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TESTING FOR STRUCTURAL BREAKS IN THE GROWTH OF THE SERVICES SECTOR IN INDIA: A REASSESSMENT[2]

There has been an ongoing debate amongst economists about whether or not the economic reforms of the early 1990s induced a spurt in the growth of the Services sector in India. The focus of this paper is thus to analytically re-examine the nature and magnitude of the structural breaks in the growth of the share of the Services sector in the gross domestic product over 1950-1951 to 2013-2014 with an intention to further probe this issue. The results of this exercise show that the structural break in the growth of the share of the Services sector in gross domestic product occurred in the early 1980s, much before the economic reforms set in, coinciding with the hypothesis that the early 80s marked the structural break in India's economic growth. The increases in per capita incomes over 30 years since independence seemed to have led to the structural break in this sector in the early 1980s, plausibly because the demand for services is highly income elastic. There is no denying though that economic reforms in the 1990s helped in maintaining and propagating the growth of the Services sector triggered in the early 1980s. The sub-period analysis has also hinted at the slowdown in the growth of the Services sector, which could have serious economic implications in coming times.
Keywords: Services sector; Structural Breaks; Gross Domestic Product; Indian Economy; Dummy Variable Technique
JEL: C1; C22; H00; F63

1. Introduction

The Indian growth experience has defined most existent growth theories. It is well established in economic literature (Fisher, Colin Clark, Kuznets and others) that as an economy develops, the share of the primary sector in national income and employment declines leading to the rapid development of the manufacturing sector (Bhattacharya, Mittra Arup, 1989) in the second stage of development. And then, as per capita incomes further rise that is in the third stage of growth, the leading role in the economy is taken over by the Services sector. In India also, the Services sector has emerged as the largest and fastest-growing sector in recent years. Today, it is hailed as the engine of economic growth by many. It has reached the third stage

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(only in terms of G.D.P. share[3]), but by frog leaping the second stage; unlike the experience of other developed nations where there was a natural transition from industrialisation to services economy (Datta, Madhusudan, 1989). This peculiarity of having a large share of the Services sector in G.D.P. at relatively low levels of per capita incomes makes India's growth story very intriguing. Over the recent years, therefore this phenomenon has invoked the interest of many researchers in India as it does not corroborate with traditional growth theories. There has been an ongoing debate regarding the role of liberalisation in bringing about this spurt in the growth of the Indian economy (Wallack, 2003; Rodrick, Subramanian, 2004; Sinha, Tejani, 2000; DeLong, 2001) and also whether it would be sustainable in the long run. Many economists are of the view that economic reforms adopted in the early 1990s were the chief drivers of this spurt in growth, but others have debated that period around the early 1980s marked the break in the growth of India's G.D.P. Since the Services is the largest sector, contributing to G.D.P., so same arguments hold for Services sector growth also. In conventional wisdom, it is agreed upon that the economic reforms induced a spurt in the growth of the Services sector, but some economists have also pointed out that there may be multiple breaks in the growth of the services sector since independence (R.O.Y. Choudhury, Purba, 2016). In the light of the above debate, a reassessment or, to say, a re-examination of the timing of the break in the growth of the share of the Services sector becomes imperative. Examining the performance of the Services sector over the last six decades would throw direct light on the performance of the Indian economy and its prospects, thus the rationale for undertaking this study.

Most of the existing studies have explored the breaks in the growth of G.D.P. originating in the Services sector. But in this study, the structural breaks in the growth of the share Services sector in G.D.P. have been studied.[4] The relative growth of any sector is reflected in its share in gross domestic product. The contribution of any sector to the national income is a strong indicator of its performance over time (D'Souza, Errol, 2000). The change in percent share of a sector in gross domestic product occurs because of the difference in the rate of growth of output originating in that sector and the rate of growth of output originating in the rest of the economy, that is, all the other sectors taken together (Dutt, Lee, 1993). It follows quite logically that if a sector has a higher rate of growth of output compared to the output in the rest of the economy, then its share in G.D.P. will increase over time; if it has a lower rate of growth of output compared to a rate of growth of output of all the other sectors combined then its share in gross domestic product share will decline, and if it has the same rate of growth of output as the rate of growth of output in the rest of the economy than its share in G.D.P. will remain constant (Kuznets) (Gujarati, 1995). The changes in the relative share of the Services sector in G.D.P. thus would capture the true picture underlying the growth of this sector.

So this paper attempts to analyse the growth trends and test for structural breaks in the share of the Services sector in a G.D.P. over the sixty-three-year period from 1950-1951 to 2013-2014 period as the data at 2004-2005 constant prices is only available for this period

[3] The share of the Services sector in employment is lagging behind and does not correspond with its share in G.D.P.

[4] A relative measure of a phenomenon is any time a better measure compared to studying any absolute measurement of the same thing.

(Kuznets, Simon, 1961). The availability of data at the same base year till 2020-2021 does pose a limitation to this study. Due to the changes in the methodology and definitions of some subsectors of the Services sector for which concordance is not available so splicing of data was also not used as it would unnecessarily distort the results. Since the paper is based on the share of the Services sector in G.D.P. and not on the Services sector G.D.P. in absolute terms, therefore the results remain meaningful full as the changes in the G.D.P. originating in any sector do not get reflected immediately in its share in G.D.P. The change in G.D.P. share happens slowly over a period of time. Also sixty-four-year period is a sufficiently long time to capture the trends and breaks in trend.

The main objective of this paper is to analytically describe the nature and magnitude of trends in the share of the Services sector in G.D.P. and then test for the structural breakpoints in these trends using intercept and slope dummies. The dummy variable technique is, chosen over the unit root testing of structural breaks because, in the case of Services sector growth in India, there are sufficient plausible breakpoints that can identify a priori. Therefore, the dummy variable technique was considered to be more suitable as blindly trying for the breakpoints was not required. For testing structural breaks, five major watersheds or breakpoints were broadly identified in the evolution of the Indian economy and polity over this period of six decades.

To begin with, the theme is introduced in section one. Then the trends in the share of the Services sector and other major sectors in G.D.P. from 1950-1951 to 2013-2014 are examined in section two (Nagraj, 1991). After that, we take up the question of stability and break in the trends in these shares over these 64 years in section three and explore the breaks at five important points in the evolution of the Indian economy over this period of six decades. In section four, an attempt was made to locate the singular most important breakpoint in the share of the Services sector using multiple dummies and probe the issue of whether economic reforms were responsible for turning around the growth of this sector as claimed by many researchers (Panagariya, 2004). Lastly, the conclusion is summed up in section five.

2. Changes in The Share of Services and Other Sectors in Gross Domestic Product: 1950-1951 To 2013-2014

To begin with, a simple comparison of the percent share of the three sectors in the gross domestic product at constant prices (at 2004-2005 prices) over the 1950-1951 to 2013-2014 period gives a bird's eye view of the changes in the structure of Indian economy. The Services, Secondary and Primary sectors are defined in this study on the lines used by C.S.O.[5]

[5] For ready reference these definitions are as follows: SERVICES SECTOR: It includes the following seven sub-sectors: (i) Trade, Hotels and Restaurants; (ii) Railways; (iii) Transport, Storage and Communication other than Railways; (iv) Banking and Insurance; (v) Financing, Real Estate and Business Services other than Banking and Insurance; (vi) Public Administration and Defence; (vii) Community, Social and Personal Services other than Public Administration and Defence. SECONDARY SECTOR: It includes: (i) Manufacturing (registered and unregistered); (ii) Electricity, Gas and Water Supply; (iii) Construction. PRIMARY SECTOR: It includes: (i) Agriculture and Livestock; (ii) Forestry and Logging; (iii) Fishing; (iv) Mining and quarrying.

The summary information on the percent share in G.D.P. of the Services sector and other two sectors at different points of time over the 1950-1951 to 2013-2014 period is presented in Table 1.

Table 1

Sectoral Shares in G.D.P. at factor cost at 2004-2005 Prices

Period (Average for triennium ending)	Percent Shares in G.D.P.		
	Services Sector	Secondary Sector	Primary Sector
1952-53	29.6	14.4	53.6
1962-63	30.9	18.6	48.4
1972-73	34.2	21.9	42.4
1982-83	38.1	23.1	38.1
1987-88	40.3	23.1	35.7
1992-93	43.5	23.8	32.5
2003-04	51.9	24.4	23.9
2013-14	59.9	24.2	15.9

Source: G.O.I., C.S.O., National Income Accounts Statistics (Revised Series), 2018.

This table reveals that the sectoral composition of gross domestic product has undergone a major change since independence. The percent share of the Services sector shows a steady increase from 29.6 percent in the early 1950s to 43.5 percent in the early 1990s to almost 60 percent in 2013-2014. It has doubled in this period of 64 years. Similarly, the share of the Secondary sector in G.D.P. has also grown from 14.4 percent to 24.2 percent over the same period. Table 1 also reveals that the share of the Primary sector in gross domestic product registered a considerable decline; from as high as 53.6 percent in the early 1950s to just about 24.2 percent in 2013-2014. It can be concluded from this information that the percent share of the Primary sector has steadily declined, on the other hand, the shares of the Services sector and the Secondary sector show a steady increase. It is seen from the table that the Services sector emerged as the largest sector of the Indian economy in terms of G.D.P. share somewhere in the mid-'80s. Out of these three sectors of the economy (primary, secondary and services), the Services sector is probably the most diversified internally. The Services sector is an agglomeration of a large number of very heterogeneous sub-sectors; all of which have the common feature of producing one or the other service.

The emergence of this sector as the largest sector in terms of G.D.P. bypassing the industrial sector is a peculiar feature of the Indian growth story and from the above data, it seems to have occurred somewhere in the early eighties and not the early nineties. But this is only a hunch that needed to be corroborated with statistical testing thus prompting us to establish the trend and rigorously test for a structural break in the growth of the share of the Services sector in G.D.P. This has been taken up in the next two sections one by one, respectively.

Statistical Procedure to Analyse Trend

For statistical analysis of the trend in the share of the Services sector in G.D.P., a simple linear model or semi-log trend model or more complex non-linear models can be employed. The visual inspection of graphs (not included here due to paucity of space) on the growth of percentage share of the Services sector in G.D.P. suggested that the use of linear or semi-log

formulation may be a good approximation to the behaviour shown by the underlying data in most cases. The non-linearity's observed in the graphs were taken care of with the help of slope dummy variables. To begin with, we have estimated the semi-log trend models to discern the nature of trend in the share of Services sector in a G.D.P. over the 1950-1951 to 2013-2014 period. The semi-log trend model was preferred over the simple linear model because the coefficient of time variable in such a model not only reveals the nature of the underlying trend in the dependent variable but can also be directly used to calculate the percent per year growth or decline rates. These growth/decline rates have also been computed and have been used in the discussion. Moreover, the simple linear trend model is handicapped by the fact that the values of the dependent variable (percent share of Services sector in a G.D.P.) being constrained between 0 and 100 percent do not fulfil the O.L.S. assumption of normality. But the dependent variable is more likely to fulfil the classical regression assumption of the normal or near-normal distribution when converted into a log form.

For ready reference, it may be mentioned that we have estimated the following trend equation from the time series data about 1950-51 to 2013-14 period at 2004-2005 constant prices.

$$log\ Y = a + b\ T + e$$

where:

Y is percent share of a sector in G.D.P.;

T – Time variable (1950-51 to 2013-14), taking values 1 to 64.

This equation was estimated with the standard ordinary least squares method. The sign, size and statistical significance of the regression coefficient of time variable in this model indicates the nature and magnitude of trend or change in the share of the Services sector in a G.D.P. over time. The growth/decline rate has been computed in the case of each sector of the Services sector with the help of the regression coefficient of time variable in the above semi-log model, using the following formula.

$$Growth/Decline\ rate = [Antilog\ (Regression\ coefficient\ of\ Time) - 1]\ X\ 100$$

The growth/decline rates, so computed are percent per year compound growth/decline rates.

Trends in the Share of Services and Other Sectors in Gross Domestic Product

The results of our regression analysis of trends in the share of the main sectors in a G.D.P. are presented in table 2. From the results given in this table, it may be seen that the regression coefficient of the time variable has a positive sign and is significant at a 1 percent level in the case of the Services sector. It is thus clear that the share of the Services sector in a G.D.P. has been growing over these 64 years at the highest rate of 1.2 percent per year. Similarly, the regression coefficient of the time variable is also positive and significant at a 1 percent level in the case of the Secondary sector indicating thereby that the share of the Secondary sector in a gross domestic product has also been growing over this period. In the case of the Primary sector, the regression coefficient of the time variable is significant at a 1 percent level and has the expected negative sign; thus, a decline in the share of the Primary sector in G.D.P. is indicated.

Table 2

Trends In The Share Of Services And Other Sectors In Gross Domestic Product: 1950-1951 to 2013-2014

Eq. No.	Dependent Variable G.D.P. (log form)	Estimated Coefficients			Growth Rate (Percent per year)
		R. Square	Intercept	Coefficient of time variable	
1.	Services Sector	0.99	3.24 (401.7)	0.012 (53.52)a	1.2
2.	Secondary Sector	0.76	2.82 (136.1)	0.008a (14.28)	0.8
3.	Primary Sector	0.92	4.13 (170.6)	-0.018a (-27.54)	-1.8

Notes:
1. Figures in parenthesis are t-values.
2. a indicates significance at a 1% level for a two-tailed test.
3. Growth Rate= [antilog (slope coefficient of time)-1] x 100

It can be seen that the Services sector is the fastest sector whereas agriculture‘s share in the G.D.P. is steadily declining. But these trends give us the overall picture of 64 years, when and how this sector took over the sectors is a valid question that follows these findings. Hence in the next section, we have taken up the issue of a structural break in the trends in the share of Services sector with the view to address the debate on whether or not the economic reforms led to the spurt in the growth of the services sector by re-assessing the breakpoints using multiple dummies. Since the same kind of growth has not been seen in the employment share of the Services sector, this exercise of re-examining the structural breaks would contribute to the understanding of the issues plaguing Services sector growth.

3. Testing for Stability and Break in Trend

In this section, the focus is to test for the stability and break in trend or is to say in other words, to re-examine the structural breaks in the share of the Services sector in G.D.P. This would be done by identifying watershed points in the growth path of the economy and then using multiple dummies to test for structural breaks around these selected points. The rationale for the econometric technique used and the chosen watershed points are explained below:

(1) Econometric Procedure to Test Break-In Trend: The overtime stability of trend coefficients during these 64 years and the nature and magnitude of possible structural breaks in the trend can be tested broadly in three ways, namely Chow test, Dummy variable technique and Unit root tests. The first two methods are alternate but almost equivalent statistical procedures, with the latter having some clear advantages. The Chow test is a classical method to test for structural change. This test by splitting the sample into two sub-periods tests for the stability of regression coefficients to establish the structural change. But this technique does not give us the nature and magnitude of the change and also leads to a substantial loss in the degrees of freedom (Quandt, Richard, 1960). The dummy variable technique using intercept and slope dummies, on the other hand though equivalent but is much superior to the Chow test. It not only tests for

structural change but also gives the magnitude and direction of this change with negligible loss in degrees of freedom. Of course, in both these methods researcher needs to have some a priori knowledge of plausible breakpoints (Bai, Jushan, Pierre Perron, 1998). Alternative to these two methods is the Bai & Perron unit root test for structural change, which endogenously determines the breaking point (using dummies) with no a priori knowledge. But testing for structural breakpoint blindly without any a priori information would qualify for the same critique as data mining. Also, endogenous estimation of break dates is sensitive to the length of partition in the Bai Perron test (Wallack, Jessica, 2003). Since, in the case of Services sector growth, there are sufficient plausible breakpoints that can identify a priori therefore, the dummy variable technique was thought to be the appropriate technique for the problem that we intend to explore. So in this section, we shall explore whether or not the trend in the share of the Services sector in G.D.P. over the 1950-51 to 2013-14 period remained stable or if there were significant breaks in trend within this period using intercept and slope dummies. Employing this dummy variable procedure, we have analysed to find out whether or not the nature and magnitude of the trend in growth in the share of the Services sector in G.D.P. have changed (Rodrik, Dani, Arvind Subramanian, 2004). The procedure is to use intercept and slope dummy variables to test for the significance of the break-in trend in the two sub-periods. This can be done by estimating a single time trend regression equation for the entire period by including intercept and slope dummy variables at the breaking point as follows:

$$log\ Y = a_o + a_1\ D + b_o\ T + b_1\ DT + e$$

where:

Y is percent share of each sector in gross domestic product

T – time variable (taking values 1 to 64)

D – the dummy variable that takes values 0 for each year in the first sub-period and value 1 for each year in the second sub-period.

D.T. – the slope dummy that is generated by multiplying the intercept dummy variable with the time variable.

The above regression equation combines the separate regressions for the two periods, which can be computed from this equation. In this model a_1 is the differential intercept coefficient which indicates how different is the intercept in the second period from the first period; similarly, b_1 is the differential slope coefficient which gives the difference in the slope coefficients of the two periods (Sinha, Ajit, Shirin Tejani, 2004). The sign, size and statistical significance of the differential intercept and slope coefficients will indicate whether or not and in what ways growth has differed in the two sub-periods. Both differential intercept, as well as differential slope coefficient and also R-square values, are used to select and pinpoint the time point (year) in which a break in trend may have occurred. But for estimating the nature and magnitude of change in trend and growth rate, only the differential slope coefficient is the relevant statistic (DeLong, Bradford, 2001). Also, the growth/decline rate has been computed in the case of each sub-period of the Services sector with the help of the regression coefficient of time as described in section I.

(2) Watershed points and their rationale: This period of 64 years is not only quite long but is also dotted with several major events in the economy and polity of India. To mention only the more important: the first phase of planning virtually came to an end in the mid-sixties with the declaration of plan holiday for three years; Green Revolution occurring in the mid-sixties completely transformed the Agricultural sector; internally motivated liberalisation of the economy started in the early 1980s and structural adjustment programme and globalisation started in the early 1990s and the maturing of economic reforms by mid-2010s. These changes in the structure of the economy may have significantly affected the nature and size of trends in the share of the Services sector in G.D.P. On this basis, five major watersheds or breakpoints were identified in the evolution of the Indian economy and polity. Based on these 5 watersheds, the entire period of 64 years was divided into two sub-periods in each case and we shall try to find out whether or not / where and when a structural change has happened. The sub-periods and their significance and rationale are briefly described in Chart 1. The reasons for selecting each of the watersheds have been explained in detail below, where regression results of each watershed point are being reported.

Chart 1

Sub-Periods of 1950-1951 to 2013-2014 and Their Rationale

Sr. No.	Sub-Period Sets	Rationale / Importance
1.	Ist Sub-period : 1950-1951 to 1966-1967 IInd Sub-period : 1967-1968 to 2013-2014	Building of key industries completed, virtual derailment of plans – Plan a holiday. Beginning of the Green Revolution
2.	Ist Sub-period : 1950-1951 to 1970-1971 IInd Sub-period : 1971-1972 to 2013-2014	Beginning of Garibi Hatao & IRDP etc. programmes, Nationalisation of banks. A restart of Five Year Plans.
3.	Ist Sub-period : 1950-1951 to 1980-1981 IInd Sub-period : 1981-1982 to 2013-2014	Maturing of Green Revolution. First big loan with conditionality's from I.M.F. Internally motivated liberalisation begins.
4.	Ist Sub-period : 1950-1951 to 1995-1996 IInd Sub-period : 1995-1996 to 2013-2014	New Economic Policy and World Bank / I.M.F. directed structural adjustment programme and joining W.T.O., globalisation/second phase of economic reforms sets in.
5.	Ist Sub-period : 1950-1951 to 2005-2006 IInd Sub-period : 2006-2007 to 2013-2014	Maturing of Economic Reforms and liberalisation / 15 years after the first phase of economic reforms

Taking each of these five watersheds and using the methodology, we have tried to find out whether or not the nature and magnitude of trends in the share of the Services sector and its sub-sectors in gross domestic product changed midway over this span of 64years (1950-1951 to 2013-2014) using C.S.O. data at 2004-2005 prices. To begin with, the break-in trend for all sets of five sub-periods as displayed in chart 1 was analysed. For selecting the time point (year) in which a break in trend may have occurred, dummies for three to four years above and below the selected watershed points were tried and the sizes of differential slope coefficients and their t-values and also the R-squares were compared for each these and employing a procedure frequently used in such exercises, the year or years in which these coefficients reached the highest values were deemed to be the year (years) in which the break-in trend occurred. It is only then that a particular breakpoint /watershed year was selected.

The results for the selected breakpoints are displayed collectively in Table 3. But have been discussed separately for each sub-period (other results have not been reported to save space).

First Set of Sub-Periods

Sub-period I: 1950-1951 to 1966-1967

Sub-period II: 1967-1968 to 2013-2014

Several factors suggest that 1966-1967 may be a probable breakpoint in the trend pattern. Firstly, by 1966-1967 the initial phase of the building of key and basic industries had been almost completed. Further, the third five-year plan had been completed by March 1966 and after that, there was a virtual derailment of plans and the government declared a planned holiday for 3 years, (1966-1967 to 1968-1969) and only annual plans were in operation. Another reason for selecting 1966-1967 as the breaking point was that this coincides with the beginning of the Green Revolution, which completely transformed Indian agriculture. Moreover, the well-known slowdown in industrial development also started in the mid-1960s. So in the mid-sixties, a break in trend is expected. After trying various dummies around the mid-sixties, 1966-67 was selected as the first watershed point. Thus keeping in mind the economic significance of these events, it will be analysed whether there has been any significant change in the nature and magnitude of trends in the post-1966-67 period compared to the previous period.

To test for break-in, a trend in the intercept and slope dummy variables model described earlier has been estimated for the Services sector. These results reveal that in the case of the Services sector, the differential slope coefficient has a positive sign and is significant even at one percent level. This suggests that the nature and magnitude of the time trend in the gross domestic product share of the Services sector did experience any significant break after 1967-1968. Till the mid-60s the Services sector was growing at the rate of 0.9 percent, but after that, it has been growing at the rate of 1.4 percent. Growth in the second sub-period is much higher than in the first, but it could be argued this may be simply due to statistical reasons that are more number of years in the second sub-period.

Table 3

The Shares Of Services Sector In G.D.P. In The 5 Subperiods

Eq. No.	SUB PERIODS	Estimated Regression Coefficients				Growth Rate
		R-Square	Slope Coefficient of time variable b_o	Differential Slope Coefficient for II Period b_1	Slope Coefficient for the II Period $b_o + b_1$	
1.	(i)1950-51 to 1966-67 (ii)1967-68 to 2013-14	0.96	0.009 (8.23)	0.005a (4.07)	0.014	(i) 0.9 (ii) 1.4
2.	(i)1950-51 to 1970-71 (ii)1971-72 to 2013-14	0.97	0.008 (11.36)	0.005a (6.79)	0.013	(i) 0.8 (ii) 1.3
3.	(i)1950-51 to 1980-81 (ii)1981-82 to 2013-14	0.99	0.009 (23.2)	0.006a (10.64)	0.015	(i) 0.9 (ii) 1.5
4.	(i)1950-51 to 1995-96 (ii)1996-97 to 2013-14	0.97	0.01 (39.9)	0.005a (4.51)	0.015	(i) 1.0 (ii) 1.5
5.	(i)1950-51 to 2005-06 (ii)2006-07 to 2013-14	0.94	0.01 (46.9)	0.005 (0.89)	0.01	(i) 1.0 (ii) 1.0

Notes:
1. Figures in parenthesis are t-values and in square bracket are Z values.
2. a indicates significance at a 1% level for a two-tailed test.
3. Form of equation estimated log y = a + bt + e
4. Growth Rate = [antilog (slope coefficient of time) – 1] x 100.

Second Set of Sub Periods

Sub-period I: 1950-51 to 1970-71

Sub-period II: 1971-72 to 2013-14

The analysis for a break in the trend for the second set of sub-periods, i.e. 1950-1951 to 1970-1971 (Ist period) and 1971-1972 to 1999-2000 (IInd period), is discussed now. The break of time trend at 1970-71 is also likely on account of many factors. The five-year plans were again put on rails, after a holiday of three years, at the beginning of the second period. Indira Gandhi launched her famous economic welfare programmes like 'Garibi Hatao' at the beginning of the second period. Another major political and economic event that almost coincides with this break is the nationalisation of 14 banks in 1969. Furthermore, by the early 1970s, dependence on food imports was much-reduced thanks to the Green Revolution. So a break in trend can be expected in the early 70s. After trying various dummies around the early 70s, 1970-1971 was selected as the second watershed point. Given the above-stated events, the break-in trend in the share of the Services sector in gross domestic product and other sectors may have occurred around this year, i.e. 1970-1971. These results clearly show that the differential slope coefficient is significant at a 1 percent level in the case of the share of the Services sector in gross domestic product. This suggests that there was a significant break in trend in the share of Services sector in the gross domestic product after 1970-1971. Since the differential slope coefficient has a positive sign, this means in the second period the share of the Services sector has been increasing at a higher rate compared to the pre-1971-1972 period. The growth rate of the Services sector share in the gross domestic product was 1.3 percent in the second period, i.e. after 1970-1971 as compared to 0.8 percent in the first period, i.e. before 1971-1972. Growth in the second sub-period is much higher than in the first, but still, the second sub-period is much larger.

Third Set of Sub-Periods

Sub-period I: 1950-51 to 1980-81

Sub-period II: 1981-82 to 2013-14

The early 1980s saw some significant changes in the economic and political scenario of the country. Indira Gandhi again came to power effectively at the beginning of this period. By this time, the Green Revolution had also substantially matured and India had become self-sufficient in food. An upturn in industrial production also started in the early 1980s. When the sixth five-year plan was launched, India was facing a severe balance of payments difficulties. So in 1981, India entered into an arrangement with I.M.F. for a loan of five billion dollars which had its attached conditionality's that set the process of liberalisation of the Indian economy rolling, albeit at a slow pace. All these factors may have led to a change in the economic dynamism of the economy and as a consequence, the pattern of growth of various sectors may also have been affected. So in the early 1980s again a break in trend is expected. After trying various dummies, 1980-1981 was selected as the third watershed point. Testing for a break in trend between these two sub-periods is also important because the two sub-periods are statistically of the same size. The estimated regression coefficients with the

growth/decline rates are presented in Table 3. A look at these results reveals that slope coefficients are statistically significant at 1 percent level, in the case of the share of the Services sector in gross domestic product. The positive sign of the differential slope coefficient and its statistical significance at the one percent level suggests that the share of the Services sector in gross domestic product increased at a faster rate (1.5 percent) in the second period (1980-1981 onwards) compared to the earlier period (0.9 percent). Here both the sub-periods are balanced in terms of the number of years, so we can conclude with some confidence that the growth in the second sub-period is much higher than the first. It seems the early 1980s was an important breakpoint both statistically and economically but needs to be explored further.

Fourth Set of Sub-Periods

Sub-period I: 1950-51 to 1995-96

Sub-period II: 1996-97 to 2013-14

Coming down to more recent years, the break in trend since the early 1990s was examined. The rationale for taking 1990-91 as the breakpoint year is that this year coincides with the introduction of the Structural Adjustment Programme (SAP) and the beginning of the new era of liberalisation and globalisation of the Indian economy. As a result of the new reforms, the whole dynamics of the Indian economy seems to have undergone a change from a mixed economy to a more open and liberalised market economy, integrated more closely with the global markets. Such paradigm shifts and basic change in the character of the economy is likely to affect various sectors differently. Furthermore, the beginning of the information technology (a sub-sector of the Services sector) revolution also almost coincides with the beginning of this period. So the early 1990s are a clear watershed in the Indian economy when a break-in trend in the shares of different sectors is likely to have occurred. After trying various dummies around this period was selected as the fourth watershed point. The results are presented in Table 3.

It may be seen from these results that in the case of the Services sector, the differential slope coefficient is significant at 1 percent level; indicating a break in trend in the share of the Services sector in the gross domestic product after 1995-1996. The positive sign of the differential slope coefficient suggests that the share of the Services sector was growing at a higher rate (1.5 percent per year) in the post-1995-1996 period compared to the earlier period when the growth rate was 1.0 percent per year. So liberalisation and globalisation of the Indian economy after 1990-1991 seems to have speeded up the growth of the share of the Services sector in gross domestic product. Cleary growth in the second sub-period is much higher than the first even though the second sub-period has a much lesser number of years. The so early 1980s up to mid-nineties are important watershed points indicating robust growth in the Services sector.

Fifth Set of Sub-Periods

Sub-period I: 1950-51 to 2005-06

Sub-period II: 2006-07 to 2013-14

The economic reforms had sufficiently matured by the mid-2010s, 15 years after the first phase of initiation. So it was expected another break in the growth-share of the Services sector could have occurred after the complete implementation of the economic reforms and with the overall G.D.P. growing robustly. Again after trying various dummies 2004-2005 was selected as the fifth breakpoint. The results are presented in Table 3. It may be seen from these results that in the case of the Services sector, the differential slope coefficient is non-significant; indicating that there was no break in trend in the share of the Services sector in the gross domestic product after 2005-2006. It continued to grow steadily at 1 per cent per year in both the periods. Cleary growth in the two sub-periods is the same. This result seems to hint at a slowdown in the services sector growth but would still be a premature but important conclusion that warrants more research.

So from the above discussion, it can be seen that there are multiple structural breaks in the growth of the share of the Services sector and this needs to be explored further as to which is the most important one or whether all of them are equally important. This exercise is undertaken in the next section. We do get some clues from the sub-period growth rates that somewhere between the early 1980s and mid-1990s the spurt seems to have happened. The results in this section are also suggestive of a slowdown in the services sector growth after the initial spurt and call for further investigation with more data because if actually, Services sector growth is tapering off, then it would be a matter of serious concern to policymakers in coming years.

4. When Did the Break in Trends Occur?

If the differential slope and intercept coefficients were statistically significant only in one of the above five exercises, then no further work would have been needed and one could straight away declare that year to be the break year. But the significant differential coefficients are observed at five of these breakpoints. So the results of these previous five exercises have to be compared and evaluated to select the year (or period) when the break-in trend in the share of the Services sector in the gross domestic product may have occurred. Ideally, one should do such dummy slope variables exercise for each of the years separately for the entire 64-year period and then decide in which year the break in trend may have occurred. But such a mechanical exercise was not needed in the present case because the significant events in this 64-year current history of the Indian economy are well known and indicate the possible years in which a break in trend is likely to have occurred. So the trend breaks were tested only for these plausible five-time points. For selecting the time point (year) in which a break in trend may have occurred, as stated above, the sizes of differential slope coefficients and their t-values and also the R-squares were compared for these five breakpoints. Employing a procedure frequently used in such exercises, the year or years in which these coefficients reached the highest values were deemed to be the year (years) in which the break-in trend

occurred. In the case of the share of the Services sector in G.D.P., the break-in trend seems to have occurred after 1980-1981. The size and t-values of differential coefficients attain the highest values (out of the five break points considered here) at this breakpoint; the R-square is also the highest at this breakpoint. The maximum difference in the growth rates in the two sub-periods of 0.6 percent points seen in equation 3 is also suggestive of 1980-1981 as the actual breakpoint and also the two Subperiods are all most of the same size in years.

Though, to be doubly sure, another econometric exercise was conducted.

We estimated regression by taking dummy variables (intercept and slope) for two breakpoints at a time in pairs using the following equations:

$$log\ Y = a_o + b_o\ T + a_1\ D_1 + b_1\ D_1T + a_2\ D_2 + b_2\ D_2\ T + e$$

where:

Y is percent share of each sector in gross domestic product

T – time variable (taking values 1 to 64)

D_1 – 0 for 1950-51 to 1980-81; 1 for 1981-82 to 2013-14

D_1T – the slope dummy that is generated by multiplying the intercept dummy variable with the time variable.

D_2 – the dummy variable that takes values 0 for each year in the first sub-period and value 1 for each year in the second sub-period for all the other sub-periods, each of the other four subsets taken one at a time.

D_2T – the slope dummy that is generated by multiplying the intercept dummy variable with the time variable.

Table 4

Locating The Breakpoint In The Shares Of Services Sector In G.D.P.

Eq. No.	SUB PERIODS	Estimated Regression Coefficients			
		Differential Slope Coefficient of dummy for each period	Differential Slope Coefficient for the early 1980s	Slope Coefficient for Time Variable	R-Square
1.	(i)1950-51 to 1966-67 (ii)1967-68 to 2013-14	0.000 (-1.35)	0.006 (3.04)[a]	0.009 (9.33)[a]	0.99
2.	(i)1950-51 to 1970-71 (ii)1971-72 to 2013-14	0.002 (0.051)	0.008 (2.70)[a]	0.008 (12.16)[a]	0.99
3.	(i)1950-51 to 1995-96 (ii)1996-97 to 2013-14	0.01 (0.96)	0.005 (13.42)[a]	0.009 (22.96)[a]	0.99
4.	(i)1950-51 to 2005-06 (ii)2006-07 to 2013-14	0.002 (0.539)	0.006 (9.00)a	0.009 (19.03)[a]	0.99

Notes:
1. Figures in parenthesis are t-values and in square bracket are Z values.
2. a indicates significance at a 1% level for a two-tailed test.
3. No. of observations = 64.

So along with the early 1980s, all the other breakpoints were used one by one as control variables. In this model, b_1 is the differential slope coefficient which gives the difference in

the slope coefficients of the post the early 80s from the base category of whichever breakpoint is earlier years and b_2 is the differential slope coefficients, which give the difference in the slope coefficients of the other sub-periods from the above-stated base category. The equations exhibiting significant results are displayed in Table 4. This exercise was done for all the other combinations also, but only the results for the early 1980s dummy exhibited significant differential coefficients. The non-significant results for other combinations of breakpoints are not reported here to save space. It can be seen from the results that the slope coefficient for the early 1980s dummy is significant in all the equations.

When the early 1980s dummy was introduced along with another break point the differential slope coefficient of the early 1980s was significant at one percent level in all the four equations, whereas the differential slope coefficients became insignificant for all other sub-periods indicating that the actual break in the growth of Services Sector had taken place in early 1980s, thus reconfirming our results. So it can be confidently concluded with that the trend in the share of Services sector in gross domestic product experienced a significant break after 1980-1981; the share of this sector started growing at a significantly higher rate from the beginning of 1980s that is at the eve of economic reforms and not due to economic reforms. It is possibly this impact that spills over to other breakpoints, that is why they exhibit significant results when taken individually. From this exercise thus, we were able to locate a singular breakpoint in the early 80s from a set of multiple breaks. The structural break in a share of the Services sector in gross domestic product occurred in the early 1980s, much before the economic reforms set in. Thus validating and coinciding with the hypothesis that the early eighties marked the structural break in India's economic growth. The increases in per capita incomes over 30 years since independence seem to have led to the structural break in this sector in the early 1980s plausibly because the demand for services is highly income elasticity in the long run.

5. Conclusion

Summing up, it can have concluded from this analysis that the share of the Services sector in G.D.P. grew at the fastest rate compared to the other two sectors in the 64 years under consideration. The study has shown that given the post-independence process of growth of the Indian economy, multiple plausible structural breaks were seen in the share of the Services sector, but an actual break occurred in the early 1980s. All other breakpoints probably capture the spillover from the spurt in the growth in the early 1980s when individual breakpoints are considered. The plausible reason seems to be that since it is well established in the literature that the Services sector growth is positively linked to per capita growth, so by the early 1980s, 30 years after independence, the Indian economy had matured and the per capita incomes had substantially increased. The economy was growing at a high rate of 7.2%, leading to a spurt in the Services sector growth since demand for services is highly income elastic in the long run. But the above conclusions, when seen in the light of the sub-period growth rate results (of section 3), it can be said that there is no denying that economic reforms have helped in maintaining and propagating the growth of the Services sector triggered in the early 1980s. Both the factors, the high rate of economic growth combined with the first big I.M.F. loan in the early 1980s (which could be said to be a precursor to

liberalisation), acted as catalysts for the structural shift and plausibly explained the spurt in the Services sector growth in early ’80s. Of course, giving economic reforms their due, this spurt would not have been probably sustainable had economic reforms not followed.

The sub-period analysis also hints at another very important change that may be unfolding which is the slowing down in the growth of the Services sector after the mid-2000s, which could have serious economic implications in coming times. The results are strongly suggestive of a slowdown in the growth of the Services sector somewhere in the 2000s, especially when a major global recession happened in 2008. Though it would be a little premature to say this, it asks for rigorous econometric analysis with additional data and should be taken cognisance by policymakers, especially since the contribution of this sector in employment has still not matched up to its share in G.D.P. and even today we grapple with jobless growth and pandemic has further done unforeseen damage.

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