Growth and the Subsidy *Raj* in India: Re-Examining the Bardhan Hypothesis[1]

Maitreesh Ghatak, London School of Economics (m.ghatak@lse.ac.uk)

Ritwika Sen, International Growth Centre, Uganda **(**ritwika.sen@gmail.com)

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1. Introduction

Pranab Bardhan's classic book *The Political Economy of Development in India* (hereafter *PEDI*), first published in 1984, has an air of pessimism about it. Written at a time when the Hindu rate of growth was still a fact of life in India, Bardhan wrote that there simply had not been enough growth for its benefits to trickle down, resulting in high levels of poverty and low levels of human development.[2] In *PEDI* he goes on to propose what is now a very well-known hypothesis about the reasons for this low-growth regime – interest-group politics in a democracy leads to populism and subsidies, choking off resources for accumulation through public investment in infrastructure.[3] This political economy of constraints, according to Bardhan, seems to have blocked the economy's escape from a low-level equilibrium trap of low growth. Moreover, high levels of social heterogeneity (caste, region, language) and economic inequality makes collective action problems harder to resolve in India that would help it break out of this trap.

If we fast-forward to 2015, with the benefit of hindsight we know that he was writing exactly before massive reforms in the Indian economy in the form of liberalization, privatization and deregulation that occurred in the early nineties. High rates of growth have occurred for almost

[1] We thank Pranab Bardhan, Elizabeth Chatterjee, Matthew McCartney, and Sudipto Mundle for helpful comments. We also thank the participants of the conference *The Political Economy of Development in India—Redux* at Oxford in March, 2015 for helpful feedback.

[2] The term 'Hindu rate of growth' was coined by Indian economist Raj Krishna in the mid-seventies to describe a period of low and unchanging economic trend growth since the 1950's, of around 3.5% to 4% per annum (Ahluwalia, 1995)

[3] In a subsequent essay Bardhan (2009) also mentions another channel through which wasteful government expenditure due to interest-group politics affects growth – the increase in government debt and higher interest rates that raise the cost of capital to private business.

three decades (ignoring recent deceleration) and so it seems India has broken off from the low-level equilibrium trap of growth that Bardhan was describing. In fact, the trend-break in growth occurred around 1980 and not in the 1990s as is commonly believed, i.e., just before he was writing this book. [4]

Very few would question that growth has helped reduce average poverty and improve human development measures in the last three decades, even though there is controversy over the extent to which poverty has declined.[5] However, it is also impossible to deny that the benefits of growth have not sufficiently trickled down to the poor. In the early 1990s, 45 percent of the population lived below the poverty line, despite three decades of high growth and a slew of anti-poverty programmes according to the latest numbers, 30 percent of the population still lives below the poverty line.[6] Cross-country evidence suggests that India's growth elasticity of poverty (to what extent decline is poverty responds to growth) has been lower compared to China and other developing countries.[7]

While there are ongoing debates about the *normative* question of how public investment should be prioritized (e.g., whether it is infrastructure or human capital as in the recent debate between Amartya Sen and Jagdish Bhagwati), *PEDI* remains as relevant as it was before about raising a key *positive* question: what are the factors that drive the composition of public expenditure? Everyone agrees that more public investment in 'general interest' public goods that help the growth process (whether it is infrastructure or human capital) is desirable, as is expenditure on merit goods. However, beyond vague allusions to 'political will', with the exception of *PEDI*'s

[4] See Rodrik and Subramanian (2005).

[5] For example, reviewing the state of the debate, Deaton and Kozel (2005) conclude that there is good evidence that poverty fell during the nineties, but at the same time, the official figures for the extent of poverty reduction are too optimistic, especially in rural areas. Sen and Himanshu (2004), who criticise some of the over-optimistic estimates of poverty decline, still conclude that poverty fell by 3 percentage points between 1993-94 and 1999-2000.

[6] These are 2011 figures, reported by the Planning Commission of India (2014). See Kotwal et al (2011) for comparison of growth rates and poverty rates before and after liberalization.

[7] Lenagala and Ram (2010).

theory of interest-group politics, there is very little discussion of the factors that help to drive government expenditure away from wasteful to more productive ends.

In this paper we look at a specific and somewhat narrow part of *PEDI*'s argument, namely the relationship between subsidies and growth. We realize that Bardhan was talking about interest-group politics and capture of public resources much more broadly than what subsidies can capture. But because subsidies are a specific and precise category on which data are available over time, despite the limited scope of the exercise, we can study some concrete patterns with precision. Following from the epilogue to PEDI (Bardhan, 1998), we interpret 'subsidies' beyond the conventional understanding of the term, as the unrecovered costs of public provision of economic and social services.

We should note up front that due to data limitations we focus on explicit budgetary subsidy payments made by the Central Government over time. There is no consistent time series available either on implicit subsidies (central or state) or on state government subsidies mainly because of the arduous task of preparing such a series. In contrast a time series on explicit subsidies at the Central level is available and that is what we focus on.[8] In particular, we study the patterns of growth in income per capita and subsidies over the period 1980-81 to 2013-14 and their correlation to examine a part of the Bardhan subsidy-hypothesis. We also estimate trends in implicit & explicit budgetary subsidy payments made by the Central & State Governments using measures of public debt, general Government debt, and point estimates from various studies conducted by the National Institute of Public Finance and Policy (NIPFP).[9]

Our main findings are: Growth did 'take off' in the decades following liberalization. However, contrary to popular perception, trend growth in the 1990s (post-reform) was not significantly

[8] The few aggregative numbers on the volume and composition (e.g., merit vs non-merit) of subsidies that take into account state-level subsidies that are available and widely quoted are based on *two* years only, namely, 1987-88 and 1998-99. These are from a number of important studies by the National Institute of Public Finance and Policy (NIPFP), namely Mundle and Rao (1992a, 1992b) and Srivastava et al (2003). Very recently, preliminary aggregative estimates based on an as of yet unpublished report has become available for the year 2011-12 (Mundle and Sikdar, 2017).

[9] The estimates of budgetary subsidies (both implicit and explicit) by NIPFP (1997) which is cited by Bardhan (1998) were computed from the expenditure items in budget documents. Since public debt (Central Government liabilities) and general Government debt (total liabilities of the Central and State Governments) correspond to deficit financing of that expenditure – budgetary subsidies are fully reflected in the debt indicators used as proxies.

different from that of the 1980s. Evidence for accelerated growth is found only in the 2000-09 decade, from 2003-04 onwards.

However, over the entire period of our analysis, subsidies in per capita terms have grown more than proportionally with income per capita, with the exception of the 1990s (more specifically, from 1990 to 1995) where there was a significant deceleration in the growth of subsidies. It is also worth noting that the elasticity of subsidies with respect to income (in other words, the observed co-movement of the two variables over time), has been similar between the 1980's and the 2000's, but not in the 1990s, when income went up but subsidies went down. We should note that very recent estimates (Mundle and Sikdar, 2017) show that in 2011-12, the share of budget subsidies (explicit and implicit) as a fraction of GDP was 10.6%, a more than two percentage point decline from 1987-88 for which comparable numbers exist, when it was 12.9%. However, we do not have sufficient data to estimate whether the current trend will continue to push the fraction of subsidies further down.

From the point of view of PEDI's framework, this analysis suggests that growth has occurred in the post-liberalization period, and except for the early to mid-1990s, subsidies have grown alongside economic growth. We also examine trends in total and public investment since PEDI, and how they have moved with respect to subsidy payments: It is apparent that investment (both private and public) has increased considerably since the 1980s. Moreover, allocations to investment and subsidies have generally moved together, with the exception of the 1990s, which challenges the argument that the divergence of resources to competing special interests have choked off resources for productive investment and growth.

Put together, these trends do not provide evidence in favour of the 'Bardhan subsidy hypothesis' that the subsidy Raj was the most important binding constraint to economic growth in the 1980s. Admittedly, nor do they refute it since both growth rates and subsidies are clearly driven by other factors, and in the absence of an exogenous shock to growth or the composition of subsidies, we cannot make any causal inference about its impact on growth. Also, subsidies may well have been a major constraint on growth. What subsequent trends suggest is that they were not the most important bottleneck, and that there were other, more important, binding constraints at work that were relaxed due to the process of liberalization. It is also possible that subsidies not discussed in this paper (i.e. trends in implicit and explicit subsides provided by the Central and State Governments) were binding constraints to growth – though our examination of debt indicators, to the extent that they capture the dynamics of total budgetary

subsidies, seems to indicate otherwise. We also mention the recent note by Mundle and Sikdar (2017) that throws some additional light on this issue.

Our analysis suggests that PEDI's theoretical framework should be extended to allow for a two-way relationship between subsidies and growth. Subsidies constrain growth by using up public resources as Bardhan argues, but growth creates resources for more subsidies. This is what our empirical analysis seems to suggest. To the extent changes in other factors lead to growth spurts, this enables governments to continue and even expand the subsidy Raj. This in turn suggests that growth leads to an expansion of the subsidy Raj which eventually chokes off growth, creating pressure for some pro-growth reforms and checks on expansion in subsidies. At the same time, subsidies may be expanded in response to economic problems, e.g. more bank lending to mitigate the effects of global financial crisis. Then the statistical relation may be wrongly read as subsidies causing slower growth (Rodrik, 2012). While this discussion is reminiscent of the literature on electoral cycles and their relationship with government spending, it is beyond the scope of this essay to develop this theoretical argument carefully in the context of the PEDI-framework.

2. Examining the 'Bardhan Subsidy Hypothesis'

PEDI's key hypothesis was that the competing claims of dominant interest groups in the Indian polity to control public resource allocation resulted in a proliferation of subsidy payments and grants designed to placate the pressure groups. This resulted in the perpetuation of a subsidy network that favoured the rich at the expense of the poor thus undermining the social impact of subsidy payments, and also in a reduction of allocations for public investment and consequent economic growth. In an epilogue written in 1998, Bardhan considers the political economy of the post-liberalization era and points to the alarming volume of subsidies as symptomatic of the continued influence of interest groups.

With the advantage of hindsight and recorded macroeconomic performance since 1984, this article starts with the following question relating to the Bardhan subsidy hypothesis: were subsidy payments a binding constraint to economic growth in the 1980s, and if so, did they change in a way that contributed to the subsequent increase in average economic growth?

2.1. Trends in Subsidies and Economic Growth

The usual rationale for subsidies on certain goods and services is to encourage increased consumption when the net benefit to society at large exceeds the net private benefit to consumers, i.e., the presence of positive externalities (e.g., health and education). Subsidies are also provided by Government to serve redistributive objectives. NIPFP (1997) argued that subsidies explicitly stated in budgetary documents in India represent only the 'tip of the iceberg' if one uses the broader definition of budgetary subsidies as unrecovered costs in the public provision of goods and services that are essentially private in nature (e.g., losses of unprofitable public sector organizations). The 1997 discussion paper provided a comprehensive estimate of subsidies at the Central and all-India level in the year 1994-95. They also classified subsidies as pertaining to merit or non-merit goods on the basic principle that merit goods deserved subsidization (albeit the degree of subsidization would need to be worked out for each instance) and that there was no case for subsidizing non-merit goods. This classification was further refined in NIPFP (2001) to merit I, merit II goods and non-merit goods and services conforming to high, intermediate and zero levels of deserved subsidization respectively (this, in turn, follows from the extent of the associated externality).[10]

Estimates by the National Institute of Public Finance and Policy of total "non-merit" subsidies (implicit and explicit, Centre and States) whose benefit accrue to the relatively better-off in India is about 11% of GDP (Bardhan, 1998). Just as a benchmark, notice that this is more than 25 times the expenditure on the rural employment guarantee programme MGNREGA (less than 0.4% of GDP), a scheme that is often subject to policy debates.

In Table 1 we summarize the magnitude of *total* Central and State Government budgetary subsidies (both explicit and implicit) as estimated by various studies over the years. Bardhan (1998) refers to the subsidy estimates from NIPFP (1997) for the year 1994-95 where budgetary subsidies at the all-India level accounted for about 13.5% of GDP. We update this with a set of relatively comparable estimates from subsequent NIPFP publications, but it should be noted the inter-temporal comparison is not valid in a strict sense due to differences in the

[10] The definitions of these terms are as follows: merit I refers to elementary education, primary health centres, prevention and control of diseases, social welfare and nutrition, soil and water conservation, and ecology and environment; merit II refers to education (other than elementary), sports and youth services, family welfare, urban development, forestry, agricultural research and education, other agricultural programmes, special programmes for rural development, land reforms, other rural development programmes, special programmes for north-eastern areas, flood control and drainage, non-conventional energy, village and small industries, ports and light houses, roads and bridges, inland water transport, atomic energy research, space research, oceanographic research, other scientific research, census surveys and statistics, meteorology; and non-merit refers to all others.

methodology employed by various authors.[11] However, all of these studies aimed to derive comprehensive estimates of budgetary subsidies, and the last four estimates (between 1994 and 1998) are more comparable on grounds of similar estimation methodology.

We can see from this table that *total* subsidies provided by the Central Government increased from 4.25% of GDP in 1994-95 to 4.59% of GDP in 1998-99. NIPFP (2003) attributes the rise in Central subsidy payments in the year 1998-99 (especially compared to 3.49% estimated by a comparable method for 1996-97) to the following factors: (i) salary revisions following from the recommendations of the Fifth Central Pay Commission; (ii) declining performance of the railways sector leading to net Government subsidization of the sector (as opposed to surplus earnings); (iii) substantial increases in Central explicit subsidy payments, and (iv) increase in input costs without corresponding improvements in recovery rates.. Subsidy payments at the all-India level remain almost unchanged at 13.5% over the same time period (1994-95 to 1998-99). The vast difference between Centre and all-India level estimates of subsidies (a little under 8% of GDP) is indicative of the relative contribution from the Centre and States to aggregate subsidy payments- 33.86% and 66.14% respectively, as of 1998-99.

Table 1: Summary of Central Govt. Subsidy Estimates from the Literature

Year	Subsidies as a % of GDP		
	Central Govt.	**State Govt.**	**All-India**
1987-88 (M-R)*	4.53	7.41	11.94
1992-93 (Tiwari)	4.92	7.82	12.74
1994-95 (NIPFP)	4.25	9.26	13.51
1995-96 (NIPFP)	3.61	-	-
1996-97 (NIPFP)	3.49	-	-
1998-99 (NIPFP)	4.59	8.96	13.55
2011-12 (NIPFP estimate)	-	-	11

Note: Sources (in order) are Mundle and Rao (1992), Tiwari. A.C. (1996), Srivastava, D.K., et.al. (1997), Srivastava and Amar Nath (2001) for both 1995-96 & 1996-97, Srivastava, D.K., et al. (2003). The estimate for 2011-12 is based on the rebased GDP series and sourced from private communication with NIPFP.[12]

There have been no subsequent estimates of implicit and explicit subsidies using this methodology, although an updated NIPFP study for subsidy payments in 2011-12, 2013-14

[11] In ascending chronological order, these are Mundle and Rao (1992), Tiwari (1996), NIPFP (1997), NIPFP (2001), which provided estimates for Central Govt. subsidies in both 1995-96 and 1996-97, and NIPFP (2003).

[12] Sincere thanks to Dr. Sudipto Mundle (NIPFP) for this information.

and 2014-15 is forthcoming. The updated study will be based on the new GDP series (rebased to 2004-05) and provides a comparable estimate to the initial Mundle and Rao (1992) paper which estimated all-India subsidies for 1987-88 (albeit based on the old GDP series). The forthcoming paper estimates that all-India total budgetary subsidies declined from 12.9% of GDP in 1987-88 (this is as per the new GDP series and therefore does not conform to the figure in Table 1), to about 10.6% of GDP.[13] About a third of these subsidies or 3.7% of GDP is estimated as being allocated to non-merit subsidies – indicative of the fiscal space for additional transfer payments or social expenditure, if non-merit subsidies are rolled back. In another recent estimation of subsidies in India, the Economic Survey Volume 1 for the fiscal year 2014-15 quantified the fiscal cost of select explicit budgetary subsidies for the Centre and State governments as approximately Rs. 378,000 crore or 4.2% of GDP. [14]

Our focus is to examine the co-movement of subsidy payments in India with economic growth *over a period of time* (since 1980 to be precise), as well as the composition of subsidy payments in the same timeframe. Due to data limitations we primarily examine trends in explicit budgetary subsidy payments made by the Central Government. To estimate trends in the payments of implicit and explicit subsidy payments made by the Central Government, and at the all-India level, we also examine trends in the co-movement of public debt (Central Government) and general Government debt (total liabilities of the Central and State Governments) with economic growth. This is based on the assumption that budgetary subsidies imputed from the expenditure items in the Government budget are fully reflected in debt indicators which capture the deficit financing of this expenditure. Any interpretation of our results must be subject to these caveats.

Explicit Central Government subsidies include subsidies on food, fertilizers, export promotion, petroleum, and other subsidies (e.g. grants to NAFED and subsidies for the import/export of sugar and edible oils). [15] Figure 1 demonstrates the positive co-movement of explicit subsidies

[13] We are grateful to Dr.Sudipto Mundle (NIPFP) for sharing these estimates through private communication.
[14] The select subsidies included those on rice, wheat, pulses, LPG, sugar, kerosene, water, electricity, fertilizer, iron ore, naphtha, and railways.

[15] Petroleum subsidies were off-budget before the year 2002.

paid by the Central Government with GDP and public expenditure levels (figures in per capita terms and logarithmic scales) between 1980-81 and 2013-14.[16]

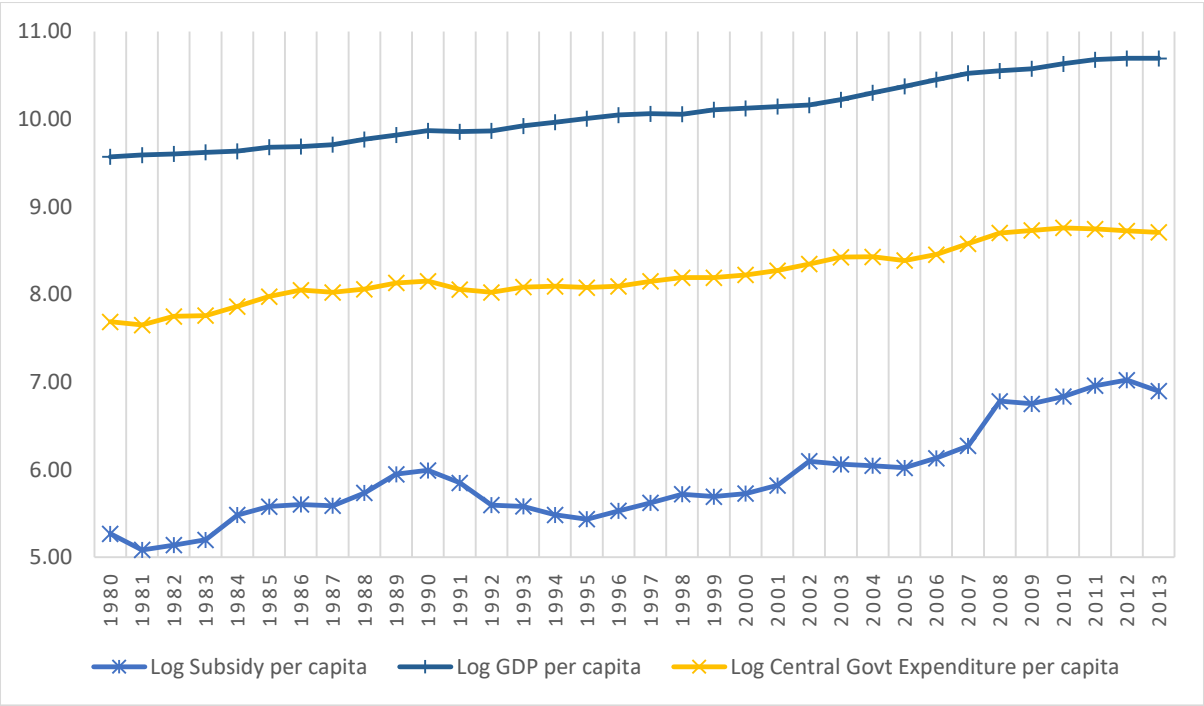

Figure 1: Trends in the Levels of Log Subsidies, GDP & Central Govt. Expenditure per capita (Source: EPWRF & RBI)

Between 1980 and 2013, the average ratio of subsidies to GDP was 1.59%, with above-average ratios recorded consistently for the periods 1985-1991 and 2008-2013. This is shown in Figure 2 below. Notice that these numbers are lower than what was reported in Table 1, since we look at explicit subsidies only. It is worth noting that the peak subsidy-GDP ratio of 2.09% reached in the former period, i.e. 1985-1991, (the average subsidy-GDP ratio was 1.82% during the same) was only crossed in the year 2008. In fact the average subsidy-GDP ratio from 2008 to 2013 was 2.32%. The trend in levels of subsidies per capita vis-à-vis that of GDP per capita (and the relative proportion of subsidies to GDP) thus indicates positive co-movement between the two series overall between 1980 and 2013, with a notable dip in the subsidy-GDP ratio in the post-reform decade (the average subsidy-GDP ratio was 1.27% between 1991 and 2000).

[16] Data on Central subsidy payments (and its components) were obtained from the EPWRF Government Finances of India database, and data on GDP, population and Central Government Expenditure were downloaded from the RBI Handbook of Statistics on the Indian Economy 2014-15. GDP data is based on the old 2004-05 series. The data is presented in constant prices (2004-05) which was deflated using the CPI-IW price index.

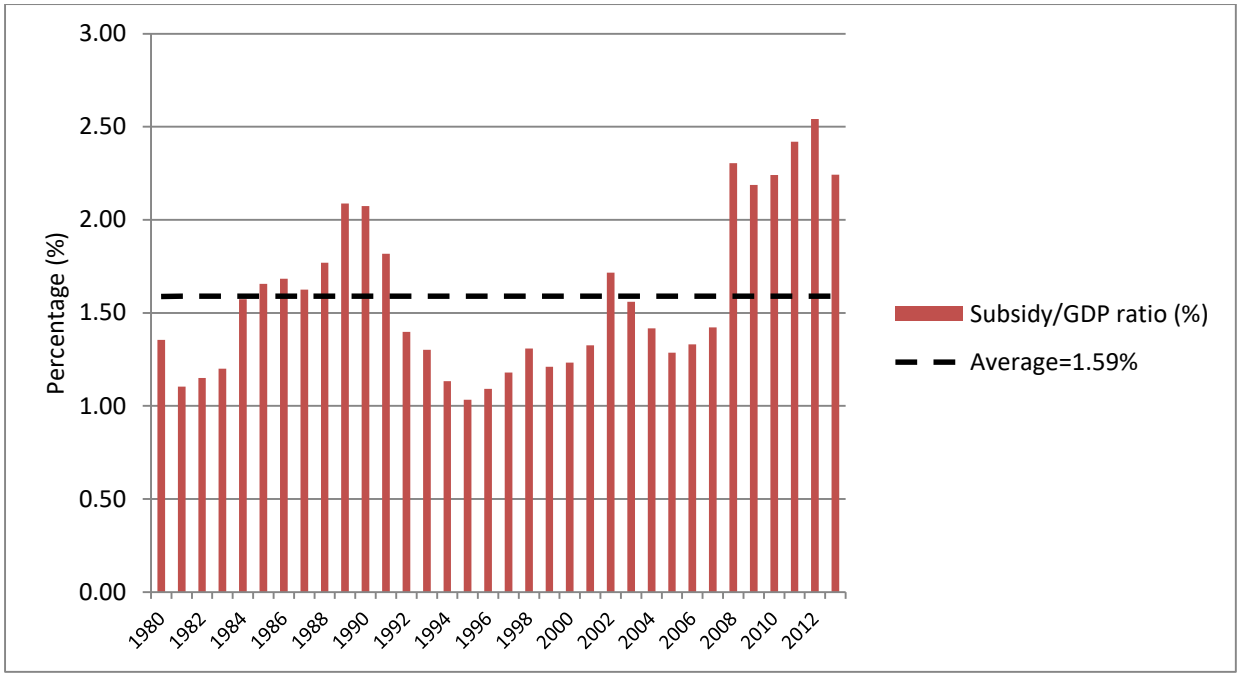

Figure 2: Trends in the ratio of Subsidies to GDP (Source: EPWRF & RBI DBIE)

In Table 2 we examine the growth rate of GDP, total Central Government explicit subsidies and its major components, and public & general Government debt (as estimates for total budgetary subsidies at the Central and all-India level respectively). The category of 'major subsidies' includes subsidies for food, petrol (after 2002), export promotion, fertilizers, and grants to NAFED for MIS/PPS.[17] Average annual growth rates for a given decade were computed by fitting a linear time trend using a standard OLS regression model, the details of which are given in the Appendix. We look at 1980-89 as the benchmark period and compare it with three subsequent time periods, namely, 1990-99, 2000-2009, and 2010-2013.[18]

Table 2: Growth Rates of GDP and Central Government Explicit Budgetary Subsidies & Debt Indicators

Indicator	1980-89	1990-99	2000-09	2010-13
GDP	2.6***	3.0	5.8***	2.0
Total Subsidies	8.6***	-2.2***	10.3	2.5
Major Subsidies	9.9***	-0.5***	10.0	3.0

[17] NAFED is the acronym of the National Agricultural Cooperative Marketing Federation of India and MIS and PPS refer to Market Intervention Scheme and Price Support Scheme, respectively. The former is intended for procurement of perishable and horticultural commodities in the event of fall in market prices, while the latter is used for procurement of oil seeds, pulses and cotton at the Minimum Support Price (MSP) declared by the government. NAFED undertakes procurement as and when prices fall below the MSP. Losses, if any incurred by NAFED in undertaking MSP operations are reimbursed by the Central Government.

[18] When we refer to the period 1980-89, the first year refers to the fiscal year 1980-81 and the last year refers to the fiscal year 1989-90. The same rule applies to all these time intervals.

Indicator	1980-89	1990-99	2000-09	2010-13
Food Subsidies	6.6***	4.6	6.4	2.0
Fertilizer Subsidies	15.5***	0.7***	13.8	-8.8**
Other subsidies	2.5	-14.4**	18.0**	-7.5
Public Debt	6.0***	2.4***	3.6***	4.4
General Govt. Debt	7.2***	2.3***	4.5***	2.3***

Note: All variables are per capita measures. The star signs indicate the level of statistical significance with *=10%, **=5% and ***=1%. In column 1, they refer to if the growth rate is significantly different from zero, while in columns 2-4, they refer to if the relevant growth rate is significantly different from the corresponding one in column 1.

The first column in the table gives the average per year growth rate over the period 1980-89 and whether it was statistically significantly different from *zero* at 10% (*), 5% (**), and 1% (***) levels. That is, here the test is if there is a positive trend. The second, third, and fourth column gives the average per year growth rates over the periods 1990-99, 2000-2009, and 2010-2013 and whether it was statistically significantly different from *the growth rate in the 1980s* at 10% (*), 5% (**), and 1% (***) levels. Here the test is whether there is a trend-break relative to 1980-89. For example, in 1980-89 the growth rate of GDP per capita was 2.6%, which while not high, is significantly different from zero at the 1% level. In 1990-99 the growth rate of GDP per capita was 3%, which is not significantly different from the 1980s growth rate, suggesting no trend-break relative to the 1980s was yet visible, even though the growth rate itself was significantly different from zero, like in the 1980s. In contrast, in 2000-09, the growth rate of GDP per capita was 5.8%, which is significantly different from the 1980s growth rate at the 1% level, suggesting a trend-break.

The above results indicate the following key points:

(i) Growth did 'take off' in the decades following liberalization. However, contrary to popular perception, trend growth in the 1990s (post-reform) was not significantly different from that of the 1980s. Evidence for accelerated growth is found only in the 2000-09 decade, from 2003-04 onwards. This finding is consistent with that of Nagaraj (2000), Kotwal et al (2011) and Ghate & Wright (2008).[19]

(ii) The decade of rapidly expanding explicit subsidy payments (1980-89) was followed by a significant deceleration in the growth of subsidies during the 1990-99 decade. A closer look at

[19] These observations are further substantiated by tests for structural break post-liberalization in 1991. Table 1 in the Appendix demonstrates that there is no evidence for a structural break post-1991, relative to growth in the 1980s, once the economic boom post-2003 is accounted for. In fact there is evidence to show that growth 'took off' even before the reforms in the late 1980's, around 1987-88 (Bhagwati & Panagariya, 2013).

the data reveals that there was a trend break in the year 1990, after which subsidy payments declined until 1995. This trend was subsequently reversed post-1995 (also a year of significant trend break – see Appendix Table 2): subsidies per capita crossed its 1990 level only in the year 2001, and the positive growth trend continued into the decade of accelerating growth (2000-09). In short, other than a deceleration in explicit Central Government subsidies in the 1990s, there is no evidence of deceleration of growth in subsidies in the subsequent period.

(iii) The pattern of negative growth in total subsidies in the 1990s is reflected in the decrease in the 'other subsidy' payments (and also the 'major subsidy' category, but that is not surprising). However, this trend is not echoed by the two major explicit subsides on food and fertilizers (subsidy payments on the former continued to grow at a faster rate than GDP).

(iv) The debt position of the Central Government (public debt) and the Central & State Governments combined (general Government debt) echoes the overall trend in Central Government explicit subsidy payments, with accelerated growth in the 1980s, a significant decline in growth in the 1990s relative to the 1980s, and resurgence (though more contained than in the pre-reform decade) in the 2000s. We use these measures as proxies for trends in total budgetary subsidy payments made by the Centre and State Governments.

Table 3a examines the elasticity of total Central Government explicit subsidies and its major components with respect to GDP (per capita measures). The calculation of decadal average elasticity measures for subsidy payments (and its major components) with respect to GDP allows us to examine the co-movement of the *growth rates* of various subsidies and GDP. The first column gives the per capita income elasticity of a specific category of a subsidy over the period 1980-89 and whether it was statistically significantly different from zero at the relevant level. The second, third and fourth column gives the elasticity in the relevant period and the stars indicate the relevant level of statistical significance of the elasticity being different from that in 1980-89.

Table 3a: Elasticity of Central Government Explicit Budgetary Subsidies w.r.t. GDP per capita

	1980-89	**1990-99**	**2000-09**	**2010-13**
Total Subsidies	3.29***	-0.71***	1.68**	2.11
Major Subsidies	3.70***	-0.14***	1.62***	2.45
Food Subsidies	2.38***	1.51	0.94*	1.07
Fertilizer Subsidies	5.60***	0.10***	2.46***	-2.78*
Other subsidies	1.27	-4.95**	3.10	-4.76

Note: All variables are per capita measures. The star signs indicate the level of statistical significance with *=10%, **=5% and ***=1%. In column 1, they refer to if the elasticity is significantly different from zero, while in columns 2-4, they refer to if the relevant elasticity is significantly different from the corresponding one in column 1.

The key finding here is, except for in the 1990s, explicit subsidies and income have grown together. Since the elasticity can be interpreted as the percentage change in subsidies per capita when GDP per capita goes up by 1%, Table 3a suggests that except for the 1990s when the elasticity was negative, for the 1980s as well as in the post-2000 period this elasticity is greater than 1. That is, growth in income has led to a more than proportional growth in explicit subsidies in these two periods. This can be inferred from Figure 1 as well – from 1996 to 2011 subsidies per capita have grown at a higher rate than GDP per capita, similar to the period 1980-1989. Only during 1990-95 and 2012-2013 we actually see a dip in subsidies per capita, which are both periods of fiscal retrenchment after an economic crisis.

Table 3b: Elasticity of Debt Indicators (Implicit & Explicit Subsidy Estimates) w.r.t. GDP

	1980-89	**1990-99**	**2000-09**	**2010-13**
Public Debt	2.21***	0.69***	0.60***	2.11
General Govt. Debt	2.66***	0.71***	0.75***	1.06*

Note: All variables are per capita measures. The star signs indicate the level of statistical significance with *=10%, **=5% and ***=1%. In column 1, they refer to if the elasticity is significantly different from zero, while in columns 2-4, they refer to if the relevant elasticity is significantly different from the corresponding one in column 1.

Table 3b presents the trends in the elasticity of debt indicators w.r.t. GDP (per capita measures) to estimate patterns in the co-movement of total budgetary subsidises provided by the Centre and State, and economic growth. These results also suggest that debt and national income have grown together, albeit in this case growth in income has been accompanied by less than proportional change (elasticity <1) in debt or total budgetary subsidies.

In order to establish whether subsidies were a binding constraint to growth in the 1980s we need to further examine what happened to productive investment in the economy in relation to the decline and subsequent rise of growth in subsidy payments after this period. Was the decline in the level and growth of subsidy payments in the 1990s accompanied by an increase in investment, which contributed to the accelerated growth performance observed in the following decade? To examine this, the elasticity of gross capital formation (GCF) sector with respect to GDP, Central Government explicit subsidies, public debt and general Government debt (all per

capita measures) was calculated using a methodology similar to the one used to generate the results for Table 3a and 3b.[20] The results are presented in Table 4a below.

Table 4a: Growth & Elasticity of Gross Capital Formation (GCF)

Indicator	1980-89	1990-99	2000-09
Growth Rate			
GCF per capita	4.90***	3.77	11.26***
Elasticity of Gross Capital Formation w.r.t. various indicators			
GDP	1.84***	1.26	1.97
Subsidies	0.47**	-0.18	0.78
Public Debt	0.82***	0.82	3.15***
General Govt. Debt	0.68***	1.49*	2.39***

Note: All variables are per capita measures. The star signs indicate the level of statistical significance with *=10%, **=5% and ***=1%. In column 1, they refer to if the growth or elasticity is significantly different from zero, while in columns 2-4, they refer to if the relevant growth rate or elasticity is significantly different from the corresponding one in column 1.

The results presented in Table 4 indicate that: a) the level of investment has grown throughout the period of our study, with a significant increase in its growth rate in the 2000's, compared to the 1980's, and; b) a positive correlation was observed between investment and subsidies across all three decades. This observation is robust to the use of three separate estimates of resource diversion to competing special interests at the Central and all-India level, i.e. Central Government explicit subsidy payments, and the stock of public and general Government debt. The elasticity of investment with respect to both public debt & general Government debt exhibits a statistically significant increase in the decade of accelerating growth (2000-09).[21] During this decade, total investment (in per capita terms) has in fact grown more than proportionally compared to public and general Government debt, i.e. elasticity is greater than one. The positive co-movement of these series was presumably driven by other economic and policy factors, but demonstrates that the increase in transfers to competing classes was actually accompanied by an *increase* in productive investment during India's growth transition over the past three decades.

[20] PEDI examines gross *fixed* capital formation by the public sector as a measure for public investment. Following from latest data available, we use estimates of total and public sector gross capital formation as measures for investment. Gross capital formation is arguably a more comprehensive measure than gross fixed capital formation as it measures outlays on additions to fixed assets, plus the net change in inventories. Fixed assets include plant, machinery, equipment and buildings, while inventory includes works in process, which are partially completed goods that remain in production.

[21] These observations are statistically significant at the 1% level.

We further examine these trends for gross capital formation in the public sector, to conform to the narrative in PEDI. These results are presented in Table 4b below. These results indicate that the level and growth of public capital formation has also increased significantly since the 1980s, but with a period of significant deceleration in the post-reform decade (1990-99). In particular, public capital formation 'took off' in the 2000-09 decade with evidence for a break of trend from the year 2002 onwards.[22] From figures 1, 2, and the analysis so far (see Appendix Table 2) we know that growth in explicit subsidy payments by the Centre decelerated in the early 1990s, but increased significantly from 1995 onwards. Moreover, the payments of explicit and implicit subsidy payments at the all-India level remained steady at around 13.5% of GDP in the late nineties (1994-95 to 1998-99), accompanied by positive growth in the debt stocks of the Central and State Governments.[23] While the trend of deceleration of public investment in the 1990s, and accelerated growth post-2002 were presumably driven by various economic and political factors – these trends put together suggest that increased subsidy and debt financing through the late 1990s, and later in the 2000s, did not impede the growth of public investment in the decade of accelerating growth (2000-09). Table 4b provides evidence for a significant increase in the elasticity of public investment with respect to subsidies, public debt and general Government debt.

Table 4b: Growth & Elasticity of Gross Capital Formation (GCF) in the Public Sector

Indicator	1980-89	1990-99	2000-09
Growth Rate			
Public GCF per capita	3.4***	-1.3***	9.7***
Elasticity of Public Sector Gross Capital Formation w.r.t. various indicators			
GDP	1.17***	-0.38***	1.71*
Subsidies	0.30*	0.07	0.72**
Public Debt	0.56***	-0.10**	2.69***
General Govt. Debt	0.46***	-0.39*	1.95***

Note: All variables are per capita measures. The star signs indicate the level of statistical significance with *=10%, **=5% and ***=1%. In column 1, they refer to if the growth or elasticity is significantly different from zero, while in columns 2-4, they refer to if the relevant growth rate or elasticity is significantly different from the corresponding one in column 1.

Even if subsidies were a binding constraint on growth in the 1980s, these empirical trends could still be plausible if there had been a substantial change in the nature and composition of subsidy

[22] The results for a trend break test are provided in the Appendix Table 3.

[23] It is therefore not surprising that the elasticity of (decelerating) public investment with respect to public debt and general Government debt, which were growing in the 1990-99 decade, is negative at the 5% and 10% levels of significance respectively (see Table 4b).

payments in the 2000s to make them more productive for society. In an ideal scenario one would examine the evolution of 'merit' (I and II) subsidies vis-à-vis that of 'non-merit' subsidies to assess this possibility. One could also argue that subsidies used to correct market failures, i.e. merit subsidies (vis-à-vis non merit subsidies) may be good for economic growth. Kohli (2012) argues that government spending, taxes, subsidies, etc. became more 'pro-business' or conducive for economic growth after c1980. However, the lack of comparable and frequent observations across time on this subject, and/or an exogenous shock to the provision of merit/non-merit budgetary subsidies does not permit us to examine this analysis at present.

From the available data on Central Government explicit subsidies we find that major subsidies (including includes subsidies for food, petrol, export promotion, fertilizers, and grants to NAFED for MIS/PPS) have increased from 84.18% of total subsidy payments by the Centre in 1980-89 (on average) to 95.25% of total subsidies in 2000-09. The lion's share of these subsidy payments is attributed to food and fertilizer subsidies, which increased from a combined average of 66.65% of total Central explicit subsidy payments in the 1980s to 89.04% in the 2000s. There is strong evidence to suggest that subsidies on food (wheat, paddy rice, pulses and sugar) are subject to substantial leakages and are poorly targeted to reach the lowest income deciles.[24] Fertilizer subsidies are moreover largely beneficial to Urea and P&K manufacturers as opposed to poor farmers who have more elastic demand for fertilizers. The Economic Survey (2014-15) posits that large farmers are better able to source scarce subsidized agricultural urea, forcing small farmers to primarily purchase urea from the black market, thus incurring about 17% extra expenditure relative to large farmers (all-India estimate). The Survey moreover suggests that only about 35% of fertilizer subsidies reaches small farmers (the intended beneficiaries). The resilience of food and fertilizer subsidies may suggest that PEDI's large farmer and urban classes are still important beneficiaries. There is thus little evidence in favour of the hypothesis that explicit subsidy payments have become more productive (in terms of societal benefit vis-à-vis the fiscal expenditure and opportunity cost of providing the same) in the 2000-09 decade[25]. However, implicit subsidies or state-level subsidies may well be behaving differently and due to data limitations we cannot say much about this. In this context,

[24] 54% of PDS wheat, 15% of PDS rice and 48% of PDS sugar is lost as leakages. Households in bottom 3 deciles consume only 56% of the remaining 46% of PDS wheat, 53% of the remaining 85% of PDS rice and 44% of the remaining 52% of PDS sugar that reaches households. Moreover, only 36% of subsidized pulses is consumed by the bottom 3 income deciles (Economic Survey 2014-15, Volume I).

[25] This observation is not limited to Central Government subsidies. For a comprehensive discussion of the effectiveness of major Central and State Government subsidies see Economic Survey 2014-15 Volume I.

mention must be made of a very recent note by Mundle and Sikdar (2017) that provides some discussion of both explicit and implicit subsidies as well as state-level subsidies, although only for two years 1987-88 and 2011-12. The note points out that budget subsidies, implicit plus explicit, amounted to 10.6% to GDP in 2011-12, down from 12.9% in 1987-88. The share of merit subsidies went up from 3.8% of GDP in 1987-88 to 5.6% in 2011-12. The share of non-merit subsidies declined from 9.1% of GDP in 1987-88 to 5% in 2011-12. The authors conclude that there has been some improved efficiency in this aspect of public expenditure. Further work along these lines can establish if this comparison between two years is part of a broader trend in the composition of total budgetary subsidy payments.

To conclude, the tends in explicit Central government subsidies do not provide evidence in favour of what we call the 'Bardhan subsidy hypothesis', namely, that the subsidy Raj was the most important binding constraint to economic growth in the 1980s. Going back to the questions posed at the beginning of the section, we conclude that there must have been other binding constraints limiting growth whose relaxation due to the process of liberalization contributed to the subsequent increase in average economic growth.

Admittedly, the evidence we provide does not refute PEDI's hypothesis either, since both growth rates and subsidies were clearly driven by other factors during the period we cover, and in the absence of an exogenous shock to the growth or composition of subsidies, we cannot make any causal inference about the impact of subsidies on growth. Nor can we rule out that reforming subsidies will not make significant differences to growth in absolute terms, as opposed to being the most important binding constraint. Also, data limitations prevent us from saying much about other aspects on Bardhan's influential argument, such as whether there has been a fundamental change in the extent, volume or nature of subsidy payments (to make them more inclusive and/or productive) once we take into account implicit and explicit subsidies as well as take into account state-level subsidies, beyond a snapshot provided by Mundle and Sikdar (2017).

3. Concluding Remarks

Curbing non-merit subsidies is a bit like trying to curb pollution. No one wants to give up their own benefits, but everyone realizes that a big chunk of public resources being spent on non-

merit subsidies cannot be good for society overall. In the current Economic Survey of the GOI there is a good discussion of reforming subsidies and making them more pro-poor. However, the main lesson from Bardhan's book is reforming the subsidy Raj is fundamentally a political problem. However, our reading of the academic as well as policy literature suggests that Bardhan's important argument has been as influential as it should have been, beyond token expressions such as "lack of political will" or "populism" or "political constraints on reforms" in the context of reforming the pattern of public expenditure.

Bardhan's argument also highlights the need to think harder about policy reforms that can limit the extent of treating public funds as a "common-property" resource that is then overused (especially by richer and more powerful groups), leading to a collective loss in terms of foregoing opportunities of increasing growth and living standards. Examples that readily come to mind include constitutional amendments that limit the government's ability to borrow, or increasing transparency in budget documents so that implicit non-merit subsidies or wasteful government expenditures become much more visible to public scrutiny. Similarly, while every effort should be made to direct public investment into productive channels, whether it is infrastructure, law and order, investment in human capital, or anti-poverty programmes, we should keep in mind that budgetary allocation is only a necessary condition for effective public investment. Without reforming the institutions of governance and public service provision, simply pumping in more money is not going to solve the problem. In this context, the discussion in policy circles (e.g., the last few Economic Surveys from 2014-15 to 2016-17) as to *how* best to target subsidies to the poor to raise the impact of public funds in achieving the objective of reducing poverty is very welcome. However, the scope of such discussions should be broadened to cover all other areas of public expenditure and not just to subsidies.

Appendix

1. Estimation of Time Trends and Elasticities

To calculate growth rate of a variable (say, z) we have used the following standard OLS regression model:

$$\ln(z) = a_0 + b_0 * t + b_1 * t * D_{90} + b_2 * t * D_{00} + b_3 * t * D_{10} + D_{90} + D_{00} + D_{10}.$$

In the regression equation $D_{90},\ D_{00}, D_{10}$ are decadal dummy variables corresponding to 1990-99, 2000-09 and 2010-13 respectively. The coefficient b_0 gives the growth rate for the 1980s while $b_1, b_2,$ and b_3 gives the incremental growth rate for 1990-99, 2000-09 and 2010-13.

To calculate elasticity of a specific subsidy (z) with respect to per capita income (y), we have used the following OLS regression model:

$\ln(z) = a_0 + b_0 * \ln(y) + b_1 * D_{90} * \ln(y) + b_2 * D_{00} * \ln(y) + b_3 * D_{10} * \ln(y) + D_{90} + D_{00} + D_{10}$. The dummy variables are as above. The coefficient b_0 in this regression gives the elasticity of a specific subsidy with respect to per capita income for the 1980s while $b_1, b_2,$ and b_3 gives the differential elasticity for 1990-99, 2000-09 and 2010-13 with respect to the 1980s.

To test for a trend break in a variable y at time t=T we have used the following OLS regression model:

$$\log y_t = a + \alpha * t + \beta * D_T + \gamma * t * D_T + \epsilon_t$$

Where D_T is a dummy that takes on the value 1 for t ≥ T, and 0 otherwise. The standard method allows for a break both in the intercept and the slope. The coefficients α and γ capture the average growth rate over the entire period, and the increase (if any) in the growth rate from time T onwards, respectively. Table 1 presents the results of tests for trend breaks in GDP per capita for T equal to 1987, 1991 and 2003. The null hypothesis for no trend break in 1987 and 2003 can be rejected at the 10% level and 1% level of significance respectively (column 3).

Table 1: Test for Trend Break in GDP per capita

	(1) ln_gdppc b/se	(2) ln_gdppc b/se	(3) ln_gdppc b/se
Trend 1980-2013	0.028***	0.028***	0.020***
	(0.00)	(0.00)	(0.01)
Trend 1991-2013	0.013***	0.000	
	(0.00)	(0.00)	
Post 1991	-0.049	0.013	
	(0.03)	(0.02)	
Trend 2003-2013		0.019***	0.018***
		(0.00)	(0.00)
Post 2003		0.068***	0.062***
		(0.02)	(0.02)
Trend 1987-2013			0.009*
			(0.01)
Post 1987			0.041
			(0.03)
Constant	9.545***	9.545***	9.567***
	(0.02)	(0.02)	(0.02)
Adj. R-sq	0.99	0.99	0.99
N	34	34	34

The star signs indicate the level of statistical significance with *=10%, **=5% and ***=1%. In column 1, they refer to if the growth or elasticity is significantly different from zero, while in columns 2-4, they refer to if the relevant growth rate or elasticity is significantly different from the corresponding one in column 1.

Table 2 presents the results of tests for trend breaks in Central Government explicit subsidies per capita for T equal to 1990 and 1995. The null hypothesis for no trend break in 1990 and 1995 can be rejected at the 1% level of significance.

Table 2: Test for Trend Break in Subsidies per capita

	(1) ln_subsidiespc b/se	(2) ln_subsidiespc b/se	(3) ln_subsidiespc b/se
Trend 1980-2013	0.086***	0.042***	0.086***
	(0.03)	(0.01)	(0.01)
Trend 1990-2013	-0.022		-0.214***
	(0.03)		(0.04)
Post 1990	-0.592***		0.020
	(0.18)		(0.13)
Trend 1995-2013		0.049***	0.219***
		(0.01)	(0.04)
Post 1995		-0.520***	0.043
		(0.12)	(0.15)
Constant	5.075***	5.248***	5.075***
	(0.13)	(0.09)	(0.08)
Adj. R-sq	0.82	0.89	0.94
N	34	34	34

Table 3 provides results for a trend break test in Gross Capital Formation in the Public Sector (a measure of public investment). The null hypothesis of no trend break in T=1994 and T=2002 can be rejected at the 5% level of significance and 1% level of significance respectively. The trend break in 1994 was followed by a deceleration in public investment from 1994-2001, whereas the trend break in 2002 was followed by a period of accelerated growth.

Table 3: Test for Trend Break in Gross Capital Formation in the Public Sector

	(1) ln_gcfpub b/se	(2) ln_gcfpub b/se	(3) ln_gcfpub b/se
Trend 1980-2011	0.041***	0.026***	0.041***
	(0.01)	(0.00)	(0.01)
Trend 1994-2011	0.023**		-0.035**
	(0.01)		(0.02)
Post 1994	-0.297***		-0.083
	(0.10)		(0.08)
Trend 2002-2011		0.077***	0.097***
		(0.01)	(0.02)
Post 2002		-0.052	0.067
		(0.08)	(0.09)
Constant	13.888***	13.967***	13.888***
	(0.07)	(0.04)	(0.05)
Adj. R-sq	0.90	0.94	0.95
N	32	32	32

2. List of Data Sources

- Central Government Explicit Budgetary Subsidies and its components: downloaded from the EPWRF Government Finances of India database
- Gross Domestic Product: downloaded from the Reserve Bank of India Handbook of Statistics on the Indian Economy 2014-15
- Population data: downloaded from the Reserve Bank of India Handbook of Statistics on the Indian Economy 2014-15
- Consumer Price Index (CPI-IW): Downloaded from the EPWRF Price Indices database. Time series (1980-14) constructed using link factors specified in the database. The time series was subsequently re-based to 2004-05
- Gross Capital Formation (both total and in the Public Sector): downloaded from the Reserve Bank of India Handbook of Statistics on the Indian Economy 2014-15

- Public Debt and General Government Debt data downloaded from the Reserve Bank of India Handbook of Statistics on the Indian Economy 2014-15. Public debt is defined, as per Ministry of Finance, Department of Economic Affairs, Budget Division, Government Debt Status Paper – January 2016, http://finmin.nic.in/reports/govt_debt_status_paper_2016.pdf.

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