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# Measurement of Investment Contribution of Service Sector in India's Economic Growth

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**TITLE: Measurement of Investment Contribution of Service Sector in India's Economic Growth**

**ABSTRACT:** This paper aims to measure the investment contribution of service sector in India's economic growth. This study brings in a novel approach by using the national income accounting framework and Harrod Domar Model to quantify services investment contribution. The study makes a distinction between public and private investment within service sector, and identifies the sub-sectors which are major contributors. The services contribution to Foreign Direct Investment into the Indian economy is also measured. This study finds that private investment started exceeding public investment within service sector from 1994-95 onwards. Public administration and defence is found to be the major sub-sector contributing to public investment during the pre-reform phase. Real estate and business services is found to be the major sub-sector contributing to private investment during the post-reform phase. Actual growth rate of service sector is found to be higher than the predicted growth rate during most of the study period.

**KEYWORDS:** Service sector, private investment, Indian economy, FDI

## 1. INTRODUCTION

Investment occupies a crucial role in a country's economic growth, by raising the productive capacity of the economy, generating employment opportunities, promoting technological innovation, and adding to the government's tax revenues. The Harrod Domar Model of economic growth highlighted the importance of savings and investment as key determinants of economic growth. On the other hand, the Solow-Swan Neo-classical growth model explained the role of capital accumulation in determining the growth rate in the short run, as the economy moves towards a new steady state. As per the expenditure approach to national income accounting, Gross Domestic Product at market prices is the sum of private final consumption expenditure, investment, government spending and net exports of goods and services. Therefore, investment is a key ingredient for economic growth.

India has a remarkable savings-investment profile in comparison with other countries at similar per-capita income levels. This was achieved in the early years by policy initiatives such as nationalisation of banks in 1969, which resulted in opening up of bank branches across the length and breadth of the country, and facilitated the transformation of savings to investment. During the Early Five-Year Plans, government took the lead in investment, and public sector dominated in core strategic, infrastructure and industrial sectors, whereas private investment was confined to residual sectors. It resulted in a high incremental capital-output ratio, implying low marginal efficiency of investment which came in the way of achieving a higher rate of economic growth. However, private investment immensely benefited from the economic reforms and liberalised policy environment of the 1990s, especially with the opening up of the Indian economy to Foreign Direct Investment. A high investment rate, averaging more than 36% of GDP supported India's impressive growth rate of 8.2% during the 11th Five-Year Plan period (2007-2012). The Approach paper to the 12th Five Year Plan (2011) envisaged an even higher investment rate (measured as gross capital

formation as a percentage of the country's GDP) of 38.4% and 41.4% for the Plan period from 2012 to 2017, commensurate with a higher growth target of 9% and 9.5% respectively.

It is a well-established fact that India has been witnessing a structural transformation over the past thirty years, with the rising share of service sector in the country's GDP. Mallick (2009) found a similar scenario of structural transformation happening in the Indian economy, with regard to private investment. He found a declining trend in the share of agriculture in India's growth in private investment, whereas the shares of industry and service-sector have become prominent. UNCTAD (2004) also noted the sectoral shift towards services world-wide, with regard to Foreign Direct Investment (FDI). Given such a scenario, this paper aims to measure the investment contribution of service sector in India's economic growth.

Rest of the paper is organised as follows. Section 2 reviews the relevant literature on the topic. Section 3 gives the methodology and data descriptions. Section 4 presents the empirical results. Section 5 discusses the major conclusions from this study.

## **2. LITERATURE REVIEW**

There are two aspects to the relationship between public investment, private investment and economic growth, namely, "complementarity" and "crowding out". On the one hand, it is argued that public investment complements private investment by creating the necessary social and physical infrastructure, which private sector shy away from due to its costly, risky nature and long gestation period (Greene and Villanueva, 1991; Ramirez, 2000). On the other hand, public investment is accused of crowding out private investment. When government borrows from the market to finance public investment, it reduces the loanable funds available for private sector investment, resulting in higher interest rates and decline in private investment (Sunderrajan and Thakur, 1980; Blejer and Khan, 1984; Mitra, 2006). When the

negative effect of a decline in private investment fully cancels out the positive effect of increased government investment (say, in infrastructure), it impedes economic growth. Ilegbinosa et al. (2015) examined the impact of domestic investment on economic growth in Nigeria from 1970 to 2013. Their study analysed the differential impact of public and private investment on economic growth, with the help of time series econometric techniques. Private domestic investment and government productive investment was found to positively influence economic growth, although the impact was statistically insignificant.

Alfaro (2003) estimated the differential impact of FDI inflows in the primary, manufacturing and services sectors, on a country's economic growth. Using cross country data for 47 countries during the time span from 1981-1999 and with the help of OLS estimation technique, she found that FDI inflows in the primary sector had a negative and significant impact on a country's economic growth. FDI in the manufacturing sector was found to have a positive and significant impact on economic growth. FDI in the services sector was found to have a positive but insignificant impact on economic growth. Pilbeam and Oboleveciute (2012) examined whether inward FDI crowds in or crowds out domestic investment in the European Union (EU). Their study covered 27 EU countries over a time span from 1990 to 2008. Using Arellano Bond GMM estimation, they found that FDI didn't have a negative impact on domestic investment in the new EU member countries. However, the older EU14 countries experienced significant crowding out effect of FDI on domestic investment. Siddiqui and Ahmed (2017) studied the relationship between FDI and economic growth at the sectoral level from 2000 to 2014, for Indian economy. The sectors chosen for their study included services, telecom, chemical, metallurgy, pharmaceuticals, automobiles and tourism. They found that growth has an impact on FDI but FDI doesn't have an impact on growth at the sectoral level.

Mazumdar (2008) studied the investment and growth pattern of the Indian economy, during the post-liberalisation period. The period of his study was from 1950-2005. He found that the Indian economy was characterised by an investment-growth asymmetry after the 1991 reforms. Capital formation was biased towards the manufacturing sector, whereas output structure was biased towards service-sector. He found that this imbalance between capacity creation and demand expansion had resulted in manufacturing investment and manufacturing output growth becoming highly prone to cyclical fluctuations and instability. He further argued that the service-intensive growth trajectory since 1991 should be seen as unable to fully utilise the capital accumulation potential of the economy, rather than being low on capital intensity. Mallick (2009) studied the trends and patterns of contribution of different sectors to growth in private investment for Indian economy. The period of his study was from 1967-2005. He defined investment in terms of Gross Fixed Capital Formation (GFCF). He found that industry was the largest contributor to growth in private investment in India, followed by services and agriculture; both in the short-term as well as the long-term. Both the studies were descriptive in nature. Based on review of existing literature on the subject, it is found that there is a dearth of studies which have focused exclusively on measuring the investment contribution of India's service-sector and its underlying growth dynamics for the Indian economy. This study aims to fill the above-mentioned research gap by measuring investment contribution in India's economic growth with the help of national income accounting and Harrod Domar Model. This study also gives an accurate picture of the services contribution in India's inward FDI in the post-reform period, by measuring the inflows based on national accounts sectoral classification.

### **3. DATA AND METHODOLOGY**

The service sector contribution to India's economic growth is initially assessed. Afterwards, the investment contribution of service sector is analysed by making a distinction between

public and private investment, and further distinguishing private investment into domestic and foreign investment. Investment is usually measured in terms of Gross Capital Formation (GCF). GCF is defined in the System of National Accounts as the total value of “Gross Fixed Capital formation (GFCF)” and “change in stocks”. The National Accounts Statistics (NAS) of Central Statistical Organisation provides data on GCF at the sectoral and sub-sectoral level, for the aggregate economy and for public sector in particular. However, it is not possible to distinguish private investment into domestic and foreign investment in the NAS framework, due to non-availability of data. Therefore, Foreign Direct Investment (FDI) contribution of service-sector is examined separately utilising sectoral-level FDI data from the SIA newsletters, published by the Department of Industrial Policy and Promotion (DIPP), Government of India. The contribution of service-sector investment to India’s economic growth is also analysed utilising the expenditure approach to national-income accounting framework and incremental capital-output ratios. Further, the growth rate of India’s service sector is predicted, using Harrod-Domar Model.

The framework for studying the public and private investment contribution of India’s service-sector is as follows. First of all, total Service sector GCF is allocated across different sub-sectors. Similarly, Services GCF arising from public sector is also allocated across different sub-sectors. Contribution of private sector to the country’s Services GCF is obtained by netting out public Services GCF, from total Services GCF. Then the GCF in different publicly and privately-owned services is examined, to narrow down on the major contributors to investment. This empirical analysis is carried out by computing the percentage shares, growth rates and investment rates.

The time span of this study is from 1980-81 to 2011-12. Although India was a significant negative outlier in 1981 (in comparison with the average country, after controlling for income and size) in terms of service sector share in the country’s GDP (Kochhar et al. 2006), services

share in India's GDP has almost doubled over the last thirty years, leading to a phenomenon of service sector-led growth in India. Agriculture had occupied a predominant share in India's GDP since independence. However, the service sector share in India's GDP started exceeding that of agriculture since 1980, coinciding with the structural transformation process undergoing in the Indian economy. The year 1981-82 is specifically chosen as the starting point for the empirical analysis for the above-mentioned specific reasons. The reliability of the new data sources and methodology used for estimating India's GDP back series since 2011-12 is presently contested in academic and policy domain. Subramanian (2019) found that India's real GDP has been overestimated during the time span from 2011-12 to 2016-17. Official estimates placed annual average GDP growth rate during this time period at 7 percent, whereas he found the actual GDP growth rate to be 4.5 percent. Due to this ambiguity in national income accounts estimation for Indian economy, 2011-12 is chosen as the end point for this study.

## **4. EMPIRICAL RESULTS**

### **4.1 Decomposition of the service-sector contribution to India's Economic Growth**

The service-sector contribution to India's Economic Growth is assessed with the help of the methodology used by Jalava and Pohjola (2002). Accordingly, the aggregate economic growth of the Indian economy ( $\hat{Y}$ ) is taken to be the sum of (i) share-weighted output growth of the service sector,  $\hat{Y}_1$  and (ii) share-weighted output growth of the rest of the economy,  $\hat{Y}_2$  (i.e., agriculture and industry). In equation (1), the weight  $w_1$  gives the share of services value-added in aggregate output, and  $w_2$  gives the share of agriculture and industry value-added in aggregate output.

$$\hat{Y} = w_1\hat{Y}_1 + w_2\hat{Y}_2 \quad \text{-----(1)}$$

Where  $w_1+w_2=1$

**Table 1: Output share-weighted decomposition of India's economic growth**

Year	Services GDP Growth Rate $w_1\hat{Y}_1$	Agriculture + Industry GDP Growth Rate $w_2\hat{Y}_2$	Indian Economy's Growth Rate $w_1\hat{Y}_1 + w_2\hat{Y}_2$	Service Sector Contribution to India's Economic Growth $\left(\frac{w_1\hat{Y}_1}{w_1\hat{Y}_1 + w_2\hat{Y}_2}\right) * 100$
1981-82	2.4	3.1	5.6	43.6
1982-83	3.3	0.2	3.5	93.6
1983-84	2.6	4.9	7.6	34.8
1984-85	2.9	1.4	4.3	67.3
1985-86	3.6	1.0	4.6	77.8
1986-87	3.5	1.1	4.7	75.9
1987-88	3.0	0.8	3.8	79.2
1988-89	3.2	6.7	9.9	32.3
1989-90	4.1	2.3	6.4	64.5
1990-91	2.4	2.9	5.3	45.9
1991-92	2.2	-0.5	1.7	130.2
1992-93	2.7	2.7	5.4	49.6
1993-94	3.4	2.4	5.8	59.1
1994-95	2.8	3.6	6.4	43.5
1995-96	4.7	2.7	7.4	64.0
1996-97	3.6	4.4	8.0	44.7
1997-98	4.1	0.3	4.4	94.0
1998-99	3.9	2.8	6.7	58.5
1999-00	4.4	1.9	6.4	69.9
2000-01	2.7	1.6	4.3	62.0
2001-02	3.4	2.3	5.7	59.0
2002-03	3.5	0.0	3.5	99.1
2003-04	4.0	4.5	8.5	46.8
2004-05	4.3	3.0	7.3	59.1
2005-06	4.8	4.6	9.4	51.5
2006-07	5.0	4.6	9.6	52.6
2007-08	4.9	3.8	8.8	56.5
2008-09	4.3	2.0	6.3	67.8
2009-10	4.9	2.0	6.8	71.2
2010-11	4.9	5.7	10.6	46.4
2011-12	3.9	1.8	5.7	67.6
AVERAGE	3.7	2.6	6.3	63.5

Source: Author's calculations from National Account Statistics, Government of India

For the time-span of this study, the average share of service-sector value-added in India's total GDP at constant prices is found to be  $w_1 = 0.47$ , and the average share of agriculture and industry value-added in India's total GDP at constant prices is found to be  $w_2 = 0.53$ . The annual growth rates of services GDP and rest of the economy GDP ( $\hat{Y}_1$  and  $\hat{Y}_2$ ) is also calculated.

Table 1 gives the empirical results relating to service sector contribution in India's economic growth, based on the decomposition analysis. Figure 1 (in the Appendix) plots the changing service sector contribution to India's economic growth, based on the empirical results computed in Table 1. From the output share-weighted decomposition of India's economic growth, it is found that the service sector contribution exceeded 40 percent during majority of the study-period, except for a few outliers in the 1980s. The output-share weighted growth rate of service sector averaged 3.7 percent during the study-period, whereas the corresponding growth rate for the rest of the economy averaged 2.6 percent. Indian economy is thus found to grow at an average rate of 6.3 percent during the time-span of our interest. Service sector contributed more than 90 percent to India's economic growth during two years 1982-83 and 1997-98, and contributed nearly 100 percent in 2002-03. Service sector contribution to India's economic growth even exceeded 100 percent in 1991-92, when rest of the economy (sum of agriculture and industry) output registered a negative growth rate in the aftermath of the 1990-91 economic crisis. It is also found that the service sector contribution to India's economic growth averaged 63.5 percent during the entire study-period. Therefore, it can be inferred conclusively that service sector is a crucial component in India's growth story during the decades of 1980s, 1990s and 2000s; and has contributed in a much bigger way to India's economic growth, compared to agriculture and industry put together.

## **4.2 Measurement of the Investment Contribution of Service Sector**

There are two major kinds of investment, public investment and private investment. Private investment is mainly undertaken with a profit motive, and involves replacement of the existing capital stock, and creation of additional capital stock embodying new technology. Private investment can be distinguished further on the basis of ownership, into domestic and foreign investment. Public investment, on the other hand, is discretionary, and is driven by government policies. Public investment is broadly of four types - investment in infrastructure (eg. transport and telecommunications networks); investment in human capital (eg. education and training); investment in technical progress (eg. research and development); and investment in plant and equipment (Lloyd, 1999).

When public and private contribution towards India's service sector investment is disaggregated for the purpose of this study, it is found that public sector capital formation within India's service sector was higher than that of private sector throughout the 1980s and early 1990s (except during the crisis year of 1990-91). Private investment within the service sector witnessed acceleration only in the mid-1990s. Share of public sector in gross capital formation within the service sector is found to be 60 percent in the 1980s, which fell to about 45 percent in the 1990s, and further declined to 30 percent in the 2000s. On the other hand, private sector share in total service sector capital formation is found to be 77 percent in 2011-12. Private sector capital formation began to exceed public sector capital formation within the service sector from the year 1994-95 onwards (Figure 2 in the Appendix). Therefore, the time-span of this study is divided into two sub-periods: 1980-81 to 1993-94 and 1994-95 to 2011-12. This is to get a better insight into the major service sub-sectors which have contributed to public sector and private sector capital formation during this time period.

Table 2 shows the contribution of different sub-sectors towards public sector gross capital formation (GCF) for the time period from 1980-81 to 1993-94, which roughly coincides with India's pre-liberalisation phase. "Community Social and Personal Services" is identified as the major subsector contributing to public sector investment within service sector during this period. Share of community, social and personal services in public GCF was as high as 63 percent during this period. It is also found that investment rate in the public-sector is highest in community, social and personal services at 24.02 percent. Transport, storage and communications closely followed with an investment rate of 23.6 percent. Table 2 also shows the contribution of different service sub-sectors towards private sector gross capital formation during the post-reform period from 1994-95 to 2011-12.

"Finance, insurance, real-estate and business services" is identified as the major-subsector contributing to private sector GCF during this period. Share of "Finance, insurance, real-estate and business services" in private GCF averaged 46.8 percent during this period. Investment rate in the private sector is also found to be highest in "finance, insurance, real-estate and business services" at 27.8 percent. The pattern of private investment during the pre-reform phase and public investment during the post-reform phase is also highlighted in Table 2 for comparison purposes. It is found that the major sub-sectors in the public sector and private sector contributing to services capital formation have remained the same throughout the time-span of this study. However, even within these major sub-sectors, it is found that the public investment rate has declined whereas the private investment rate has risen significantly during the post-reform phase, from 1994-95 to 2011-12.

When public sector capital formation in "community, social and personal services" during the time-span from 1980-81 to 1993-94 is further disaggregated (Figure 3 in the Appendix), it is found that investment in "public administration and defence" is the biggest contributor to public sector capital formation within the service sector during this phase. Similarly, when

private sector capital formation in “finance, insurance, real-estate and business services” during 1994-95 to 2011-12 (Figure 4 in the Appendix) is dis-aggregated, it is found that investment in “real-estate, ownership of dwellings and business services” is the biggest contributor to private-sector capital formation within the service sector during the post-reform phase. In this context, it is interesting to note that “real-estate, ownership of dwellings and business services” is also the biggest contributor to service tax revenue for the Government of India in recent years (Thomas, 2017).

**TABLE 2: Gross Capital Formation within Service Sector**

Sub-sectors	Public Services GCF (1980-81 to 1993-94)		Private Services GCF (1980-81 to 1993-94)	
	Share in Public GCF	Investment Growth Rate	Share in Private GCF	Investment Growth Rate
	(in percent)			
Trade, Hotels & Restaurants	1.5	0.7	25.4	7.9
Transport, Storage & Communication	29.3	23.6	20.8	12.9
Finance, Insurance, Real-estate & Business Services	5.9	3.2	48.5	19.5
Community, Social & Personal Services	63.3	24.02	5.3	1.6
Sub-sectors	Public Services GCF (1994-95 to 2011-12)		Private Services GCF (1994-95 to 2011-12)	
	Share in Public GCF	Investment Growth Rate	Share in Private GCF	Investment Growth Rate
	(in percent)			
Trade, Hotels & Restaurants	0.2	0.3	12.2	6.8
Transport, Storage & Communication	27.9	13.4	26.3	23.2
Finance, Insurance, Real-estate & Business Services	6.1	1.9	46.8	27.8
Community, Social & Personal Services	65.7	19	14.7	9.1

Source: Author’s calculations from NAS; \*GCF in Rs. crores

### **4.3 Measurement of the Foreign Direct Investment Contribution of Service Sector**

FDI is a valuable source of technology and management know-how, in-addition to the direct capital financing it supplies. It also fosters forward and backward linkages with local firms, thus helping to accelerate the economic growth of an economy. Sectoral-level data on FDI inflows into India is available only from the year 2000 onwards, and is published in the SIA newsletters of DIPP. However, the coverage of services in the SIA newsletters is different from the NAS definition of service sector. The SIA definition of “services” includes only financial, banking, insurance, business services, outsourcing, R & D, courier, technical testing and analysis and other services. Therefore, the coverage of services FDI is re-defined for the purpose of this study, to make it comparable to the NAS definition of service sector. Service sector FDI is re-defined to be the sum of FDI inflows into (i) services, (ii) telecommunications, (iii) education, (iv) consultancy services, (v) information and broadcasting, (vi) hotels and tourism, (vii) trading, (viii) retail trading, (ix) hospitals and diagnostic centres, (x) air-transport, (xi) sea-transport and (xii) housing and real-estate. Based on this definition, it is found that the service sector share in India’s total FDI inflows, which was only 22.3 percent during the 5-year period from 2000-05; has more than doubled since then and stood at 55.4 percent in 2012 (Table 3). Services FDI even exceeded 50 percent of the total FDI inflows into India in 2006, 2009 and 2012. The remarkable rise in the Foreign Direct Investment contribution of India’s service sector during the post-2005 years is noteworthy. This is consistent with the FDI pattern witnessed world-wide of dominance of services (UNCTAD 2004).

Table 4 shows the changing share of major service sub-sectors in India’s total FDI inflows. It is found that “services” and “telecommunications” were the major sectors attracting FDI inflows during the 5-year time period from 2000-2005, with a share in total FDI of 8 percent

and 7.6 percent respectively. The “services”(as per SIA definition) share in total FDI inflows witnessed a phenomenal increase to 35 percent in 2006, and it emerged as the major contributor to FDI. However, the “services” share in total FDI has been exhibiting a falling trend since then. On the other hand, the share of telecommunications in total FDI has increased only marginally post-2005 and remained below 10 percent. The SIA definition of “telecommunications” includes radio-paging, cellular mobile and basic telephone services. It is also found that the share of “housing and real-estate” in total FDI inflows increased steadily after 2005 and attained a peak of 12 percent in 2009. Although its share fell drastically to 2.4 percent in 2011, FDI inflows into housing and real-estate recovered to an impressive 10.5 percent of total FDI in 2012.

**Table 3: Service Sector Share in Total FDI Inflows**

<b>Calendar Year</b>	<b>Share (in percent)</b>
2000-05	22.3
2006	52.9
2007	39.4
2008	49.3
2009	53.5
2010	43.5
2011	38.7
2012	55.4

*Source: Author’s calculations based on data from various issues of SIA newsletters, DIPP, Government of India*

Many service sub-sectors such as telecommunication, consultancy services, information and broadcasting, retail-trading, and housing and real-estate managed to attract maximum FDI inflows during the year 2009 (Table 4). However, their shares in total FDI inflows fell post 2009, which has been taken up by sectors such as “hotels and tourism”, which has emerged as an attractive destination for FDI in 2012, with a share of 14.9 percent. Nevertheless, “services” continue to retain its top rank as the sub-sector which succeeded in attracting maximum FDI inflows into India even in the year 2012. Telecommunications retained its second rank as a popular destination for FDI inflows in 2011, but “hotels and tourism”

bagged the second rank in 2012. Contribution of “housing and real-estate” to total FDI inflows exceeded that of “telecommunications” during the years 2007, 2009 and 2012 (share in total FDI nearly same for both sectors in 2010).

**Table 4: Share of different service-subsectors in India’s Total FDI inflows (in percent)**

Calendar Year	Services	Tele communications	Consultancy Services	Education	Information & Broadcasting	Hotels & Tourism
2000-2005	8.1	7.6	2.1	0.0	0.9	1.1
2006	34.7	8.3	1.1	0.4	0.4	1.6
2007	18.2	5.5	0.9	0.1	1.0	1.3
2008	24.3	8.3	1.1	0.8	1.6	1.6
2009	21.3	9.5	1.5	0.2	2.9	2.2
2010	17.6	7.2	1.2	0.1	2.0	2.4
2011	18.8	8.2	1.1	0.3	1.4	3.3
2012	20.8	0.4	0.7	0.9	2.4	14.9

Calendar Year	Wholesale Trading	Retail Trading	Hospitals & Diagnostic Centres	Air Transport	Sea Transport	Housing & Real-estate
2000-2005	0.8	0.0	0.6	0.1	0.7	0.2
2006	0.8	0.0	0.3	0.4	0.6	4.2
2007	2.9	0.0	0.9	0.5	0.5	7.6
2008	2.0	0.1	1.0	0.1	0.2	8.1
2009	1.9	0.5	0.4	0.1	1.1	11.9
2010	2.6	0.2	1.1	0.6	1.4	7.1
2011	2.0	0.0	0.6	0.1	0.4	2.4
2012	2.8	0.1	1.7	0.1	0.3	10.5

*Source: Author’s calculations based on data from various issues of SIA newsletters, DIPP, Government of India*

#### **4.4 Investment Contribution of service-sector in India’s Economic Growth**

For examining the contribution of service sector investment to India’s economic growth, the correlation matrix between the relevant variables is initially calculated. Table 5 gives the inter-correlation coefficients between services GCF, total GCF and total GDP for the 32-year period, from 1980-81 to 2011-12. The correlation coefficients are found to be positive and statistically significant, implying the existence of a strong positive relationship between these three variables. The correlation coefficient between service sector GCF and total GDP is

found to be slightly higher than the correlation coefficient between total GCF and total GDP. Here, service sector GCF is the sum of public sector GCF and private sector GCF in service sector, and private sector GCF includes both domestic investment as well as foreign investment in service sector.

**Table 5: Correlation Matrix of Investment and GDP for Indian Economy: 1980-81 to 2011-12**

Capital Formation	Total GDP at Factor Cost
Service sector GCF	0.99
Total GCF	0.98

Source: Author's calculations from NAS

The next step is to quantify the contribution of service sector investment to India's economic growth. The expenditure approach to national income accounting is utilised to analyse the contribution of service sector investment to India's economic growth. Table 6 gives the growth rates and the contribution of different components of India's GDP at market prices, during the pre-reform phase (1980-81 to 1993-94) and post-reform phase (1994-95 to 2011-12). It is found that Gross Capital Formation is the only component of GDP which has contributed significantly to the increase in India's GDP at Market Prices during the post-reform phase, in comparison with the pre-reform phase. The contribution of GCF to increase in India's GDP at Market Prices was 21.42 percent during 1980-81 to 1993-94, which almost doubled to 41.85 percent during the time-span from 1994-95 to 2011-12. Private Final Consumption Expenditure (PFCE) contributed more than 50 percent to the increase in India's GDP at Market Prices during both the phases. Although PFCE continues to be biggest contributor, it is found that there is only a small increase in the contribution of PFCE to the increase in GDP during the post-reform phase, compared to pre-reform phase. On the other

hand, the contribution of Government Final Consumption Expenditure (GFCE) to increase in India's GDP even declined during post-reform phase.

When the contribution of GCF to increase in India's GDP at Market Prices is further disaggregated in Table 6, it is found that this phenomenal increase in the contribution of India's GCF witnessed in the post-reform phase can mostly be attributed to the rise in capital formation within industry, and in service sector to a lesser extent. The contribution of industry GCF to increase in India's GDP is found to be the highest during both the phases, followed by service sector. Contribution of industry GCF to increase in India's GDP almost doubled to 23.01 percent during the post-reform phase, compared to 12.42 percent in the pre-reform phase. Contribution of service sector GCF to increase in India's GDP at Market Prices also increased moderately from 9.06 percent in the pre-reform phase, to 16.12 percent during 1994-95 to 2011-12. It is found that the contribution of agriculture GCF to increase in India's GDP has been insignificant during both the phases, compared to industry and services.

**Table 6: Expenditure Approach to GDP at Market Prices (at constant 1999-2000 prices)**

Components of GDP at Market Prices	1980-81 to 1993-94		1994-95 to 2011-12	
	CAGR	Contribution to increase in GDP*	CAGR	Contribution to increase in GDP*
	(in percent)			
GDP at Market Prices	5.13	100	7.04	100
PFCE	3.95	55.73	6.48	57.98
GFCE	5.91	12.89	6.92	10.84
GCF	5.11	21.42	9.55	41.85
Services GCF	5.33	9.06	9.34	16.12
Industry GCF	6.59	12.42	9.81	23.01
Agriculture GCF	- 0.11	- 0.07	8.71	2.72
Exports of Goods and Services	6.17	9.32	13.97	33.04
(less) Imports of Goods and Services	7.62	-11.42	13.95	-38.48

Source: Author's calculations based on data from NAS, various years.

\* Contribution to increase in GDP is calculated as (final-initial value of each component / final-initial value of GDP).

Note: Sum of different components of GDP does not add up to 100 due to statistical discrepancies.

When the Compound Annual Growth Rate (CAGR) of different components of India's GDP at Market Prices is compared, it is again found that Gross Capital Formation witnessed the biggest hike in CAGR from 5.11 percent in the pre-reform phase, to 9.55 percent during the post-reform phase. On further dis-aggregation of GCF, it is found that Industry GCF registered the highest CAGR of 6.59 percent during pre-reform phase, and 9.81 percent during the post-reform phase. This reinforces the earlier finding that industry GCF has contributed in a much bigger way to India's economic growth, compared to service sector GCF.

**Table 7: Incremental Capital-Output ratios of Service Sector and Indian Economy**

Time Period	Service Sector	Indian Economy
1980s	3.5	4.5
1990s	3.2	4.7
2000s	3.1	4.5
1980-81 to 1993-94	3.6	4.8
1994-95 to 2011-12	3.0	4.4

*Source: Author's calculations from NAS*

To get a better understanding of the contribution of service sector investment to India's economic growth, this study delves further and computes the incremental capital-output ratio (ICOR) for India's service sector, and estimates the growth rate of service sector using Harrod-Domar Model. Table 7 gives a comparative picture of the ICORs for the service sector and the Indian economy during the last three decades, and also for the two time-spans relevant for this study. ICOR is computed based on the Planning Commission formula, which is  $(GFCF \text{ Sum}/GDP \text{ difference})$ , computed over the time-span under consideration. It is found that the ICOR of India's service sector declined drastically, from 3.6 during the pre-reform phase to 3.0 during the post-reform phase. An important implication that follows is that during the post-reform phase (1994-95 to 2011-12), when private investment dominated capital formation within the service sector, service sector output is found to have lesser capital intensity. The ICOR of the Indian Economy also fell from 4.8 during 1980-81 to 1993-94, to 4.4 during 1994-95 to 2011-12. It is also found that the gap between the ICORs

of the service sector and the Indian economy widened during the post-reform phase. The capital intensity of India's service sector output is found to have declined progressively during the 1980s, 1990s and 2000s, as is evident from Table 7. The ICOR of Indian economy is found to increase from 4.5 in the 1980s to 4.7 in the 1990s, which again reverted back to 4.5 in the 2000s.

**Table 8: A Comparison of Actual Growth Rate and Predicted Growth Rate of Service Sector from Harrod-Domar Model**

Year	Investment Rate (i)	ICOR	Estimated Growth Rate* = $i/ICOR$	Actual Growth Rate*
1981-82	22.3	4.5	5.0	5.2
1982-83	21.0	4.5	4.7	7.0
1983-84	20.9	4.5	4.7	5.6
1984-85	21.7	4.5	4.8	6.1
1985-86	21.3	3.6	5.9	7.6
1986-87	20.9	3.6	5.8	7.5
1987-88	20.2	3.6	5.6	6.4
1988-89	22.5	3.6	6.3	6.8
1989-90	22.6	3.6	6.3	8.7
1990-91	23.5	4.7	5.0	5.2
1991-92	19.7	4.7	4.2	4.6
1992-93	22.0	4.7	4.7	5.7
1993-94	21.5	4.7	4.5	7.2
1994-95	24.1	4.7	5.1	5.9
1995-96	21.4	3.2	6.8	10.1
1996-97	18.7	3.2	5.9	7.6
1997-98	19.8	3.2	6.3	8.8
1998-99	19.2	3.2	6.1	8.3
1999-00	24.6	3.2	7.8	9.5
2000-01	25.8	3.9	6.6	5.7
2001-02	25.6	3.9	6.5	7.2
2002-03	24.6	3.9	6.3	7.5
2003-04	24.1	3.9	6.2	8.5
2004-05	23.5	3.9	6.0	9.1
2005-06	23.9	3.3	7.3	10.3
2006-07	24.6	3.3	7.5	10.7
2007-08	24.3	3.3	7.4	10.5
2008-09	27.3	3.3	8.4	9.0
2009-10	24.8	3.3	7.6	10.3
2010-11	25.4	3.3	7.8	10.5
2011-12	25.7	3.3	7.9	8.2

Source: Author's calculations from NAS

\*Growth rates in percentage

The Harrod-Domar Model relates the growth rate ( $g$ ) of an economy to its savings rate( $s$ ) and the incremental capital-output ratio ( $c$ ), wherein  $g = s/c$ . Based on the model, the growth rate of an economy can be raised by increasing the level of national savings or by reducing the capital output ratio (i.e., by increasing the productivity of capital inputs). But data on savings rate for India's service sector is not available at the all-India level. The equilibrium condition in the Harrod-Domar model equates savings to investment. Therefore, it is possible to compute the predicted growth rates for the service sector from Harrod-Domar Model, by utilising information available on investment rates and incremental capital-output ratios. Table 8 gives the computation results and Figure 5 (in the Appendix) gives a comparative picture of actual growth rates and the growth rates estimated using Harrod-Domar Model, for India's service sector. Actual growth rates of India's service sector are found to be higher than the growth rates predicted from Harrod-Domar model, during most of the years. Divergence between the growth rates can be explained in terms of ICOR or investment rate. Given the investment rate of service sector, if ICOR is underestimated, growth rate estimated using Harrod-Domar Model becomes equal to the actual growth rate of service sector. Given the ICOR of service sector, if investment rate is overestimated, both the predicted growth rate as well as actual growth rate of service sector becomes equal.

## **5. CONCLUSION**

In recent decades, more than half of India's Gross Domestic Product is arising from the service sector. Based on the output share weighted decomposition of economic growth, it is found that the contribution of service sector to India's economic growth averaged 63.5 percent, during the time-span of this study from 1980-81 to 2011-12. Given such a scenario, this study attempts to measure the investment contribution of service sector in India's

economic growth. The study finds that private investment began to exceed public investment within service sector from 1994-95 onwards, during which the incremental capital output ratio of India's service sector also declined. Private sector share in total services capital formation stood at 77% in 2011-12. "Public administration and defence" is found to be the biggest contributor to public sector capital formation within the service sector during the pre-reform phase (1980-81 to 1993-94). "Real-estate, ownership of dwellings and business services" is found to be the biggest contributor to private sector capital formation within the service sector during the post-reform phase (1994-95 to 2011-12). With the help of expenditure approach to national income accounting, it is found that industrial capital formation contributed to India's economic growth in a much bigger way during the study period, compared to services capital formation. However, service sector is found to be a major contributor to India's inward FDI in recent decades. Services share in total FDI inflows into the Indian economy more than doubled during the post-2005 years, and is found to even exceed 50 percent during 2006, 2009 and 2012. Within the service sector, "services" as per SIA definition, which includes financial services, banking, insurance, business services, outsourcing, R & D, courier, technical testing and analysis and other services, is the sub-sector which succeeded in attracting maximum FDI inflows into India, post 2005. Also, India's service sector is found to grow at a rate higher than the predicted growth rate based on Harrod Domar Model, during most of the study period. Hence, it can be concluded that services investment is in fact a significant contributor to India's economic growth.

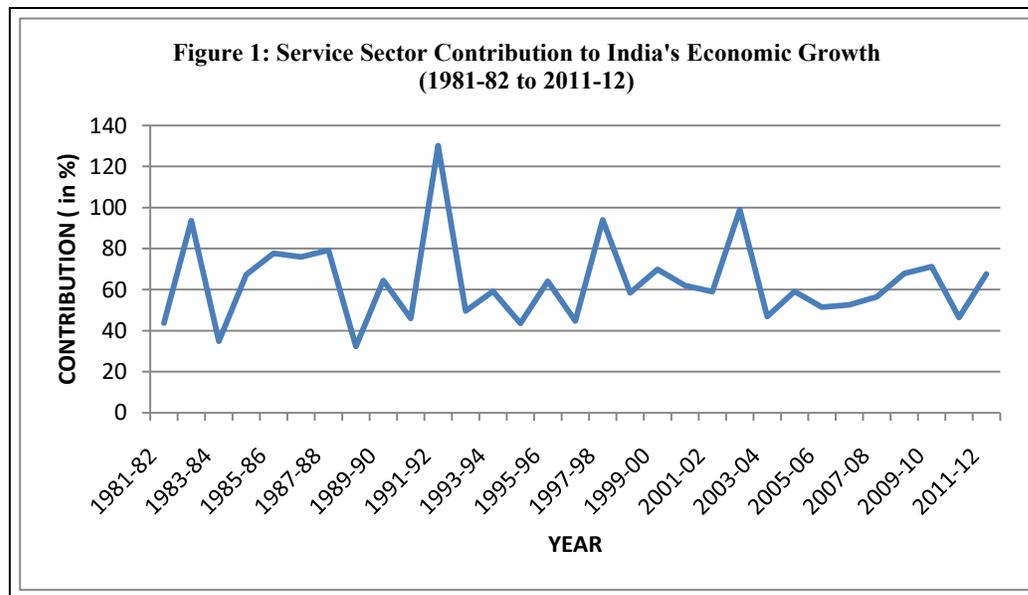
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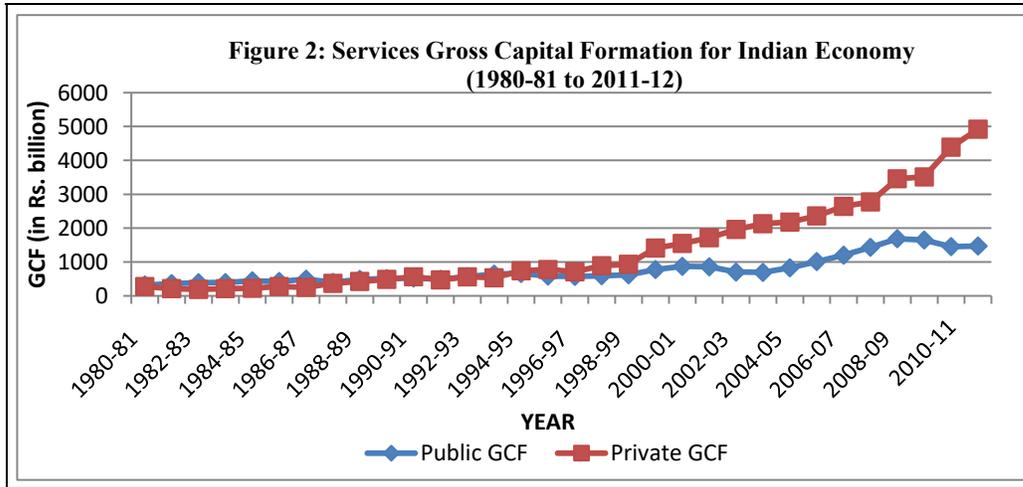
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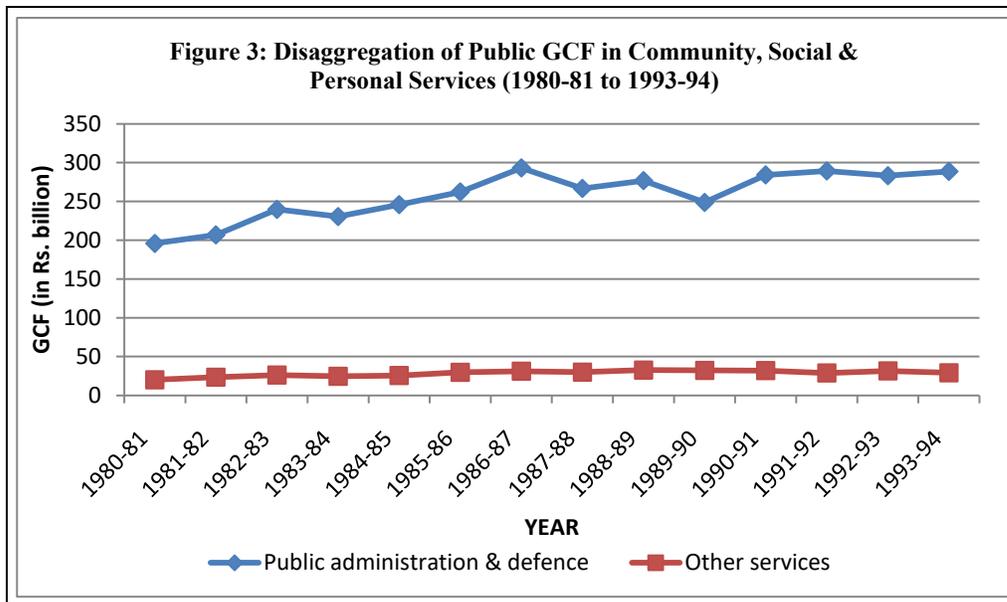
## APPENDIX



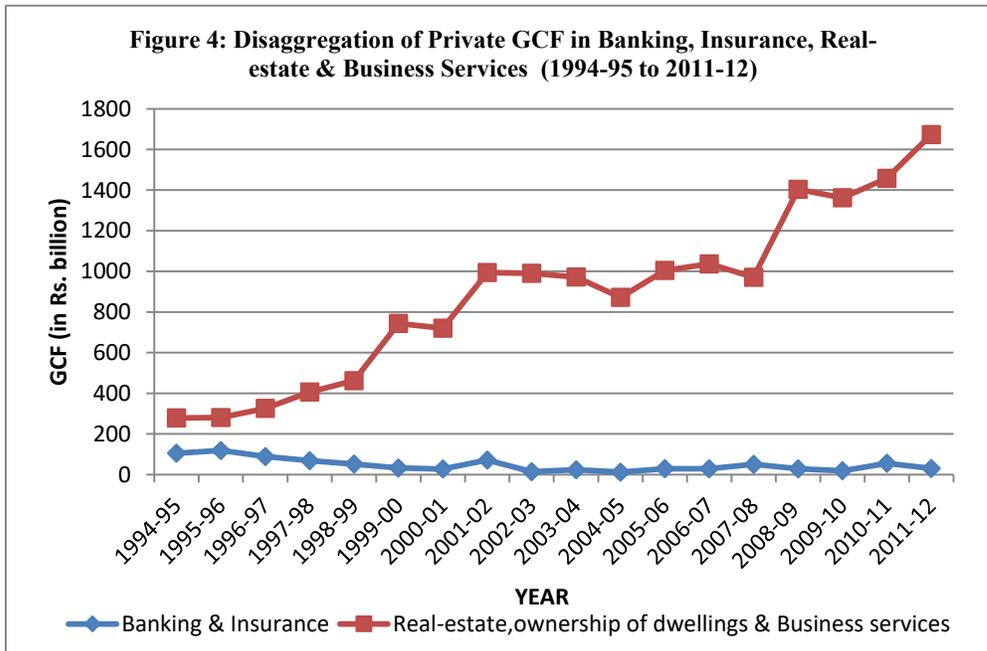
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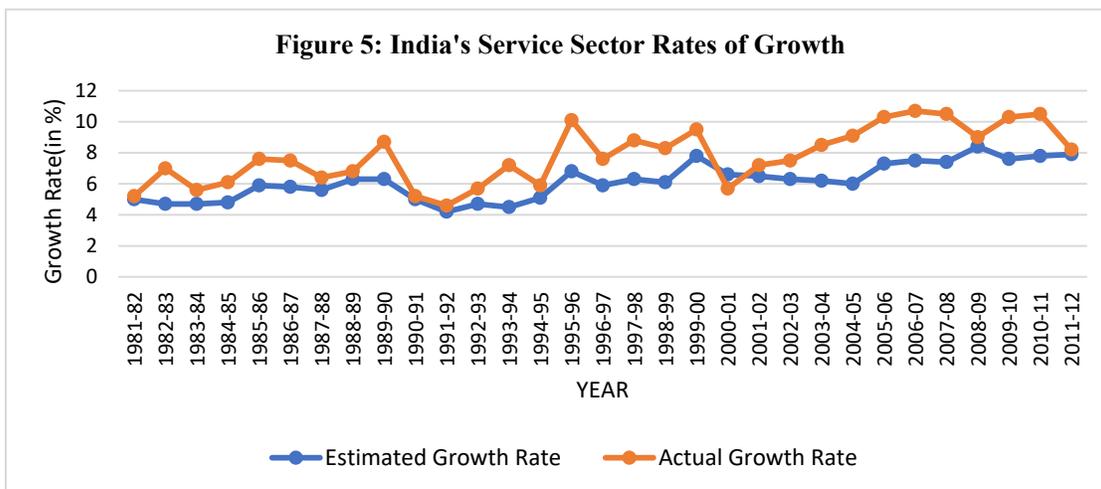
Source: Author's calculations based on data from National Account Statistics, various years



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