains in economic growth from encouraging exports of IT, communication, financial and business services while also liberalizing activities like education, health care and retail trade, where regulation has inhibited the ability of producers to meet domestic demand.

7. Employment in Services

One reason observers are sceptical about the developmental impact of the growth of the service sector is the presumption that modern services do not use significant amounts of unskilled and semi-skilled labor, the factor of production that India has in abundance. They downplay information-technology and communications-related service sector employment on the grounds that these activities are small and use little unskilled labor, the implication being that a labor-abundant economy cannot rely on them to move people out of low-productivity agriculture.

This hypothesis is untested, perhaps because little data is available for employment in services by skill. In Table 4, we report employment elasticities from Rangarajan et al (2008), who calculate these from the NSSO data.[32] As is evident from the table, service sector growth has in fact been quite labor intensive.

Although these data do not allow us to say whether this is an increase in skilled or unskilled employment, evidence from other countries sheds indirect light on this question.[33] We look at the GDP share of different services for the 17 OECD countries.[34] We again distinguish Korea, given its status as a middle-income OECD country, it is in some sense intermediate between India and the high-income OECD countries. While the share of Group I (traditional services) in GDP has declined over time, its share in employment has not. Group II (hybrid) services have accounted for a growing share of GDP and an even more rapidly growing share of economy wide employment. Group III (modern) services have accounted for increased shares of both GDP and employment over time.

Looking separately at shares in hours worked by low skilled and high skilled labour, we find that the movements mirror movements in relative labor productivity. Notably, for modern high-tech services, labor productivity exceeds labor productivity economy-wide. This group of activities is similarly distinctive in that there is no sign of changes over time in the gap relative to economy-wide labor productivity.

Next we calculate the elasticity of employment with respect to value added for 17 OECD countries in the period 1970-1995. Though in principle we can calculate these for 1970-2005, then earlier period is likely to be more relevant to India. One might argue, not unreasonably, that

[32] NSSO data refer to the household survey data published by the National Sample Survey Organization. The numbers we report are drawn from Rangarajn et al (2008).
[33] As does some anecdotal evidence described in the conclusion.
[34] Again using the EUKLEMS data base.

India does not use the same technology as the advanced countries analyzed here. Given the relative endowments of labour and capital, India presumably uses more labor and more unskilled labour. Thus when we calculate these elasticities using data only through 1995, the assumption is that technology lags in India by a decade and half.

Specifically, we estimate:

$$\text{Log Employment}_{ijt} = \alpha_{ij} + \delta_t + \beta \text{Log Value Added}_{ijt} + \varepsilon_{ijt} \qquad (5)$$

where α_{ij} refers to country-sector fixed effects and t to year fixed effects. As dependent variables, we consider number of employees, number of hours worked and number of hours worked by skill level – low-skilled workers, medium skilled workers or high-skilled workers (all in log terms). We calculate these elasticities with respect to value added in agriculture, manufacturing and different services.

In Table 6 we report these elasticities for number of hours worked and number of hours worked by the low and high skilled workers. The results show that employment elasticities are highest in Group II and Group III services, and that they are higher for high-skilled than low-skilled workers.[35]

Overall, the skill content of the labor employed in manufacturing and services is showing tendencies toward convergence. Manufacturing, like most service activities, has negative employment elasticity for unskilled labor hours, a positive but modest elasticity for medium skilled labor, and a large elasticity for skilled labor in Table 6. Thus, the skill content of both the manufacturing and services sectors is increasing over time. It is not as if manufacturing employs only unskilled labor while modern services employ only highly-skilled labor. In fact, the skill

[35] We also estimate the regressions for employment elasticity with interaction terms for Korea. Elasticities are somewhat higher for Korea, in particular the elasticities for unskilled labor. This is consistent with the notion that there is an economically significant demand for unskilled labor associated with the growth of the service sector in less advanced economies.

mix of labor employed in the two sectors is becoming increasingly similar. The bad news is that skill shortages are likely to become an increasingly important constraint on the expansion of the Indian economy. The good news, as emphasized in the introduction, is that it is no longer obviously the case that manufacturing is the main destination for the vast majority of Indian labor moving into the modern sector and that modern services are a viable destination only for the highly-skilled few.

8. Conclusion

India is distinctive for the rapid growth of its service sector – high-tech information technology, communications and business services in particular. Whether the service sector provides a route out of poverty for the masses is disputed, however. Some say that the skill and education requirements of modern service sector jobs make them an impractical destination for the rural masses. Others counter that as more skilled and educated workers "graduate" from manufacturing and traditional services into modern services, they open up economic space for less educated workers capable of upgrading their skills. They argue that the skilled-unskilled mix of the manufacturing and service sectors, each taken as a whole, is not as different as commonly supposed.

The critics object that much non-traditional service sector employment is little more than the relabelling of activities previously undertaken in-house by manufacturing firms. Others counter that much of the growth of service sector employment in fact represents new job creation. For our part, we find little evidence that the growth of the service sector is simply disguised manufacturing activity. We also find that the skilled-unskilled mix of labor in the two sectors, taken as a whole, is becoming increasingly similar. The implication is that it is no longer

obvious that manufacturing is the exclusive destination for the vast majority of Indian labor moving into the modern sector, or that modern services are a viable destination only for the highly-skilled few.

While our analysis has been statistical, there is anecdotal evidence consistent with these conclusions. Polgreen (2009) describes how modern service sector jobs are now migrating from India's urban centers to its small towns and rural villages, creating employment for semi-skilled workers. These workers may not have the mathematical training to work as computer programmers or the English fluency needed for employment in call centers, but with some high school education they are sufficiently numerate and have adequate facility in English to "do basic data entry, read forms, and even write simple e-mail messages." The wages of these rural service sector workers are three to four times those in agriculture but only half those of workers in Bangalore, where the competition for labor is more intense and living costs are higher. American trucking companies seeking to process timesheets in India may not have the local knowledge to find rural workers to undertake the task, but companies like Rural Shores have been established to run service sector facilities in rural areas. By one estimate, 20 data entry and call centers have been set up in small towns and villages in recent years. Rural Shores alone has plans to operate 500 such centers by 2017.[36] In addition, there is growing anecdotal evidence of parents spending substantial sums on opportunities for children with only high-school education on the acquisition of England-language, computer-utilization and other basic skills that might enable them to take better advantage of openings in the service sector. These observations are consistent with the view that employment in modern service sector activity can be a route out of poverty not just for the few and not just for urban residents. They are consistent with the

[36] For the estimate in question, see Magnier (2010).

conclusion that employment in modern services can be a useful supplement to employment in manufacturing as a route out of rural poverty.

We conclude that sustaining economic growth and raising living standards in India will entail shifting labor out of agriculture into modern services as well as manufacturing and not just into the latter. To the extent that the expansion of both sectors continues to be constrained by the availability of skilled labor, this simply underscores the importance for India of continuing to invest in labor skills.

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Appendix A: Issues Related to Measurement and Quality of the NAS Data

Bosworth, Collins and Virmani (2007) provide a comprehensive account of the sources of growth in the Indian economy and its broad sectors since 1960 and lay out the limitations of the sectoral GDP data and employment data in India. They express reservations about the quality of the data in activities that are conducted in the informal (unorganized) sector. They point to the possibility that data on price inflation for services are not reliable and emphasize the shortcomings of the annual data for employment in services. They conclude that service-sector growth is probably overestimated because the price deflator underestimates inflation for services. Support for this thesis is found in the growth of productivity in certain services segments, which are traditionally known to be low productivity growth sectors.

Here, we comment on the quality of the data used in our paper and the areas in which the data quality needs to be improved.

Data on Value Added: Service activities are carried out in the organized as well as unorganized sectors. While the data on services produced in the organized sector is relatively reliable, the data for services activities in the unorganized sector is not measured directly and is imputed using the labor-input method. This involves estimating the labor input at the industry level (as the difference between the measures of total labor input and labor input in the organized sector, obtained from quinquennial household surveys and employer reports respectively) with measures of value added per worker (obtained from enterprise surveys). Bosworth et al. rightly point out that these estimates can be reasonably prepared for the benchmark years in which the quinquennial surveys are carried out. But since annual estimates for the years between the survey years are obtained by interpolation, these are likely to be imprecise.

While there is agreement that the measurement of value added in unorganized sector is likely to be imprecise, the direction of the bias is not clear. The bias in the size of the various service sectors or growth rates can be in either direction-upward or downward. Below we provide some details on the methodology used in measuring the value added in different services and an assessment of the data quality.

Methodology used and Quality of Data on Services Value Added

Trade	Since a large part of trade is in unorganized sector, data quality may not be especially good. However, it is difficult to say whether the current practice results in underestimation or overestimation of the size and growth of this sector. Unsurprisingly, the growth in this sector is highly correlated with the growth in manufacturing.
Transport and Storage	Data quality appears to be reasonably good for some of the main components of the transport sector, including railways, air transport, organized road transport, and organized water transport. The main activities for which the measurement can be improved are those in unorganized sector.
Public Administration and Defense	Data are relatively reliable
Hotels and Restaurants	Since a large segment operates in the unorganized sector, data quality is likely to be relatively poor. However, these activities constitute a very small part of the services sector.
Education, health, other services	Since many of these activities are also in the unorganized sector, data quality may again be relatively poor, due to inter alia underreporting.
Communication	Since a large share is either in the public or the organized private sector, data quality is likely to be relatively good.
Banking	Since a large percentage of the banking activity is carried out in the organized sector, data quality should be reasonable.
Business Services	Modern business services such as chartered accountancy, legal services, technical services, advertising, construction design etc. are carried out in the unorganized sector, so these are probably not captured well in the estimation of value added.

Below we compare the growth rates for selected services calculated using the CSO data with those calculated using the data from alternative sources (for the latter we rely on Jain and Ninan 2009). Sectors include retail, entertainment, IT, transport, and education. The table below shows that the growth for the last few years or that projected for the coming few years using alternative data sources is at par or higher than that calculated using CSO data.

Comparison of Growth Rates of Services using the CSO Data and the Data From Other Sources (in per cent)

	CSO	Other Sources
Retail	7.7 percent (for wholesale and retail trade in 2006)	13 percent projected annual growth rate in 2006-2011.[a] 8 percent projected annual growth rate in 2008-2013, Technopak.[b]
Media and entertainment	2.8 percent (average of radio, broadcasting, entertainment, recreation between 2004-2007)	18 percent projected annual growth rate between 2008-2010.[c]
IT Industry	19.4 percent (annual average growth rate of computer services between 2004-2007)	30 percent based on the size of the IT industry between 2004-2007. [d]

Sources:

a. Projected growth of retail business, based on ICRIER's study of the retail sector.

b. Based on the projected size of the Indian retail industry in US $ between 2008 and 2013, Technopak.

c. Jain and Ninan (2009), drawing on ICCI Frames.

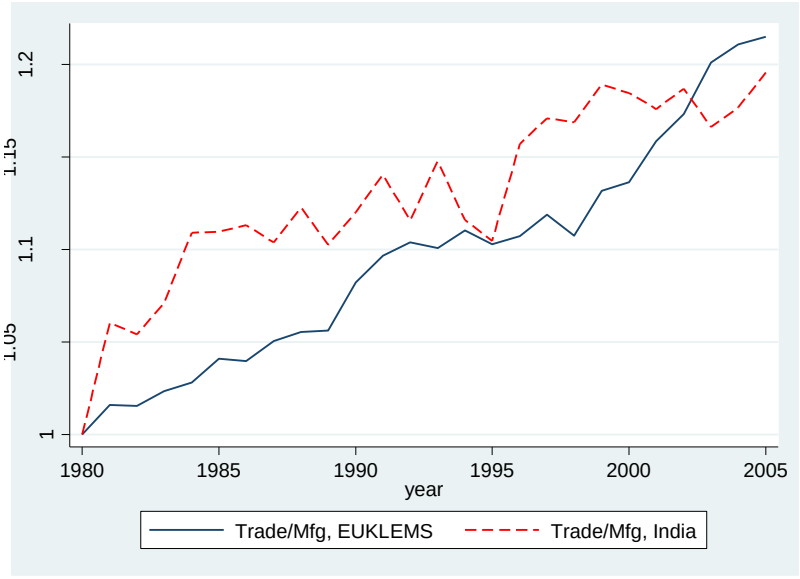
d. Jain and Ninan (2009).

Deflators: To address the concern of Bosworth et al (2007) that the rate of increase of deflators for certain services, especially traditional services, is currently underestimated, we compare the deflators used for services sub-sectors relative to the deflator for manufacturing for India (deflators for India are based on the 1999-00 data series provided by the CSO, calculated using current and constant prices values) with the average of the OECD countries for which the data are available in the EUKLEMS database.

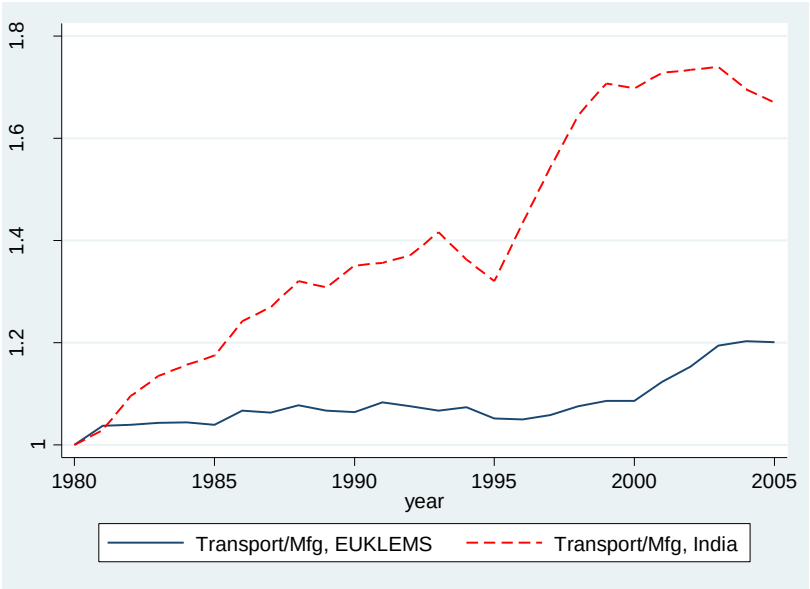
The results of the comparison are shown in Figure A1. The index of relative deflators takes a value 100 in 1980. For all the services (except banking), the deflator has grown either faster or at the same pace in India as in the OECD countries. Based on this comparison, deflators for services in India do not seem to be underestimating price inflation.

Figure A1: Deflators of Services in India and in the selected OECD Countries

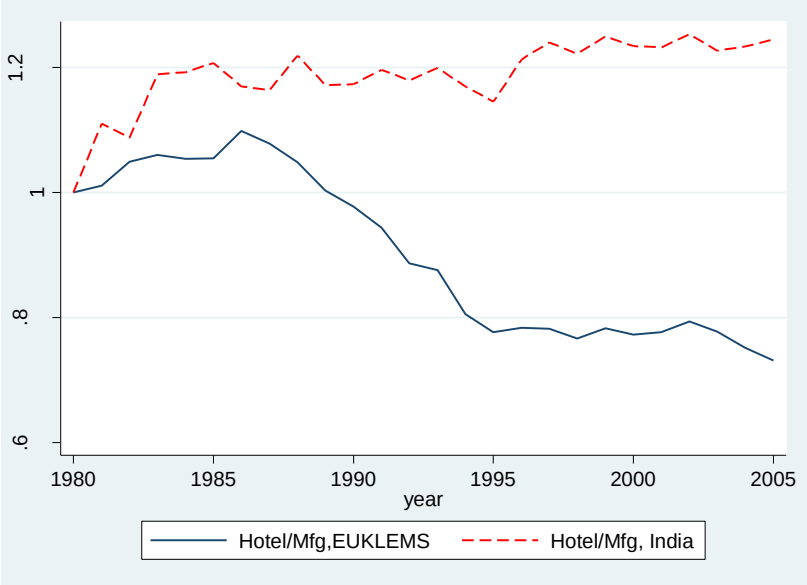
A. Trade



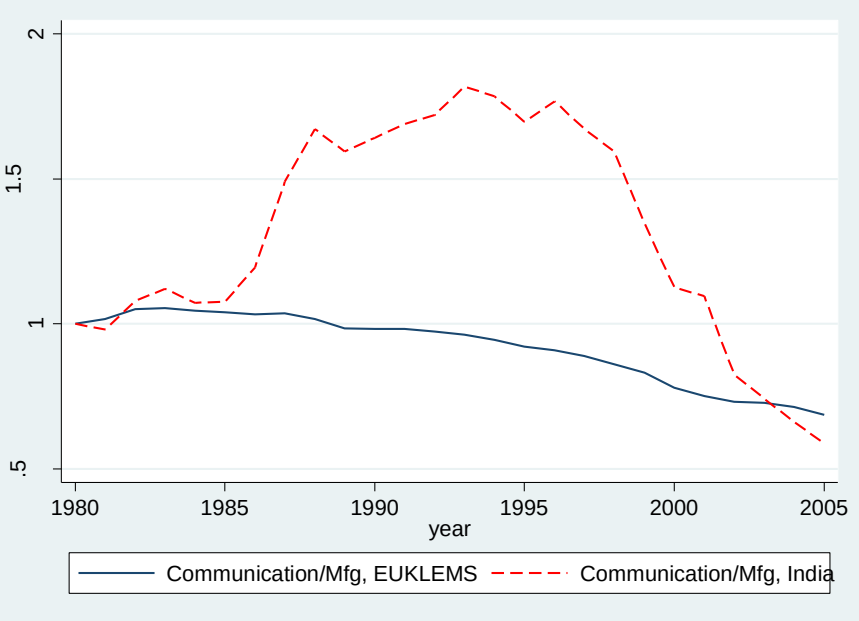
B: Transport



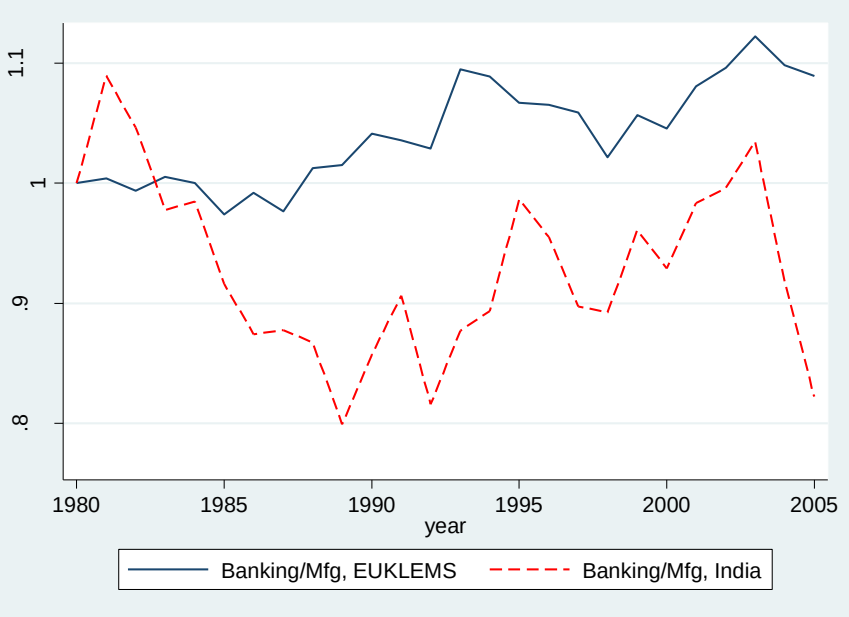
C: Hotels



D. Communication



E: Banking



Note: Data for India is from CSO and for selected OECD countries is from the EUKLEMS. The deflators are relative to manufacturing.

Employment Data: Finally, the data for employment in services is not readily available even for organized activities. Some researchers use the National Sample Surveys (NSS) to get estimates of employment in services. These surveys are available every five years, data from which are interpolated to obtain annual series.

Some data on employment for India are available in the Economic Censuses, which have been conducted by the Ministry of Statistics and Programme Implementation, Government of India in 1977, 1980, 1990, 1998 and 2005. These cover non-agricultural enterprises, and use the enterprise as the unit of enumeration.

Appendix B: Data Sources

Variable	Data source
Per Capita income	Eichengreen and Gupta (2009) for data until 2004. We updated the data for 2005, 2006 using the latest version of the WDI and for India for FY 2006-2008 using the CSO.
Share of services in GDP	Eichengreen and Gupta (2009) for data until 2004. We updated the data for 2005, 2006 using the latest version of the WDI and for India for 2005, 2006 and 2007 using the CSO.
Disaggregated services value added	For India latest data from CSO, for cross country from the EUKLEMS data, downloaded from: www.euklems.net
Input output matrices	CSO
Exports and imports of services	World Development Indicators
Detailed data on exports and imports of services for India	Reserve Bank of India's website: www.rbi.org.in
Employment data for OECD countries	EUKLEMS's website: www.euklems.net
Deflators for India, OECD countries	Calculated using the current and constant price series for value added from CSO, EUKLEMS, respectively.

Appendix C: Construction of Services Characteristics

Sector	Tradable	Correlated with Mfg	Skill Intensity	Skill Intensity Dummy	Liberalization Index
Trade	0	1	9.1	0	0.25
Hotels and Restaurants	0	1	6.1	0	1
Transport, storage	0	1	6.7	0	0.5
Communication	1	0	9.2	0	1
Banking, Insurance	1	0	21.6	1	0.5
Business Services	1	0	26.7	1	1
PAD	0	0	22.4	1	0
Education	0	0	43.9	1	0.5
Health and Social Work	0	0	24.6	1	0.5

Sources and Construction of Characteristics: Tradability is indicated by a dummy variable, which takes a value one if the service is considered to be tradable and zero otherwise, see Eichengreen and Gupta (2009) for details.

The dummy for correlation with manufacturing is based on the correlation coefficients between services growth and growth in manufacturing, calculated over different time periods. The correlation coefficients are consistently and significantly different from zero for trade, hotels and restaurants, and transport. Data from input-output matrices show that the coefficients for the use of trade, transport and banking in manufacturing are the largest, but the hotels and restaurants industry does not have a large coefficient. We therefore also construct this dummy a second way, in which it takes the value 1 for trade, transport and banking services, and zero for other services. Results do not change when we use this alternative measure.

The liberalization index is based on Cain et al. (2009). They divide different sectors of the economy into least liberalized, moderately liberalized and significantly liberalized. We give a numeral score of 0, 0.5 and 1 respectively to these categories. Cain et al. work at a more disaggregated level, so in a few cases, services within the broad categories that we use here belonged to different categories. In such cases, we take a simple average of the numeral scores for the services in the same broad category that we use.

Appendix D: Correlation of Growth Across Sectors

Here we report additional tests of whether the correlation between growth rates in services and manufacturing has increased or not. If the intensity of use of services as an intermediate input is increasing, then we should see the correlation between services and manufacturing growth to be increasing over time.

Correlation of Growth in Services and Growth in Other Sectors in India

	I	II
Period	b/w Services Growth and Manufacturing Growth	b/w Services Growth and Agriculture Growth
1951-1965	.77***	.22
1966-1980	.59**	.49*
1981-1995	.55**	-.25
1996-2008	.30	.16

Note: *, **, *** indicate that the correlations are significant at 1, 5, and 10 per cent levels respectively. Authors' calculations using the data for India from CSO.

The results show that the correlation between growth in manufacturing and services has been falling over time. These correlations confirm the pattern that we see in the input-output matrices and imply that growth momentum in services in recent years has been largely independent of that in manufacturing.

The next table shows the correlation between the growth of specific services and the growth of manufacturing. For traditional services such as trade and hotels, the correlation is relatively high though declining over time. Interestingly, the growth of modern services such as communications, business services and financial services is not correlated with the growth of value added in manufacturing. Again, this implies that these services have a growth momentum of their own which does not simply derive from outsourcing by manufacturing.[37]

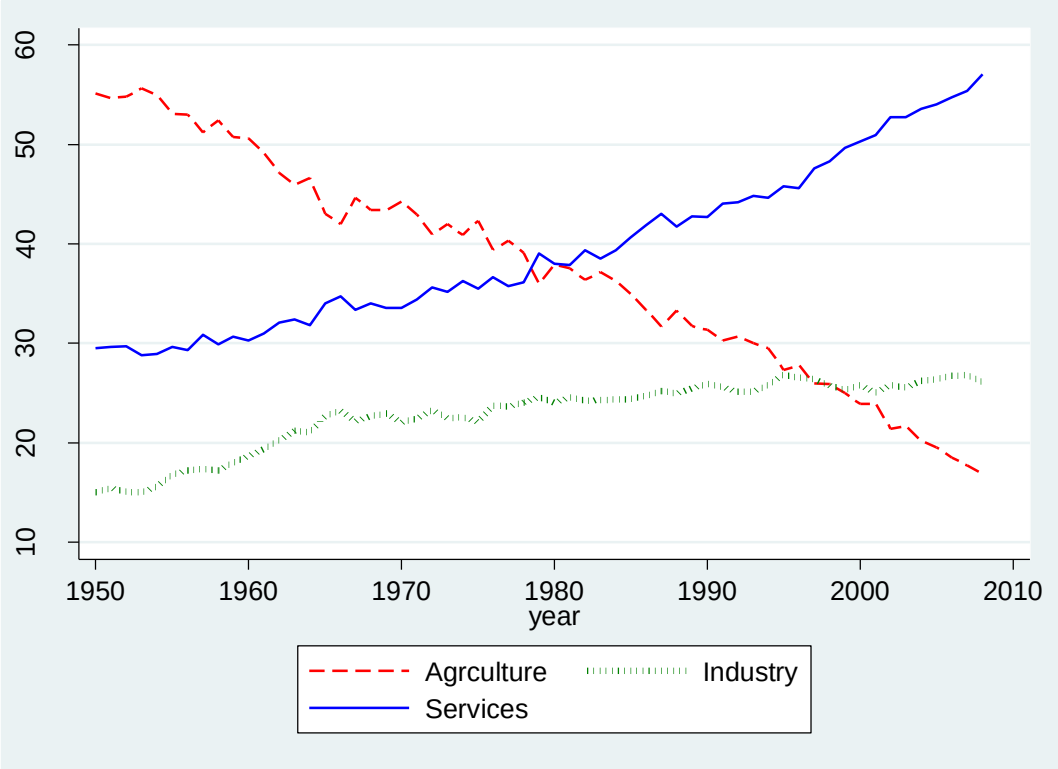
Correlation between Growth in Services sub-sectors and Manufacturing in India

	Trade	Transport	Hotels	Communication	Business Services	Banking
1951-1965	.86***	.33	.67***	.45*	.31	-.14
1966-1980	.52**	.01	.49*	-.15	-.05	.59*
1981-1995	.82***	.39	.37	.41	.53**	-.16
1996-2008	.01	.71***	.43	.27	-.43	.06

Note: *, **, *** indicate that the correlations are significant at 1, 5, and 10 per cent levels respectively. Authors' calculations using the data for India from CSO.

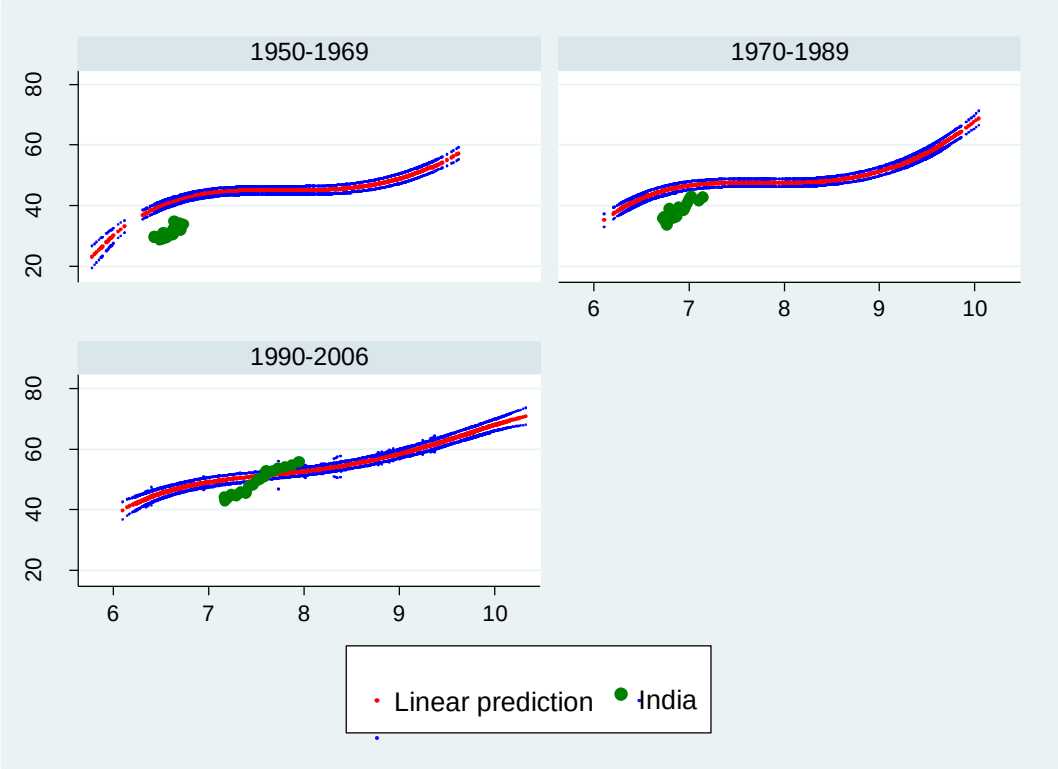
[37] The input-output coefficient is also the largest for trade, followed by transport.

Figure 1: Shares of Agriculture, Industry and Services in India



Note: Data are from Central Statistical Organization (CSO) for FY1951-FY 2009.

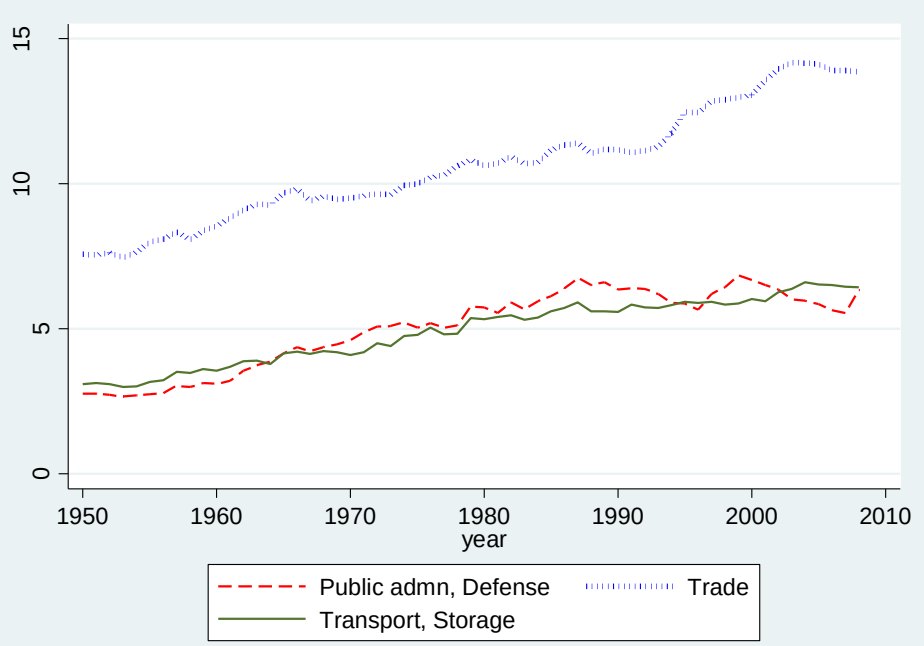
Figure 2: Service Sector Share in GDP and Log Per Capita Income



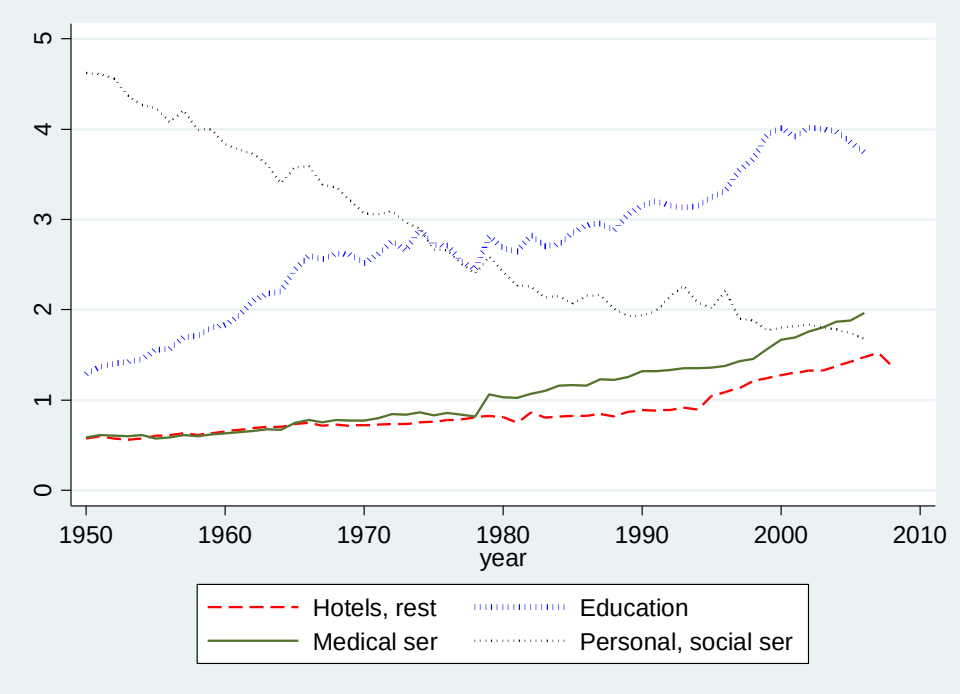
Note: The charts extend the analysis in Eichengreen and Gupta (2009) through 2006. The estimated relationship is based on a regression of share of services in GDP on a quartic polynomial in log per capita income, and country fixed effects. The regressions allow for a different intercept in the three periods indicated and different slope parameters in 1990-2006.

Figure 3: Size of Specific Services in India
(Percent of GDP)

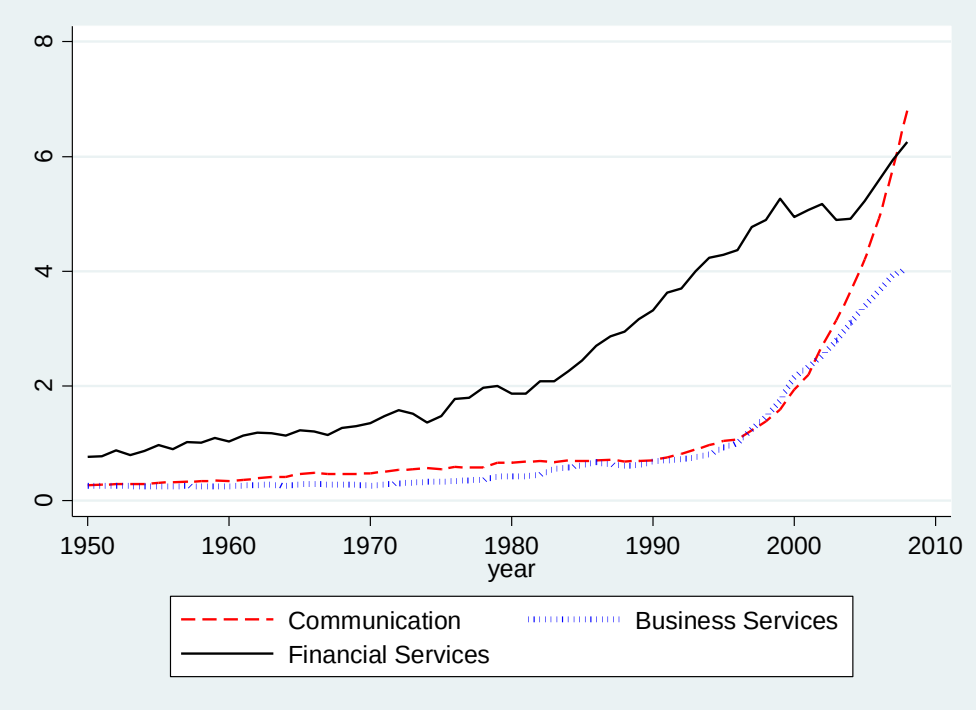
A. Group I



B. Group II



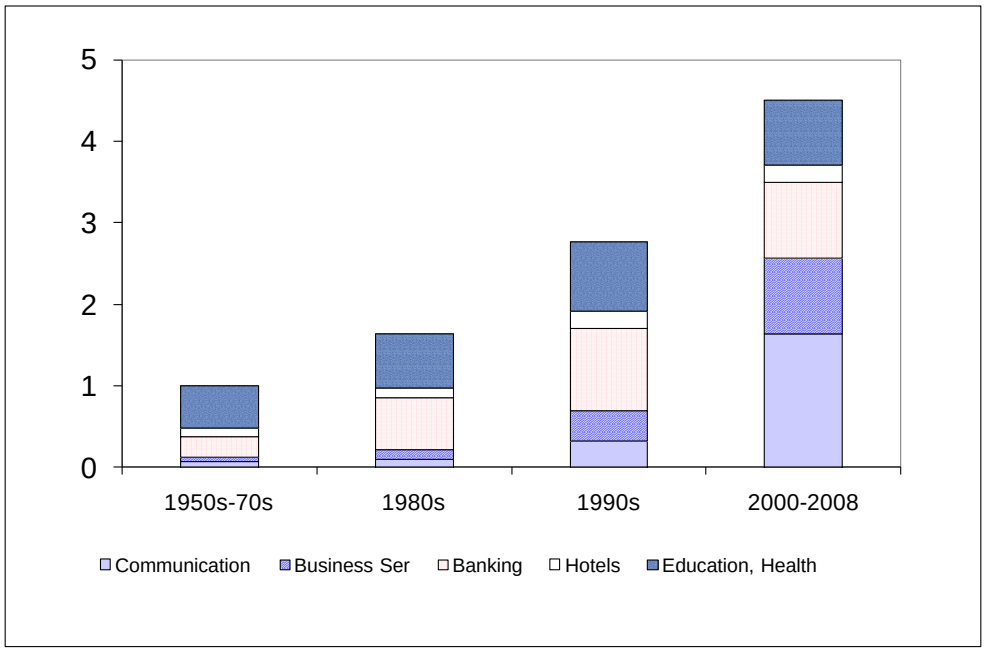
C. Group III



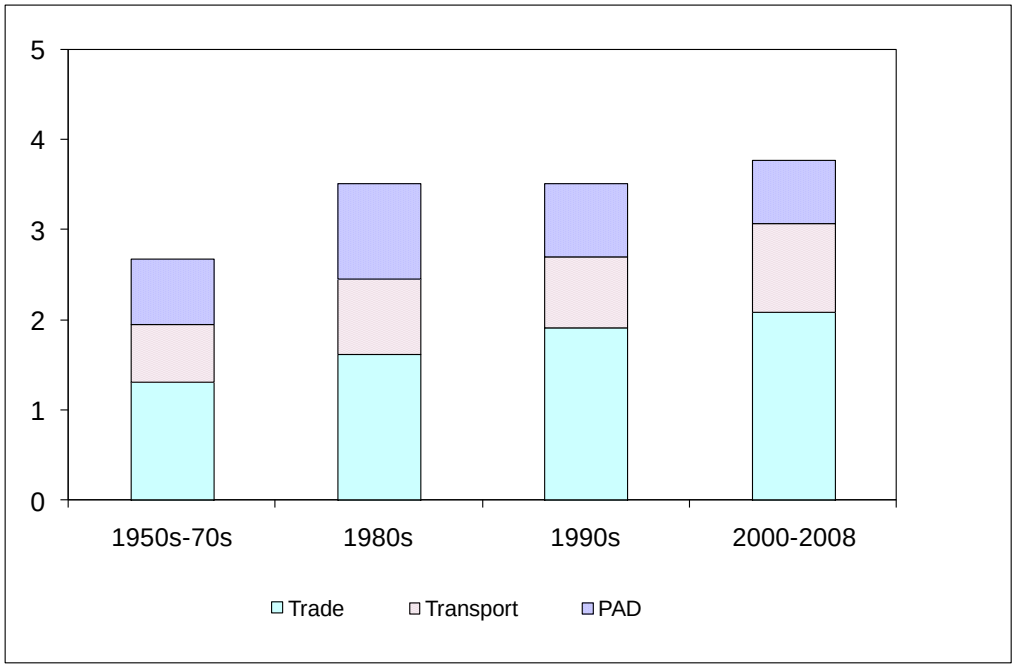
Note: Own calculations using the data from CSO.

Figure 4: Contribution of Various Services to Total Services Growth

Group II and III



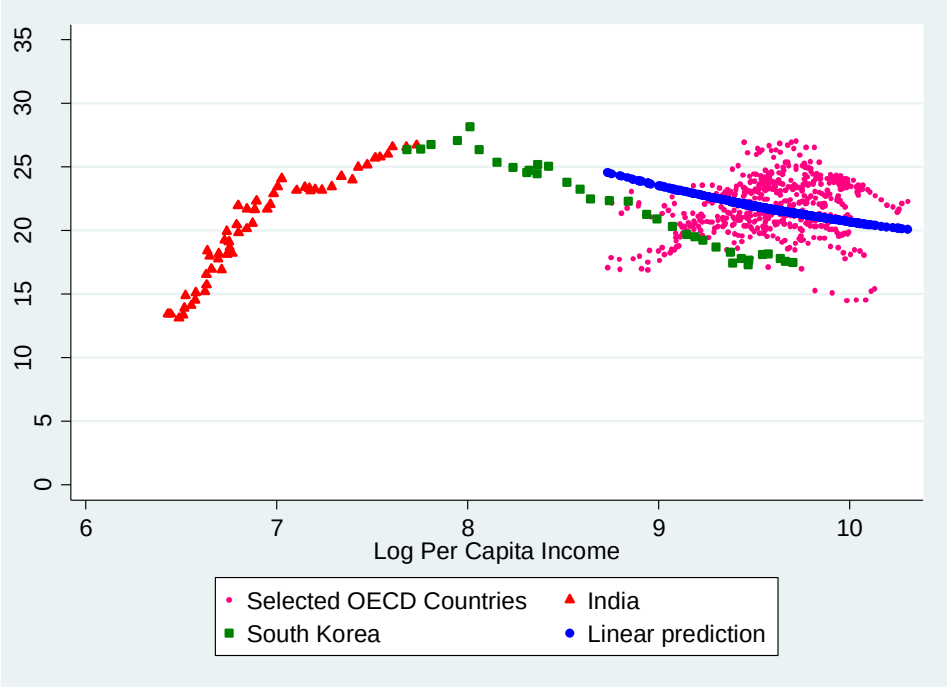
Group I



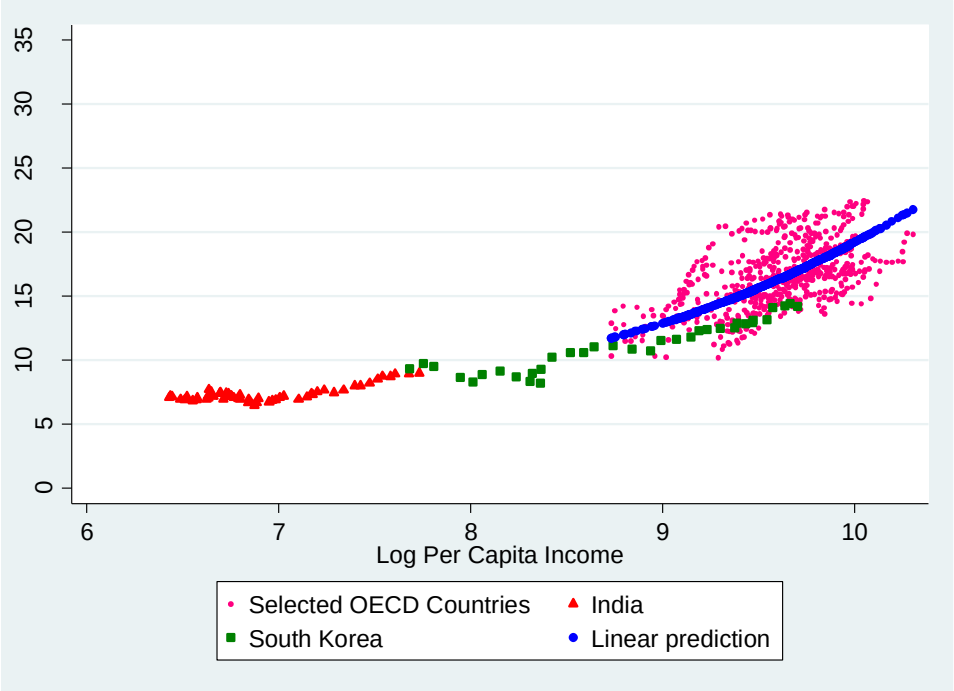
Note: Own calculations using the data from CSO.

Figure 5: Size of Different Service Activities and Per Capita Income: Cross Country Experience and India

A: Group I



B: Group II


0
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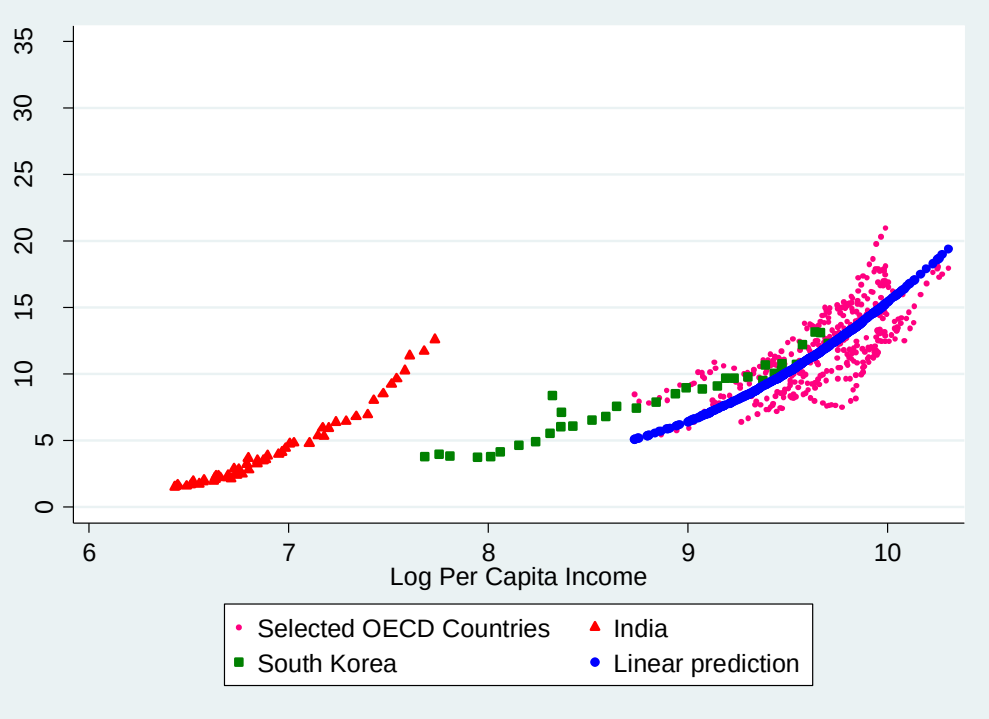
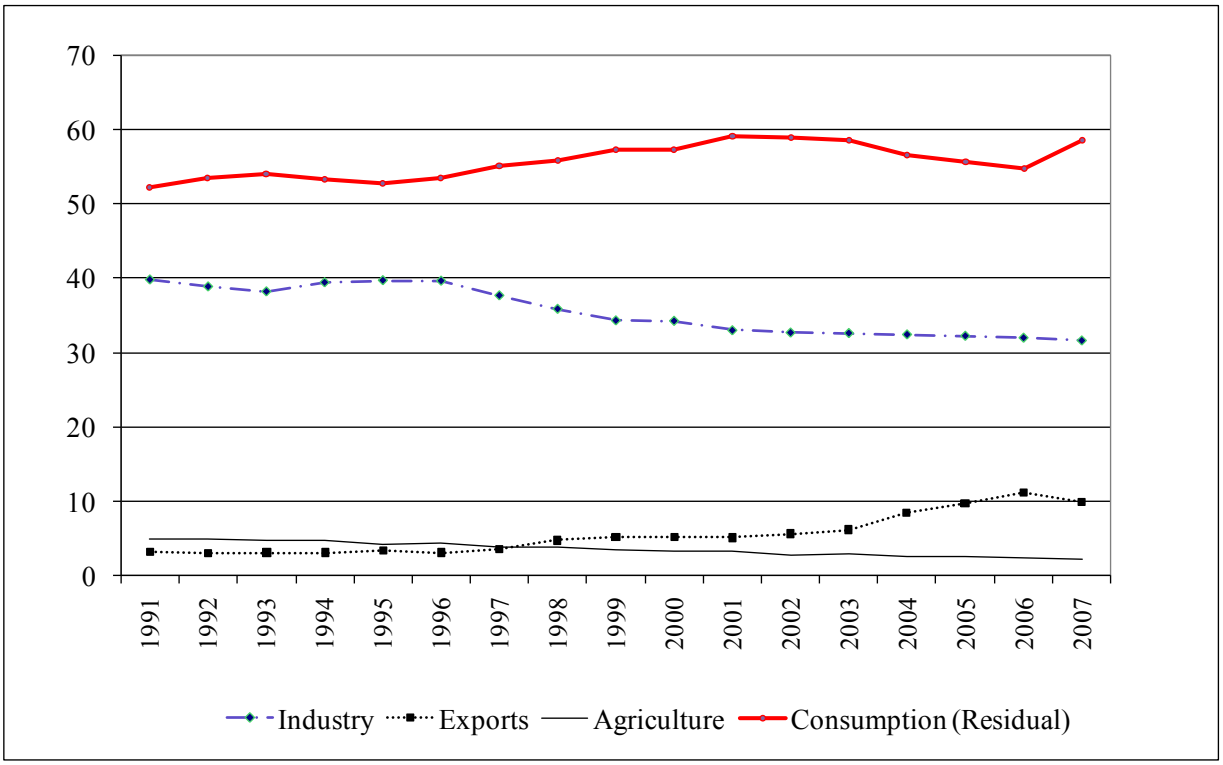
Log Per Capita Income
Selected OECD Countries
India
South Korea
Linear prediction

C: Group III



Note: Cross-country data is from the EUKLEMS database, and the data for India is from the CSO.

Figure 6: Different Uses of Services as per cent of Total Services Value Added in India



Note: own calculations using the data from the CSO.

Figure 7: Different Uses of Services as Per Cent of Total Services Value Added across Countries

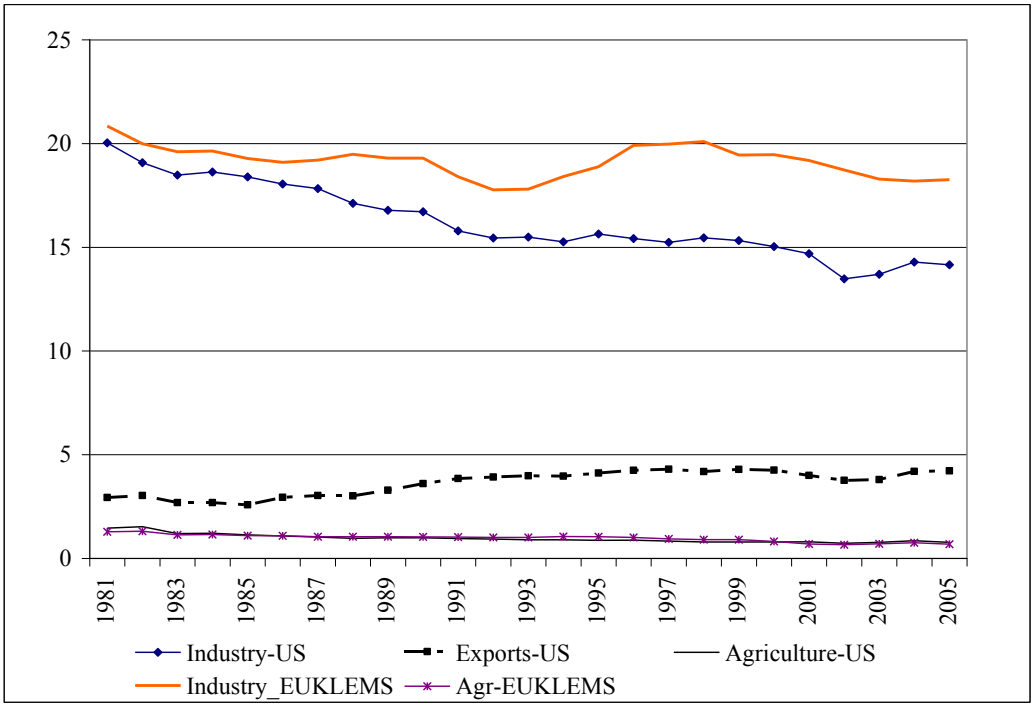
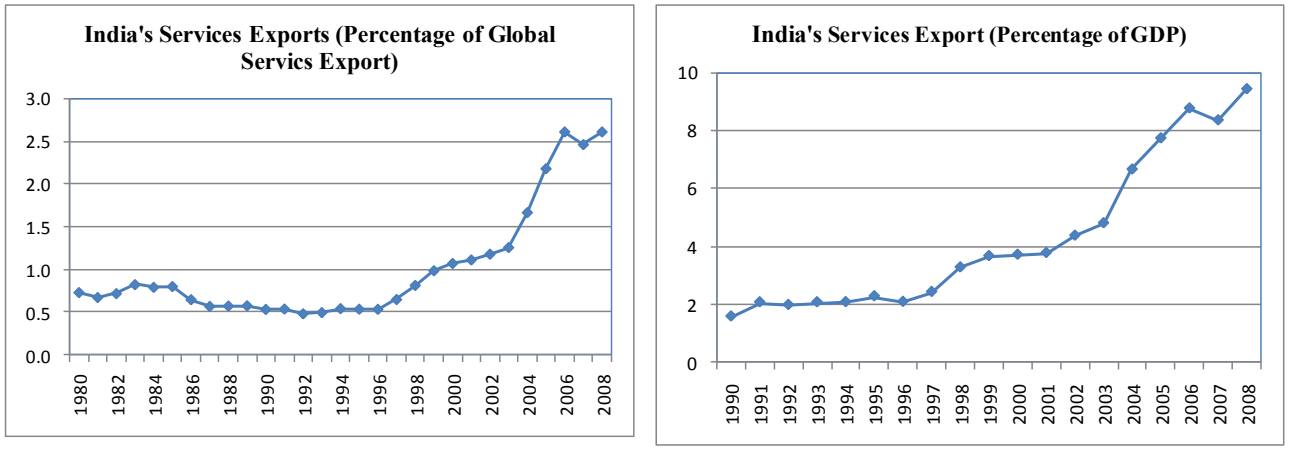
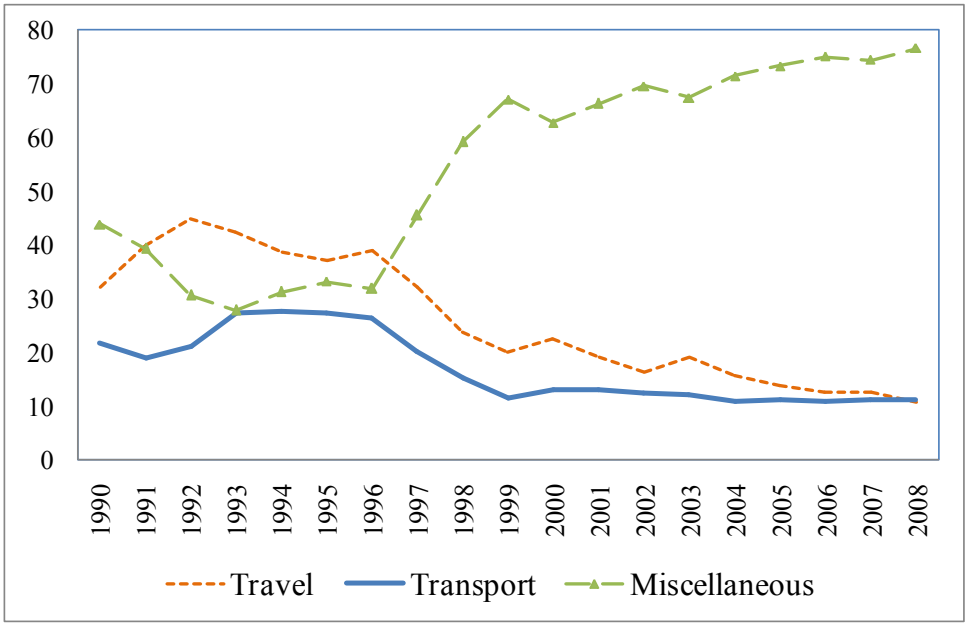


Figure 8: Exports of Services



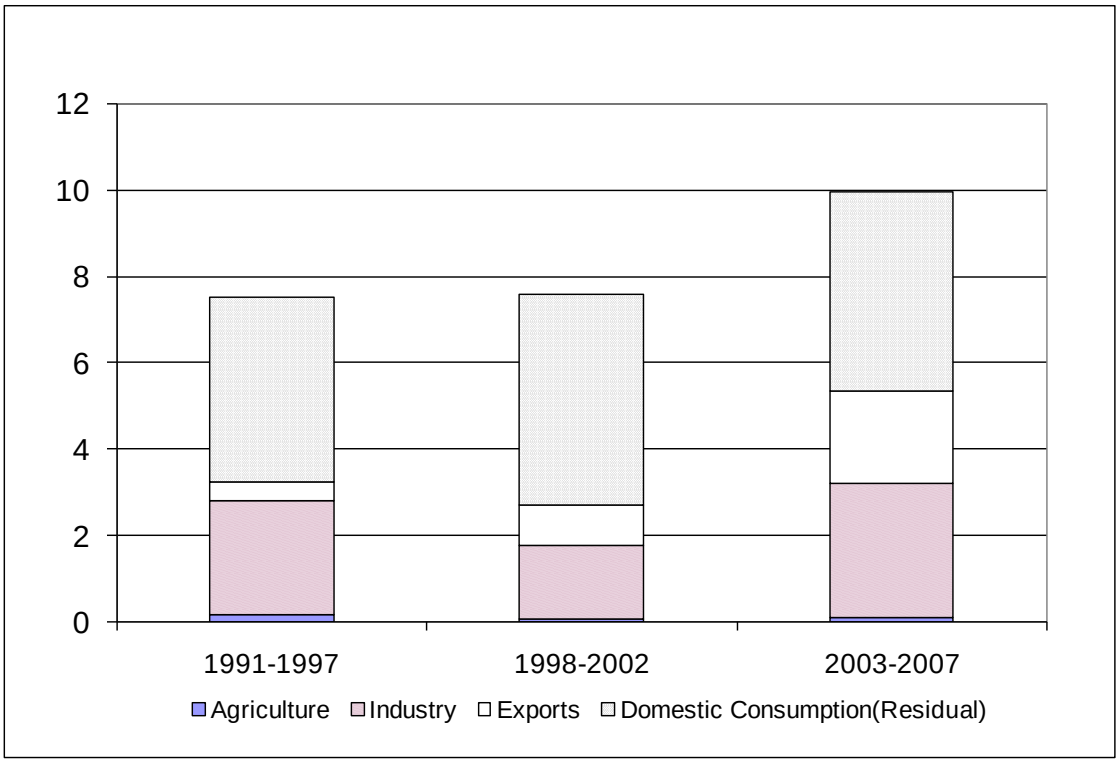
Source: World Development Indicators

Figure 9: Composition of Services Exports from India



Source: RBI, India

Figure 10: Services Growth in India Attributed to Growth in End Use



Note: Calculated using Equation 4 and as described in the text.

Table 1: Characteristics of Different Services
(Averages of OECD countries in the EUKLEMS database)

	Average annual productivity increase in 1980s (in percent)	Average annual productivity increase in1990-2005 (in percent)	ICT (Producing or Using)	Tradability
Group I				
Public Administration, Defense	0.11	0.31	0	NT
Retail Trade	1.71	1.17	1	NT
Transport and Storage	1.85	1.01	0	?
Wholesale Trade	1.54	1.88	1	?
Group II				
Education	0.13	-0.50	0	NT
Health, Social Work	-0.01	-0.53	0	NT
Hotels and Restaurants	-0.14	-1.00	0	NT
Other Community, Social and Personal Services	-0.71	-0.86	0	NT
Group III				
Posts and Communication	3.13	7.17	1	T
Computer Services	n.a.	n.a.	1	T
Financial Intermediation	n.a.	n.a.	1	T
Legal, Technical, Advertising	n.a.	n.a.	1	T
Other Business Activities	n.a.	n.a.	0/1	T

Note: Source is Eichengreen and Gupta (2009). ICT equal to 0 implies that the service neither produces nor uses information and communication technology; and a 1 indicates that the service uses or produces information and communication technology. In the last column, NT refers to non-tradable services and T refers to tradable services. The information on tradable and non- tradable services is derived from Jensen and Kletzer (2005). Jensen and Kletzer calculate the Gini Coefficient for the geographical dispersion of each activity, and use it to identify tradable and non-tradable services. The underlying idea is that services that are tradable can be geographically concentrated in order to reap economies of scale. Productivity refers to total factor productivity and the average annual growth rates have been calculated using data from EUKLEMS.

Table 2: Growth Rates and Sectoral Shares of Different Services in India

Sector **Activities Included**	**Avg. Growth Rate in 1950–79 (Share in 1980)**	**Avg. Growth Rate in 1980–89 (Share in 1990)**	**Avg. Growth Rate in 1990–99 (Share in 2000)**	**Avg. Growth Rate in 2000-08 (Share in 2008)**
Trade (distribution services): Wholesale and retail trade in commodities both produced at home and imported, purchase and selling agents, brokers and auctioneers	4.8 (10.6)	5.7 (11.2)	7.0 (13.1)	7.7 (13.9)
Hotels & Restaurants: Services rendered by hotels and other lodging places, restaurants, cafes and other eating and drinking places	4.8 (0.81)	5.9 (0.89)	9.1 (1.3)	8.1 (1.4)
Railways	4.2 (1.6)	4.1 (1.5)	3.3 (1.2)	7.1 (1.2)
Transport by other means: Road, water, air transport, *services incidental to transport*	6.3 (3.6)	6.7 (4.0)	6.9 (4.6)	8.2 (5.2)
Storage	5.5 (0.14)	2.6 (0.11)	2 (0.1)	4.1 (0.1)
Communication: Postal, money orders, telegrams, telephones, overseas communication services, miscellaneous	6.7 (0.66)	5.8 (0.7)	13.8 (2.0)	23.1 (6.8)
Banking: Banks, banking department of RBI, post office saving bank, nonbank financial institution, cooperative credit societies, employees provident fund	7.2 (1.9)	10.0 (3.3)	10.6 (5.0)	8.9 (6.3)
Insurance Life, postal life, nonlife	7.1 (0.55)	9.6 (0.62)	2.2 (0.61)	15.3 (1.3)
Dwellings, real estate	2.6 (4.5)	7.2 (5.8)	4.8 (5.2)	2.8 (3.6)
Business services: Renting of machinery, computer related services, accounting, research etc.	4.2 (0.42)	9.1 (0.7)	15.9 (2.1)	16.3 (4.0)
Public administration, defense	6.1 (5.7)	6.7 (6.4)	5.9 (6.7)	6.1 (6.3)
Personal and Other services: Domestic, laundry, barber, beauty shops, tailoring, recreation, entertainment, radio, TV, broadcast, sanitary services	1.4 (2.4)	2.5 (1.9)	4.7 (1.8)	6.0 (1.6)
Community services Education, research, scientific, medical, health, religious and other community	4.8 (4.6)	7.5 (5.1)	7.5 (6.3)	7.0 (6.1)

Note: Own calculations using the data from CSO

Table 3: Service Input per unit of Output in Agriculture and Industry in India

	1993	1998	2003
Agriculture	0.07	0.06	0.08
Industry			
Weighted	0.84	0.55	0.72
Unweighted	0.79	0.55	0.73

Note: Authors' own calculations using the data on input-output matrices from CSO. The data that we get from the CSO is for input use per unit of value of output. We transform these in terms of per unit of value added. The data is available for individual industries, which we average across industries. We calculate these averages by taking a simple average across various industries; and as a weighted average (with weights equal to the share of value added of each industry in total industry value added).

Table 4: Explaining the Growth in Services in India

Dependent variable: Growth in Value Added of Different Services

	I	II	III	IV	V	VI
Size gap	0.31	0.35**	0.48**	0.12	0.1	
	[1.48]	[1.98]	[2.46]	[0.54]	[0.27]	
Log Per Capita Income	6.56***	6.62***	6.80***	6.30***	6.27***	6.12***
	[6.17]	[7.78]	[8.03]	[7.51]	[7.20]	[7.42]
Tradable (Dummy)		5.59***	5.62***	4.40***	4.28**	3.95***
		[7.85]	[7.94]	[5.28]	[2.48]	[3.84]
Skilled labour Intensity			-0.05**	-0.01	-0.01	-0.01
			[2.05]	[0.45]	[0.32]	[0.34]
Liberalisation (Index)				3.14**	3.25*	3.69***
				[2.57]	[1.71]	[3.44]
Correlated with Industrial Growth, dummy					-0.16	-0.47
					[0.09]	[0.45]
Observations	252	252	252	252	252	252
R-squared	0.13	0.36	0.37	0.39	0.39	0.39

Note: Robust t statistics are in parentheses. *, **, *** indicate the coefficients are significant at 1, 5, and 10 per cent significance levels respectively. Regression equation estimated is in Equation 4.

Table 5: Employment Elasticity in India using the data from the NSS

	Employment in 2004-05 (million)	Elasticity 1999-00 to 2004-05
Manufacturing	53.5	0.34
Trade, hotel and restaurant	47.1	0.59
Transport, storage and communication	17.4	0.27
Financing, insurance, real estate and business services	6.9	0.94
Community social and personal services	35.7	0.28

Note: Derived from Rangarajan, Kaul and Seema (2008), who construct it using the data from the 61st round of the NSSO survey.

Table 6: Employment Elasticity of Growth in Different Service Activities in Cross Country Data

Dependent Variable	Log Employment	Log Employment (Hours)	Log Employment Low Skilled (Hours)	Log Employment High Skilled (Hours)
Log VA, Agriculture	-0.28***	-0.30***	-0.57***	0.22***
	[12.15]	[12.72]	[12.62]	[3.54]
Log VA, Manufacturing	0.07**	0.05*	-0.25***	0.43***
	[2.41]	[1.71]	[4.64]	[22.68]
Group I				
Log VA, Wholesale trade	0.23***	0.21***	-0.13***	0.53***
	[11.40]	[10.04]	[4.56]	[18.82]
Log VA, Retail Trade	0.15***	0.12***	-0.23***	0.40***
	[7.25]	[5.14]	[7.10]	[10.35]
Log VA, Transport	0.12***	0.13***	-0.17***	0.45***
	[8.68]	[9.85]	[5.41]	[30.95]
Log VA, Pub Adm, Defence	0.15***	0.13***	-0.20***	0.32***
	[12.67]	[10.55]	[6.29]	[16.89]
Group II				
Log VA, Education	0.19***	0.18***	-0.13***	0.30***
	[21.01]	[21.44]	[5.62]	[11.52]
Log VA, Health	0.21***	0.20***	-0.04***	0.35***
	[19.31]	[19.57]	[3.24]	[11.30]
Log VA, Hotels	0.16***	0.14***	-0.11***	0.48***
	[12.49]	[12.28]	[8.02]	[12.88]
Log VA, Other Ser	0.19***	0.17***	-0.11***	0.43***
	[20.25]	[25.99]	[8.36]	[12.13]
Group III				
Log VA, Finance	0.26***	0.23***	-0.52***	0.58***
	[28.84]	[23.50]	[10.98]	[29.08]
Log VA, Communication	0.12***	0.12***	-0.01	0.50***
	[8.97]	[10.63]	[0.31]	[18.72]
Log VA, Business Services	0.47***	0.47***	0.27***	0.61***
	[32.66]	[32.37]	[7.81]	[52.53]

Note: Robust t statistics are in parentheses. *, **, *** indicate coefficient is significant at 10, 5, and 1 per cent levels respectively. All regressions include country-sector fixed effects. Coefficients correspond to the regressions, as in Equation 5.