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Profitability in India's Organized Manufacturing Sector: The Role of Technology, Distribution and Demand

Deepankar Basu and Debarshi Das*

Using aggregate data from the Annual Survey of Industries, we analyze profitability in India's organized manufacturing sector from 1982–83 to 2012–13. Over the whole period of analysis, the rate of profit grew at about 1% per annum, primarily driven by a rising share of profits. We use visual inspection to identify five shorter-run profitability regimes: 1982–91, 1991–96, 1996–2001, 2001–07 and 2007–12. Profit rate decomposition analysis shows that both technological factors and aggregate demand have been important determinants of changes in profitability in these shorter periods.

Key words: Organized manufacturing, India, Profitability, Technology and distribution
JEL classifications: B51, E11

1. Introduction

Theories of economic growth have established a direct, proportional link between the rate of profit and the long-run equilibrium growth rate of output. This goes back as far as Ricardo and has been reiterated by later theorists like von Neumann, Harrod, Kaldor and even those belonging to the neo-classical tradition.[1] To avoid problems arising from both oversupply and scarcity of labour, the growth rate of output must be equal to the growth rate of labour supply (in terms of physical units and productivity). If all savings are invested, this will immediately establish a proportional relation between rate of profit and the long-run rate of growth of the capital stock, as long as the savings propensity is fixed.

Kaldor (1961) contended that in the Marxist framework a crisis erupts when the labour absorption rate, which is the growth rate of the economy, is higher than the growth of labour supply. The excess of the growth of labour demand over labour supply eats into the reserve army of labour. The result is rising wage rates and falling profit rates,

Manuscript received 17 March 2015; final version received 21 March 2016.
Address for correspondence: Deepankar Basu, Department of Economics, University of Massachusetts, Amherst; email: dbasu@econs.umass.edu

* Indian Institute of Guwahati. Debarshi Das thanks the Fulbright-Nehru Foundation for facilitating his visit to UMass, Amherst. Data and computer code files for the analysis in our paper are available upon request. Any reader who wishes to access this data can do so by sending me am email. I will be happy to share the data, computer code files and a README file.

[1] See Kaldor's (1961) extensive survey article for a reference to the previous literature.

which jeopardises accumulation of capital.[2] Kaldor (1961) argued that such a situation of labour scarcity might bring down the profit rate. Declining profit rate effected by the rising wage rate would bring about a change in the distribution of income between wages and profits, and that is exactly what is needed to get the economy back onto a new long-run equilibrium path. A new steady state would be established after the profit rate declines sufficiently and rate of growth, which is a fraction of rate of profit, becomes equal to the growth of labour supply. Thus, after a transition, which is swift with fixed coefficient production but gradual in a neo-classical model with infinite substitution possibilities between labour and capital, the economy would settle down to a steady state where the growth rate of output is low and this rate is equal to the growth rate of labour.[3]

The upshot is that the rate of profit and the distribution of income (between profits and wages) play vital roles in the determination of growth. While the long-run steady state growth rate is proportional to the rate of profit, changes in distributional shares can help the system move towards the steady state if it is off course.

At an operational level, since it is plausible to suggest that firms are, among other things, motivated by the desire and need to make profits, the rate of profit naturally enters as an important determinant of the investment decision. As investment leads to growth of output through accumulation of capital, the rate of profit has a positive effect on the rate of growth *ceteris paribus*. It also affects accumulation through another channel. A high profit rate leads to higher flow of profit income (in proportion to capital invested) and eases liquidity constraints. In the presence of credit market imperfections, this has a positive impact on the ability of the firms to undertake future investments.[4]

The simple positive relationship between the rate of profit and the rate of growth seems to be borne out by data from India's organised manufacturing sector. Figure 1 is a scatter plot of the annual rate of profit (x-axis) and the annual rate of growth of net value added (y-axis) in India's organised manufacturing sector between 1982–83 and 2012–13. Figure 1 also includes the regression line obtained by regressing the growth rate on the profit rate and a constant (estimated with OLS). This simple bivariate regression shows that the rate of profit and the rate of growth of net value added were positively correlated with each other over the three-decade period, 1982–83 to 2012–13, in India's organised manufacturing sector.

It seems natural therefore that research analysing growth would give primacy to the profit rate. However, this is seldom the case in the neoclassical growth literature.[5]

[2] '[B]ecause the economy grows at a higher rate than λ [the maximum rate of growth of population], sooner or later capital accumulation must overtake labour supply. According to Marx this is precisely the situation which leads to a crisis' (Kaldor, 1961). However, within the Marxist tradition, this is not the only mechanism that has been highlighted as a cause of crisis. There is a large body of literature probing the many sources of crisis, including underconsumption, rising organic composition of capital, profit squeeze, problems of disproportionality, longer-term institutional problems, etc. (Sweezy, 1942; Shaikh, 1978; Kotz, 2009; Basu, In press). Although interesting, this question about how the inception of a crisis is theorized within the Marxist tradition lies outside the scope of the present paper.

[3] What would happen if the new steady state rate happens to be lower than what Kaldor calls 'minimum necessary compensation to the capitalists'? Kaldor's answer is less than convincing here. It is not clear why in such a case growth will take place in periodic spurts, as he claimed.

[4] For evidence on the positive impact of profitability on investment in India's organized manufacturing sector, see Basu and Das (In press).

[5] For example, the exhaustive survey article by Kotwal *et al.* (2011) discusses different hypotheses that could explain changing economic growth in recent decades in India. One hypothesis is that the import of new capital equipment in a liberalised economy pushed up productivity and growth. Another hypothesis is that reallocation of factors in an efficient way due to heightened competition, which is attributed to liberalization, enhanced the growth rate. It is worth noting that none of these mechanisms would work without healthy profitability. However, profitability does not enter the discussion at all.

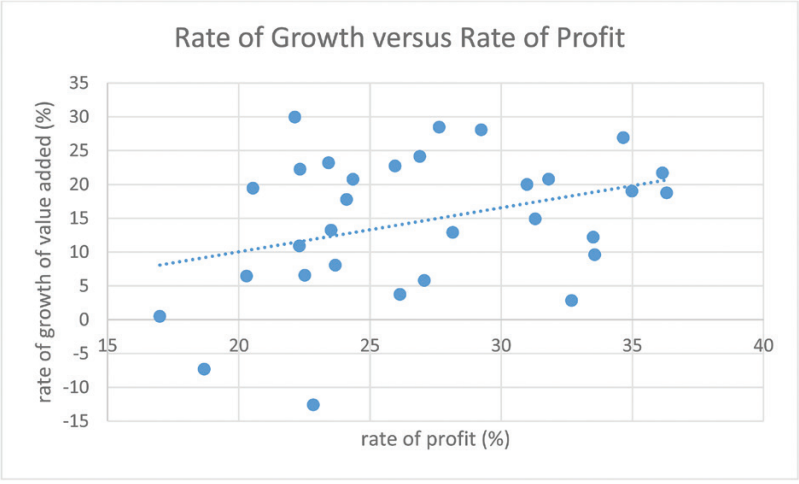

Figure 1: *Scatter plot of the annual rate of growth of value added versus the annual rate of profit in the organized manufacturing sector in India, 1982–2012. The linear regression line has a slope of 0.61 with a standard error of 0.303 (p-value = 0.053).*
Source: authors' calculations.

The heterodox tradition has been more alive to the importance of profitability (Glyn and Sutcliffe, 1972; Body and Crotty, 1975; Weisskopf, 1979; Shaikh, 1987; Moseley, 1991; Duménil and Lévy, 1993; Basu and Vasudevan, 2013). By according the rate of profit an important role in determining the trajectory of capital accumulation and through an examination of the determinants of changes in the profit rate, this body of research has made important contributions towards understanding advanced capitalist economies.

Similar studies for developing economies are hard to come by.[6] This is not surprising because capitalism, as a mode of production, has not developed fully in such countries. A large part of the workforce is engaged in the agricultural sector where family labour–based, petty production dominates.[7] In the industrial sector an overwhelming number of firms belong to the unorganized sector. They are small in size and depend on family labour. In India, in 2000–2001, for example, the unorganized sector accounted for nearly 86% of the total manufacturing sector workforce (Marjit and Kar, 2009).[8]

Although capitalism has not developed fully, the size of the capitalist sector is by no means negligible in big economies like India. In 2012–13, the organised manufacturing sector, a subset of the capitalist sector in India, had 222,120 factories employing 10 million workers. In the same year, it produced a net value added of 8,602 billion Indian rupees (about 139 billion US dollars) that accounted for about 10% of Indian GDP. This is perhaps the reason why studies have appeared from time to time probing the profitability of the organised manufacturing sector in India. Sau (1989) took a subset

[6] Sau (1989) and Marquetti *et al.* (2010) are exceptions in this regard. The former studies profitability trends in a subset of India's organized manufacturing sector and the latter examines the changing trends of profit rate for the whole Brazilian economy.
[7] See Basu and Das (2013) for an analytical exposition.
[8] The unorganised sector comprises two types of firms: (a) those using power and employing less than 10 workers, and (b) those not using power and employing less than 20 workers.

of the total organised manufacturing sector with data running from 1969 to 1986 and found a non-declining trend of profit rate, which is at variance with the profit rate trend in the advanced capitalist economies till the mid-1970s. Sau (1989) attributes this to the ability of the bourgeoisie to reduce the share of labour in national income. In a more recent contribution, Felipe and Kumar (2010) find a mild decline in the profit rate from 1980 to 2001, and a rise thereafter.

Both of the above studies were motivated by a Marxist theoretical framework. There are other papers which do not work within such a framework but which have, nonetheless, offered analyses that are useful from a Marxist perspective. In their study of organized manufacturing in India, Balakrishnan and Babu (2003) attribute the acceleration of growth after 1991—the beginning of neoliberal reforms—to the rise in investment (as a share of output). Higher investment was, in turn, driven partly by higher animal spirits (due to policy changes) and higher profitability.

The focus of Kannan and Raveendran (2009) is a little different: employment generation in the organised manufacturing sector. For the quarter century from 1981–82 to 2004–05, as well as the pre- and post-reform sub-periods separated by the year 1991–92, they find evidence of 'jobless growth' that is caused by rising capital intensity at the expense of employment growth. The resulting growth in labour productivity is largely appropriated by capital, so that labour loses both in terms of employment and an adverse movement of distribution.

This paper analyses profitability trends in India's organised manufacturing sector over the past three decades. We contribute to two sets of literature—the Marxist literature on profitability analysis and the Indian literature on growth and distribution—in several ways. First, we calculate consistent time series of the replacement cost capital stock and the corresponding rate of profit in India's organized manufacturing sector from 1982–83 to 2012–13. In calculating the rate of profit, we pay close attention to the difference between productive and unproductive labour, an important issue in the Marxist literature. Second, we use our preferred measure of the rate of profit for carrying out a decomposition analysis to understand the underlying drivers of profitability in terms of three distinct factors: technology, distribution and aggregate demand.

We find that over the entire period from 1982–83 to 2012–13, the rate of profit has a positive trend growth, and that the rising share of profit income seems to be the principal reason behind this. The thirty-year period can be broken down into shorter periods depending on changes in the trend of the profit rate. Using turning points in the time-series plot of the rate of profit, we identify five short-run regimes: 1982–91, 1991–96, 1991–2001, 2001–07, and 2007–12. Our decomposition analysis shows that in three of the five periods, changes in technology (captured by the full-capacity output-capital ratio) had the greatest effect on changes in the profit rate; the change in aggregate demand (captured by the capacity utilization rate) was the key driver of profitability in two of these five short-run periods; changes in the distribution of income (captured by the profit share) were important in some periods but never had the greatest numerical effect on the change in the rate of profit.

The rest of the paper is organized as follows. In Section 2, we discuss trends in profitability in India's organized manufacturing sector to motivate the analysis in this paper. In Section 3, we outline the methodology of profit rate decomposition, our main analytical framework. In Section 4, we present results of profit rate decomposition.

The last section concludes the paper with some thoughts about future research. Details of data sources and construction of variables are collected in an Appendix.

2. Trend of profitability

2.1. Measure of the rate of profit

In this section we study the trend in the rate of profit, R, defined as

$$R = \frac{\Pi}{K} \tag{1}$$

where Π is the flow of profit income over a year, and K is the replacement (current) cost stock of fixed capital at the beginning of the year. To analyse profitability trends in India's organised manufacturing sector, we look at three different measures of the flow of profit income. The broadest measure of profit flow is the difference between net value added and the compensation (wages and benefits) of workers, Π_1. A narrower measure of profit flow removes the compensation of unproductive labour (supervisors and managers) from Π_1 to get Π_2. The narrowest measure removes interest and rent payments from Π_2 to arrive at Π_3.[9]

The first measure, Π_1, is our preferred measure because it comes closest to approximating the classical-Marxist definition of the rate of profit as the ratio of the surplus value and the stock of capital. Consistent with a Marxist understanding, according to the first measure, surplus value includes compensation of unproductive labour (supervisors and managers), rent and interest payments, and profit of enterprise (that part of surplus value which remains with capital enterprises after paying rent and interest to rentiers).

While most of the analysis in this paper works with the first measure, we plot time series of all the three measures in Figure 2 and also provide the underlying data in Table 1.

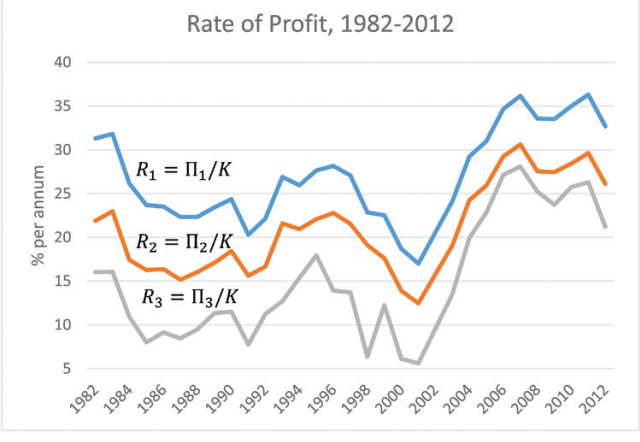

Figure 2: *Rate of profit (various measures) in the organized manufacturing sector in India, 1982–2012. K is the current cost net stock of fixed capital; Π_1 is net value added less compensation (wages and benefits) of productive workers; Π_2 is Π_1 less compensation of supervisors and managers; Π_3 is Π_2 less rent and interest payments.*

Source: authors' calculations.

[9] Details of data sources and construction of variables are available in the Appendix.

Since other researchers have often used Π_2 or Π_3 in their analysis, Figure 2 will help in comparison with existing results (Sau, 1989; Balakrishnan and Babu, 2003). Interestingly, all the three profit rates display very similar trends over this three-decade period. Hence, our analysis of profitability trends is robust to these different measures of the rate of profit. But since the first measure is our preferred measure for theoretical reasons, we will use it for analysis and discussions in the rest of the paper.

2.2. Broad trends and periodization

Over the whole period of our analysis, 1982–83 to 2012–13, the rate of profit increased at about 1% per annum in India's organized manufacturing sector. But as Figure 2 makes clear, this three-decade period was composed of very different shorter-run regimes of profitability. We use visual inspection of the time-series plot of the rate of profit (R1) in Figure 2 to identify turning points in the trend of the profit rate. These turning points, in turn, help us identify the following five shorter-run regimes of fluctuating profitability: 1982–91, 1991–96, 1996–2001, 2001–07, and 2007–12.[10]

The first period, from 1982–83 to 1991–92, was a period of declining profitability. The rate of profit fell from 31.3% in 1982–83 to 20.30% in 1991–92. The compound annual growth rate (CAGR) over this period was –4.24% per annum. The second period ran from 1991 to 1996, when the rate of profit increased at a CAGR of 5.6%, increasing from 20.3% to 28.16%. This was followed by a period of declining profitability: the rate of profit fell from 28.16% to 17.00%, declining at a CAGR of –8.7%. The next period, 2001–07, saw a rapid recovery in profitability, with the rate of profit increasing at a CAGR of 11.38%, from 17% in 2001–02 to 36.15% in 2007–08. The last period, 2007–12, witnessed declining profitability, with the rate of profit falling at a CAGR of –1.66%. To analyse these divergent empirical trends, we will use an analytical framework organized around profit rate decomposition. We explain this in the next section.

3. Profit rate decomposition

To understand the underlying drivers of profitability, we will adopt a profit rate decomposition methodology that goes back to the pioneering work of Weisskopf (1979) and has also been used by many later studies for studying short-run capitalist dynamics (e.g. see Bakir and Campbell, 2009; Kotz, 2009; Izquierdo, 2013).

To study the drivers of profitability, the rate of profit is decomposed into the product of three factors, the share of profit, the capacity utilisation rate and the capacity-capital ratio, i.e.

$$R \equiv \frac{\Pi}{K} = \left(\frac{\Pi}{Y}\right) \times \left(\frac{Y}{Z}\right) \times \left(\frac{Z}{K}\right) \tag{4}$$

where R is the rate of profit, Π is total profits, K is the stock of fixed capital, and Y is value added, and Z is capacity-output. In decomposition in (4), the profit share, Π / Y,

[10] An alternative method would be to use the statistical methodology of structural break tests to identify different regimes of profitability. Our sample size of 31 observations is not large enough to carry out such an analysis with reasonable statistical power. Hence, we adopt the method of visual inspection.

Table 1. *Basic data on India's organized manufacturing sector*

	Y	K	WP	WUNP	RENT	INT	WPIMAC	CPIIW	WPIMFG
1982–83	1667368	3470259	581081.13	327072.87	19706	407611	29.58	18.97	25.59
1983–84	2013718	4222931.19	670283.74	373302.26	22460	469881	30.69	21.35	27.15
1984–85	2088716	5062930.84	764930.94	441812.06	25852	533774	32.28	22.69	29.05
1985–86	2256813	6120877.48	807208.10	454024.90	32566	614809	34.92	24.23	30.78
1986–87	2555224	7067110.17	892794.46	505936.54	35942	708763	36.61	26.35	31.95
1987–88	2833360	8155807.25	1013380.36	583881.64	44751	862606	38.04	28.65	34.24
1988–89	3463480	10103835.1	1206664.16	637328.84	59620	969355	43.37	31.35	37.46
1989–90	4266281	12287195.1	1388040.12	778200.88	72808	1213680	47.80	33.27	41.69
1990–91	5151459	14743386.1	1560508.12	874680.88	88474	1488850	51.82	37.12	45.20
1991–92	5482702	18972525	1631489.78	887398.22	119117	1881190	59.92	42.12	50.29
1992–93	7124819	23163217	1996104.98	1272434.02	140144	2262427	66.32	46.15	55.78
1993–94	8843399	24977590.8	2123927.41	1332750.59	181329	2345535	68.44	49.62	60.13
1994–95	10851699	31679048.5	2628143.29	1590059.71	234507	2678240	75.61	54.62	67.53
1995–96	13939719	37961831.3	3446197.36	2112503.64	387506	3588806	79.74	60.19	73.30
1996–97	15735887	44532208.3	3197424.98	2390007.02	426234	3994437	82.52	65.77	74.80
1997–98	16644124	48428094.8	3531909.97	2678960.03	418451	4560700	82.24	70.38	76.97
1998–99	14546105	52802602.5	2482648.00	1979937.00	409083	3969283	82.74	79.62	80.34
1999-00	15497442	54356076	3256534.31	2666611.69	453117	4387703	82.81	82.31	82.50
2000–01	14362141	58801574.4	3374768.02	2810969.98	407862	4198659	87.73	85.38	85.21
2001–02	14430212	64840192.1	3409614.79	2935306.21	375118	4221788	92.08	89.04	86.77
2002–03	17234004	65984755.5	3678546.26	3155666.74	379356	3835182	92.94	92.69	89.06
2003–04	20295377	68471161.8	3785343.55	3460089.45	416084	3397229	94.65	96.15	94.11
2004–05	25990686	74894768.6	4089771.25	3741510.75	453845	3245360	100.00	100.00	100.00
2005–06	31186419	86065393	4514238.12	4356132.88	529948	3339801	105.14	104.23	102.40
2006–07	39572526	98840311.4	5319146.65	5339357.35	640399	4131128	110.98	111.35	108.20
2007–08	48159268	116490480	6050689.92	6451741.08	750549	5148688	118.83	118.47	113.40
2008–09	52776558	136254449	7034400.84	8199219.16	975778	6868048	124.47	129.16	120.40
2009–10	59211387	152343397	8153395.41	9232643.59	1200490	7331793	124.25	145.20	123.10
2010–11	70457581	172953100	9947822.84	11342182.16	1349336	8802079	127.76	160.34	130.10
2011–12	83670291	198644909	11542858.98	13279321.02	1619529	12065632	131.73	173.70	139.50
2012–13	86024349	223968426	12809267.24	14746871.76	1641862	13794240	135.18	191.52	147.10

Notes: Y = net value added (Rs. Lakh); K = replacement cost capital stock (Rs. Lakh); WP = total compensation of productive labour (Rs. Lakh); WUNP = total compensation of unproductive labour (Rs. Lakh); RENT = rent paid (Rs. Lakh); INT = interest payments (Rs. lakh); WPIMAC = wholesale price index of machines & machinery (index, 2004–05 = 100); CPIIW = consumer price index for industrial workers (index, 2004–05 = 100); WPIMFG = wholesale price index of manufactured products (index, 2004–05 = 100).

captures the effect of the distribution of income between capital and labour on the rate of profit; the capacity utilization rate, Y / Z, captures the effect of fluctuations in aggregate demand on the rate of profit; and the capacity-capital ratio, Z / K, captures the effect of technology on profitability.

To analyse the dynamics of the underlying drivers of distribution, the profit share is further decomposed as follows:

$$\frac{\Pi}{Y} = \frac{Y - W}{Y} = 1 - \frac{W}{Y} = 1 - \frac{w_r}{y_r} \times \frac{P_w}{P_y} = 1 - \frac{w_r \lambda_{wy}}{y_r} \tag{5}$$

where W is the total wage bill, L is the number of workers, P_w is the price of index of wage goods, and P_y is the price index of output. In (5), $w_r = W / (L \star P_w)$ is the real wage, $y_r = Y / (L \star P_y)$ is the real labour productivity, and $\lambda_{wy} = P_w / P_y$ is the ratio of the price index of wage goods (we use the consumer price index for industrial workers) and the price index of output (we use the wholesale price index for manufactured products).

It is worth distinguishing between the real wage rate, w_r, and the product wage rate, $w_p = w_r \times \lambda_{wy}$. The real wage rate captures the real purchasing power of the money wage rate and is relevant to analysing the living standard of workers. On the other hand, the product wage rate can be thought of as a measure of the relative bargaining power of capital and labour in an oligopolistic setting. The profit share rises whenever real productivity (y_r) grows at a faster rate than the product wage rate, reflecting changes in the mark-up that firms can set on unit costs.

To analyse the underlying drivers of technological change, by disentangling real factors and changes in relative prices, the capacity-capital ratio is decomposed as

$$\frac{Z}{K} = \frac{Z_r P_y}{K_r P_k} = \frac{z_r}{k_r \lambda_{ky}} \tag{6}$$

where $z_r = Z_r / L$ is real capacity output per unit of labour, $k_r = K_r / L$ is real capital stock per unit of labour, and $\lambda_{ky} = P_k / P_y$ is the ratio of a price index of capital stock (P_k) and output (P_y).

Our main interest is not in the levels of these variables but in their changes over time. Moreover, we would like to investigate the contribution of different drivers to changes in the rate of profit and its three components, the profit share, the capacity utilisation rate, and the capacity capital ratio.

For any variable x, let

$$\hat{x} = \frac{d}{dt} \log(x) = \frac{1}{x} \frac{dx}{dt} \tag{7}$$

denote its growth rate. Then, logarithmic differentiation of (4) shows that the growth of the profit rate is the sum of the growth rates of the profit share and the output-capital ratio

$$\hat{R} = \frac{\hat{\Pi}}{Y} + \frac{\hat{Y}}{Z} + \frac{\hat{Z}}{K}. \tag{8}$$

Logarithmic differentiation of (5) gives

$$\frac{\hat{\Pi}}{Y} = \frac{W}{\Pi} \times \left(\hat{y}_r - \hat{\lambda}_{wy} - \hat{w}_r \right) \tag{9}$$

where W / Π is the 'initial value' of the wage-profit ratio,[11] and logarithmic differentiation of (6) gives

$$\frac{\hat{Z}}{K} = \hat{z}_r - \hat{k}_r - \hat{\lambda}_{ky} \tag{10}$$

Using (8), (9) and (10), we can study the contribution of different factors to the growth rate of the rate of profit over relevant periods. Thus, the final equation capturing our decomposition analysis of the rate of profit is given by

$$\hat{R} = \frac{W}{\Pi} \times \left(\hat{y}_r - \hat{\lambda}_{wy} - \hat{w}_r \right) + \frac{\hat{Y}}{Z} + \left(\hat{z}_r - \hat{k}_r - \hat{\lambda}_{ky} \right) \tag{11}$$

4. Results

4.1. The long-run story

Results of the profit rate decomposition analysis, i.e. estimates of the three components of the decomposition formula in (11), are collected together in Table 2 for the organized manufacturing sector in India. To increase the robustness of our results, we use three different methods of computing growth rates: in Panel A, we use growth rates computed as the compound annual growth rate using end-points of every period; in Panel B, we use growth rates computed as the arithmetic mean of year-on-year growth rates; and in Panel C, we use growth rates computed by regressing each variable on a constant and a linear time trend. Before we look at the results for the five periods separately, let us look at the evolution of the rate of profit over the whole period, 1982–83 to 2012–13, which is given in the last row of each panel in Table 2.

Depending on the method of computing the average growth rate over the whole period, the rate of profit increased between 0.14% (Panel A) and 0.96% per annum (Panel C). Looking at the three components of the rate of profit, we see that the positive growth rate of the rate of profit was entirely driven by the growth in the share of profit, which grew between 0.87% per annum (Panel A) and 1.15% per annum (Panel C) over this period.[12] Over this three-decade period, the capacity utilization rate did not change much—growing between 0.08% per annum and –0.09% per annum. The third component, the output-capital ratio, declined between –0.13% per annum

[11] Following Weisskopf (1979), in our calculations (as reported below in Table 2), we use the geometric mean of the wage-profit ratio over the relevant period (instead of a single, 'initial' year). This ensures that our results are not affected by any unusual 'initial' year.

[12] Note that what we are calling the 'share of profit' is really the 'share of surplus value', where surplus value is the difference between value added and the compensation of productive labour. Thus, what we are calling the share of profit includes not only profit of enterprise but also other forms in which surplus value is redistributed: compensation of unproductive labour, interest, rent, dividend, taxes.

Table 2. *Profit rate decomposition and contributions (average annual growth rate, % per annum)*

	Rate of Profit				Profit Share				Capacity-Capital Ratio		
	(1)=(2)+(3)+(4)				(2)=(8)*[(5)-(6)-(7)]				(4)=(9)-(10)-(11)		
	Rate of Profit	Profit Share	Capacity Utilization Rate	Capacity-Capital Ratio	Real Labour Productivity	Real Wage Rate	CPIIW / WPIMFG	Geometric Mean of Wage /Profit	Real Capacity-Labour Ratio	Real Capital-Labour Ratio	WPIMAC / WPIMFG
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A											
1982–91	-4.24	0.76	-1.33	-3.67	5.36	2.44	1.23	0.51	6.71	10.44	0.30
1991–96	5.60	2.12	3.93	-0.50	9.01	1.47	0.81	0.33	7.36	9.29	-1.27
1996-01	-8.07	-0.70	-3.34	-4.22	-0.74	-0.80	2.61	0.27	-0.52	4.54	-0.64
2001–07	11.38	1.95	2.09	7.01	9.24	-0.45	0.26	0.20	11.99	4.84	-0.18
2007–12	-1.66	-0.45	-1.11	-0.11	1.96	1.11	3.74	0.16	6.66	9.14	-2.16
1982-12	0.14	0.87	-0.09	-0.63	5.74	1.02	1.83	0.29	7.44	8.92	-0.74
Panel B											
1982–91	-4.35	0.87	-1.30	-4.01	6.18	2.83	1.41	0.51	7.51	11.69	0.37
1991–96	7.08	2.59	4.79	-0.33	11.01	2.00	1.03	0.33	8.94	11.31	-1.51
1996-01	-9.39	-0.79	-3.73	-5.02	-0.78	0.51	3.18	0.27	-0.58	5.50	-0.73
2001–07	13.60	2.29	2.49	8.32	10.87	-0.50	0.31	0.20	14.15	5.74	-0.19
2007–12	-1.82	-0.54	-1.19	-0.12	2.41	1.35	4.54	0.16	8.08	11.07	-2.59
1982-12	0.73	0.93	0.08	-0.45	6.14	1.39	1.94	0.29	7.83	9.30	-0.73
Panel C											
1982–91	-3.97	0.80	-1.05	-3.72	5.87	3.19	1.04	0.51	7.19	10.57	0.34
1991–96	6.47	2.18	4.67	-0.37	9.74	2.67	0.57	0.33	8.39	10.67	-1.91
1996-01	-10.43	-1.00	-4.10	-5.33	-0.73	-0.12	3.01	0.27	-1.28	4.99	-0.95
2001–07	12.72	2.31	2.15	8.26	10.08	-0.99	0.10	0.20	13.68	5.61	-0.19
2007–12	-0.64	-0.44	-0.24	0.04	2.98	1.23	4.55	0.16	7.84	10.52	-2.73
1982-12	0.96	1.15	-0.06	-0.13	5.81	0.38	1.63	0.29	7.30	8.08	-0.65

Source: authors' calculation; CPIIW = consumer price index for industrial workers; WPIMAC = wholesale price index for machines and machinery; WPIMFG = wholesale price index for manufactured products. In Panel A, growth rates refer to the compound annual growth rate computed by using the end-points; in Panel B, growth rates refer to the arithmetic mean of the year-on-year growth rates; and in Panel C, growth rates are computed by the regression of the logarithm of a variable on a constant and a linear time trend.

(Panel C) and –0.63% per annum (Panel A). Thus, over the long-run period from 1982–83 to 2012–13, profitability in India's organized manufacturing sector has been kept up by a regressive redistribution of income away from productive labour. India's organized manufacturing sector has not displayed much technological dynamism: the capacity-capital ratio has, in fact, *declined* over this three-decade period (no matter which method is used to compute the average growth rates).

What accounts for the rise in the share of profit income over this three-decade period? Columns 5 through 8 in the last row of each panel in Table 2 provide an answer to this question. Since all the three panels give qualitatively similar answers, let us use one of them, Panel A, for the subsequent discussion. The figures in Panel A show that over this three-decade period, real labour productivity has increased at an impressive rate of 5.74% per annum. In contrast, the product wage rate (the sum of columns 6 and 7) has increased at only 2.85% per annum. Thus, it seems that firms have been able to capture an increasing part of productivity growth. This close to 2-fold difference in the rates of growth of productivity and the product wage rate accounts for the regressive redistribution of income away from productive labour in India's organized manufacturing sector since the early 1980s.

Two further issues should be noted. First, the average annual increase in the product wage rate, even if less than half that of real productivity, was substantial by itself. But this did not lead to a robust increase in the real wage rate because of adverse movement of relative prices. The consumer price index for industrial workers increased much faster than the wholesale price index for manufactured products (the ratio of the two grew at 1.83% per annum). Thus, an average annual growth rate of 2.85% in the product wage rate gave only a mild growth rate of 1.02% per annum of the real wage rate.[13] Thus, workers lost not only in terms of the wage share but also in terms of the purchasing power of their wage. Second, turning to column 10 in the last row of Panel A in Table 2, we see that the reason for the growth of labour productivity has been significant capital deepening: the real capital-labour ratio has increased at 8.92% per annum over this three-decade period.

Thus, the long-run dynamics in India's organized manufacturing seems to be a trend of rapid capital deepening leading to rising labour productivity, with the lion's share of productivity growth appropriated as surplus value. There is some evidence of technological stagnation, in terms of a mild fall in the capacity-capital ratio.[14] Taken together, this means that the regressive income redistribution and not technological progress has kept profitability rising over the long run in India's manufacturing sector. Of course, the long-run trend hides interesting shorter-run changes, and to these we turn next.

4.2. Period-wise decomposition

We can organize the discussion of period-wise decompositions into two parts, the first relating to periods of negative growth of the rate of profit and the second relating to periods of positive growth in the rate of profit.

[13] Balakrishnan and Babu (2003) also report this seemingly paradoxical finding: robust growth in the product wage rate but tepid growth of the real wage rate.

[14] While there is an overall fall in the capacity-capital ratio over this three-decade period, it is clear from Figure 3 that there are two distinct regimes. The first regime runs from the early 1980s to the late 1990s, when the capacity-capital ratio fell; the second regime runs from the early 2000s onwards, when the capacity-capital ratio grew sharply. The specific forms and types of technical change that could account for some of these differences are important issues that need close investigation; these are beyond the scope of our paper.

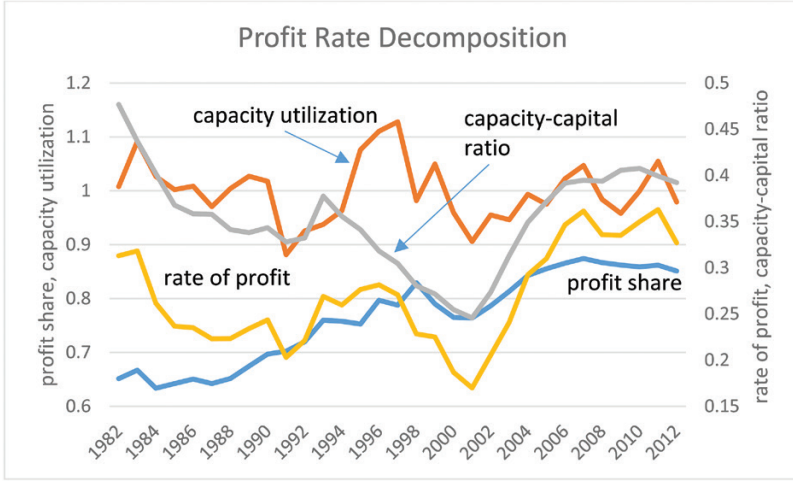

Figure 3: *Decomposition of the rate of profit (R1 in Figure 2) into the profit share, the capacity utilization rate (ratio of actual and potential output), and the capacity-capital ratio (ratio of capacity output and capital stock).*
Source: authors' calculations.

4.2.1. Periods of declining profitability. From Table 2, we see that the following periods witnessed negative growth in the rate of profit: 1982–91, 1996–2001 and 2007–12. According to the figures in Panel A in Table 2, over the first period, 1982–91, the decline in the rate of profit was primarily driven by the change in the capacity-capital ratio, which accounted for 87% (= –3.67/–4.24) of the fall in the profit rate. Turing to columns 9 through 11, we see that the decline in the capacity-capital ratio was caused by the fact that the increase in the real capital-labour ratio swamped the increase in the real capacity-labour ratio.

In the second period, 1991–96, the decline in the rate of profit was driven almost equally by the change in the capacity-capital ratio and the capacity utilisation rate, the former accounting for 50% (=–4.22/–8.07) and the latter 41% (= –3.34/–8.07) of the fall in the rate of profit. The fact that the capacity-utilization rate fell rapidly during this period suggests that there was a severe problem of effective demand. On the other hand, the decline in the capacity-capital ratio was caused by the fact that a rapid growth in the real capital-labour ratio could not generate any growth in the real capacity-labour. In fact, even as the real capital-labour ratio increased at 4.54% per annum, the real capacity-labour ratio *declined* by –0.52% per annum.

During the third period, 2007–12, the fall in the rate of profit was primarily driven once again by the change in the capacity utilization rate, which accounted for 67% (= –1.11/–1.66) of its fall, and secondarily by the change in the profit share, which accounted for 27% (= –0.45/–1.66) of its fall. Thus, apart from a contraction in aggregate demand, the fall in the profit rate was caused by a fall in the profit share. What are the reasons for the decline in the share of profit over this period? From columns 5 through 7 in Panel A of Table 2, we see that the share of profit fell because the growth rate of the product wage (sum of columns 6 and 7) was higher than the growth rate of real labour productivity (column 5). But it is worth noting that the growth of the product wage was primarily driven by changes in relative prices: the ratio of the CPIIW

and WPIMFG increased at 3.74% per annum; and the real wages increased at 1.11% per annum. Thus, the growth rate of real wages, at 1.11% per annum, was lower than the growth rate of real labour productivity, which increased at 1.96% per annum. This implies that the increase in the share of wages (or the fall in the share of profits) was not caused by relatively rapid increase in real wages, but by the adverse movement of the price of wage goods vis-à-vis the price of manufactured goods. This is a case of what Weisskopf (1979) termed a defensive victory of labour over capital; if the fall in the share of profits was driven primarily by the growth of the real wages, that would have counted as an offensive victory.

4.2.2. Periods of increasing profitability. From Table 2 we see that the following two periods witnessed positive growth in profitability: 1991–96 and 2001–07. Over the first period, 1991–96, the increase in the rate of profit was driven primarily by the change in the capacity utilization rate, which accounted for 70% (= 3.93/5.60) of the increase, and secondarily by the change in the profit share, which accounted for 38% (= 2.12/5.60) of the increase in the profit rate. Over the second period, the increase in the rate of profit was largely driven by the change in the capacity-capital ratio, which accounted for 65% (= 7.01/11.38) of the increase, with changes in the profit share and capacity utilization rates playing equally important but secondary roles. There are interesting differences and similarities between these two periods of positive profitability growth.

During the first period, the increase in the rate of profit is primarily driven by favourable changes in aggregate demand (as captured by the large positive change in the capacity utilization rate). On the other hand, favourable changes in aggregate demand did not play the most important role in the second period of positive profitability change. The increase in profitability during the second period was primarily driven by favourable changes in technology (as captured by a large and positive change in the capacity-capital ratio).

A key similarity between these periods rests on the fact that they both benefitted from positive growth in the profit share, the first at 2.12% per annum, and the second at 1.95% per annum. When we investigate the underlying factors that led to growth of the profit share, we see some important patterns. Both periods witnessed rapid growth in real labour productivity, the first at 9.01% per annum, and the second at 9.24% per annum. But there is a crucial difference between the two periods: while real wages increased at 1.47% per annum during the first period, it declined at –0.45% per annum during the second.

5. Conclusion

Growth in capitalist economies is intimately related to profitability. This is because capitalist firms, to a large extent, are motivated by the need and desire to make profits. Even though capitalist relations of production have not fully taken root in the Indian economy—large parts of the countryside remain dominated by the logic of simple commodity production—the organized manufacturing sector is, by all accounts, a capitalist enclave. This means that growth in this sector will be linked to, albeit in complex ways, with profitability. With this motivation, this paper has analysed the underlying drivers of profitability in India's organized manufacturing sector for a three-decade-long period from 1982–83 to 2012–13 using annual data from the Annual Survey of Industries.

We have found that the rate of profit—defined to closely match the broad Marxist definition of the profit rate as the ratio of the flow of surplus value and the stock of capital—has increased mildly over our period of study at between 0.14 and 0.96% per annum. This long-run positive trend is largely driven by a secularly rising share of profit income in the sector, which grew at between 0.87 and 1.15% per annum over this whole period. Using visual inspection of the time-series plot of the rate of profit, we identified five shorter regimes of profitability. Our analysis shows that over these shorter periods, movements in technology (captured by the capacity-capital ratio) and changes in aggregate demand (captured by changes in the capacity utilization rate) are the primary drivers of profitability. The fact that the change in demand did not affect the profit rate over the long run, even though it did so over short periods, is not surprising. Over a longer horizon it is probable that producers will have adjusted their capital stock more satisfactorily to unanticipated demand changes than over shorter periods.

From the point of view of the entire three-decade period, the organised manufacturing sector is facing two challenges. First, capital is becoming less productive, as evidenced by the decline in the capacity-capital ratio at 0.63% per annum; and second, a not-so-vibrant demand growth at –0.09% per annum. Both these factors threaten to reduce the profit rate. This threat to profit is being managed by passing the pressure on to the labourers, by squeezing their share of value added. We had a curious situation in 2001–07 where real labour productivity rose at a phenomenal rate of 9.24% per annum even as the real wage fell at 0.45% per annum.

The fact that the profit share secularly increased over the whole period of study, thereby pushing up the profit rate, is worth noting. For most advanced capitalist countries, the profit share has displayed medium-run fluctuations, falling in the regulated capitalist period and rising in the neoliberal period (Basu and Vasudevan, 2013). Even developing countries like Brazil have witnessed a rising profit share only in the neoliberal period, from 1990 to 2003 (Marquetti *et al.*, 2010). Thus, in this respect, the distribution of value added between the fundamental social classes in India's organized manufacturing sector is strikingly different: labour has been continuously losing over the past three decades. In fact, this trend of declining wage share goes back even further: the results in Sau (1989) show that the wage share declined from the early 1960s to the mid-1980s, although his data are not completely comparable to the data used here.

We would like to end with a caveat to and some possible extensions of our research, in that order. In this paper, we have often invoked a direct link between profitability and capital accumulation. While we believe that there is certainly a link, it is more complicated than we have probably given due. One important issue in this regard is the distribution of surplus value into interest, rent, dividend, taxes, wages of unproductive labour, and profit of enterprise. Our preferred measure of profit is really an estimate of surplus value and not profit of enterprise. If it is the latter that is more directly relevant for capital accumulation, our measure of profit rate would need to be suitably modified for an analysis of investment behaviour. Since we did not have data to remove many of these forms of surplus value—especially taxes and dividend payments—we leave this as a topic for future research.[15] Investigating the link of profitability and capital accumulation would also require us to engage with an interesting body of recent research that has found financialization to have a negative impact on real investments (Orhangazi, 2008).

[15] For a study of the link between profitability and investment in India's organized manufacturing sector, see Basu and Das (In press).

In addition to investigating the link between profitability and capital accumulation, two other important issues could emerge as extensions of this paper. First, in this paper we have analysed the organized manufacturing sector as a whole. But there might be interesting variations across different industries within organized manufacturing. For instance, textiles might have a different dynamic from machine manufacture. Thus, one future extension of the current work would be to do a more disaggregated profitability analysis. Second, an important topic that has been discussed with respect to India's organized manufacturing sector is the phenomenon of jobless growth (Kannan and Raveendran, 2009). To understand jobless growth and the employment-generating potential of manufacturing, an investigation of the determinants of capital intensity is called for. A disaggregated analysis of organized manufacturing would be useful in this respect.

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Appendix

In this appendix, we describe data sources and methodologies for construction of key variables used in our analysis. The main source of data for the analysis in this paper is the Annual Survey of Industries (ASI). It is an annual survey of all industrial units registered under Sections 2m(i) and 2m(ii) of the Factories Act, 1948, and Bidi and Cigar establishments registered under Bidi and Cigar Workers (Conditions of Employment) Act, 1966, i.e. all factories in India where 'any manufacturing process is being carried on' and which employ 10 or more workers if using power and 20 or more workers if not using power.

ASI time series on principal characteristics, aggregated at the level of the total organized manufacturing sector, was downloaded from the website of the Ministry of Statistics and Programme Implementation, Government of India. This provided data from 1981–82 to 2012–13 on the following variables: net value added; wages of workers; emoluments (wages of workers, and salaries of supervisors and managers); benefits of workers, supervisors and managers; number of workers; number of managers and supervisors; rent and interest payment; net investment; and historical cost of fixed capital stock.

We supplemented the ASI data with annual time series of relevant price indexes. The wholesale price index for machines and machinery (WPIMACH) was obtained from the website of the Office of the Economic Advisor, Government of India; the consumer price index for industrial workers (CPIIW), and the wholesale price index for manufactured products (WPIMFG), was obtained from the Handbook of Statistics on Indian Economy, 2014, published by the Reserve Bank of India. All price indexes were recalibrated to a base year of 2004–05.

In our analysis, the rate of profit is measured as the ratio of profit income over a year and the replacement (current) cost stock of fixed capital at the beginning of the year. We measure profit income in three different ways. The broadest definition of profit, Π_1, is the difference between net value added and the compensation of productive workers. A narrower definition of profit is Π_1 *less* compensation of supervisors & mangers; we denote this as Π_2. The narrowest definition of profit is Π_2 *less* rent and interest payments; we refer to this as Π_3.

Our preferred measure of the rate of profit is $R_1 = \Pi_1 / K$, where K is the replacement cost stock of fixed capital, and Π_1 is net value added less compensation of productive workers. This is because this definition is the closest approximation to the Marxist

definition of the profit rate as the ratio of 'surplus value' and capital stock. Moreover, it is the broadest measure of the rate of profit and captures the maximal rate of expansion of capital.

Our preferred measure of the rate of profit requires us to calculate the compensation of productive workers. We form an estimate of this by adding the wages *and* benefits of productive workers. While data on wages of productive workers are available, we form an estimate of the benefits of productive workers by multiplying total benefits—since we only have data on total benefits for workers, supervisors and managers all together—with the ratio of wages and emoluments (wages of workers, and salaries of supervisors and managers). Adding this to wages of productive workers gives us the compensation of productive workers. This essentially assumes that total benefits are divided between workers and supervisors and managers in the same ratio as their wages and salaries.

We calculate the replacement cost value of the capital stock using the perpetual inventory method recursively as

$$K(t+1) = K(t) \times \left\{ \frac{P(t)}{P(t-1)} \right\} + I(t) \tag{A1}$$

where $K(t+1)$ and $K(t)$ are the current cost net capital stock at the beginning of periods $(t+1)$ and t, respectively, $P(t)$ and $P(t-1)$ are the values of the wholesale price index for machines & machinery in periods (t) and $(t-1)$, respectively, and $I(t)$ is net investment in period (t). For our data set, the recursion (A1) starts in the initial period 1981–82 and $K(0)$ is the historical cost fixed capital stock in this initial period. A caveat about our capital stock estimate is in order: the perpetual inventory methodology does not fully address the issues raised during the Cambridge capital controversy, but it does take account of the costs of producing new capital goods and the speed with which they depreciate.

In our profit rate decompositions from a short-run perspective, we use the capacity utilization rate. We calculate the capacity utilization rate as the ratio of net value added and its trend, where the trend is computed by fitting a Hodrick–Prescott filter to the time series of net value added.