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Technology, distribution and the rate of profit in the US economy: understanding the current crisis

Deepankar Basu and Ramaa Vasudevan*

This paper offers a synoptic account of the state of the debate among Marxist scholars regarding the current structural crisis of capitalism, identifies two broad streams within the literature dealing, in turn, with aggregate demand and profitability problems, and proceeds to concentrate on an analysis of issues surrounding the profitability problem in two steps. First, evidence on profitability trends for the non-farm non-financial corporate business, the non-financial corporate business and the corporate business sectors in post-war USA are summarised. A broad range of profit rate measures are covered and data from both the US Bureau of Economic Analysis (NIPA and Fixed Assets Tables) and the Federal Reserve (Flow of Funds Account) are used. Second, the underlying drivers of profitability, in terms of technology and distribution, are investigated. The profitability analysis is used to offer some hypotheses about the current structural crisis.

Key words: Profitability, Technological change, Income distribution, Structural crisis.
JEL classifications: B51, E11

1. Introduction

The USA and the global economy are in the grip of the most profound crisis since the Great Depression. The course of capitalist development has been punctuated by other such deep structural crises—the Long Depression in the 1880s, the Great Depression in the 1930s and the stagflation of the 1970s—in addition to the current crisis. Marxist analysis sees these recurrent crises as reflections of the inherently contradictory and turbulent nature of capitalist accumulation.[1] The precise causal mechanisms underlying the present crisis remain subject to intense debate among Marxist scholars. This is not surprising. Despite a long engagement with the theory of crisis, Marxist scholarship has not developed a single, overarching 'general theory' of capitalist crisis.

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Address for correspondence: Deepankar Basu, Department of Economics, Thompson Hall, University of Massachusetts, Amherst, MA 01003, USA; email: dbasu@econs.umass.edu

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The structural crisis of the 1970s had also engendered a rich debate on the root cause of the crisis. The 'Monthly Review School' saw the crisis as a reflection of the tendency towards stagnation fostered by the dominance of monopoly. In the absence of external factors, the development of productive capacity outpaced internally generated demand (Baran and Sweezy, 1966; Sweezy and Magdoff, 1981). The 'profit squeeze' explanation ascribed the eruption of crisis to the impact of rising wages in eroding profitability (Glyn and Sutcliffe, 1972; Body and Crotty, 1975). Within the social structures of accumulation theory, the crisis was seen as an outcome of declining labour productivity with a fall in the intensity of work (Bowles *et al.*, 1983). In Brenner's account, the crisis was precipitated by intensification of competition, which squeezed profit margins and led to persistent overcapacity in manufacturing (Brenner, 2006). In contrast, Shaikh (1987), Moseley (1992), and Duménil and Lévy (1993) explained the crisis of the 1970s as a crisis of profitability. For Shaikh (1987) the crisis tendency stems from a falling rate of profit due to a process of increasing capital intensity and labour-saving technical change that is reflected in a rising 'materialised composition of capital'; for Duménil and Lévy (1993) the crisis stems from exhaustion of the technological progressivity of the post-war period; Moseley (1992), on the other hand, highlights the growth of the ratio of unproductive to productive labour as the main reason for declining profitability and stagnation.

While the explanations varied, these rival theories at least agreed on the nature of the empirical trend of falling profitability that marked the crisis of the 1970s. A peculiar feature of the current debate is the absence of agreement on the basic question of the predominant trend in profitability leading up to the crisis. Given the centrality of the question of profitability to Marx's analysis of capitalist dynamics, a constructive evolution of the theoretical debate around the causal mechanisms engendering the current crisis would require some resolution of the empirical trends. This paper does not attempt to resolve the larger theoretical debates in the theory of crises; instead it seeks to clarify some of the empirical issues in the debate on the origins of the current crisis.

The rest of the paper is organised as follows: Section 2 offers a brief overview of the main competing accounts of the current crisis; Section 3 investigates and summarises profitability trends; and Section 4 presents results on profit-rate decomposition in order to investigate the roles of technology and distribution as drivers of profitability.[2] This investigation offers some interesting insights into the different regimes of technological change in post-war USA. Specifically, it points to the significance of the sharp fall in capital productivity in the period preceding the crisis.[3] Declining capital productivity is an important driver of declining profitability in Marx's analysis. This bias in the pattern of technical change has been explained as a response to the pressure of rising wages. The recent sharp decline in capital productivity is remarkable in that it occurs in the context of stagnant wages. The final section of the paper offers an account of this development in the context of the crisis.

[1] See Shaikh (1978) for a historical overview of the theories of crisis.

[2] Information on the data sources is provided in the Appendix.

[3] We adopt the terminology of 'capital productivity' to refer to the ratio of output to the capital stock, while acknowledging that the concept of 'capital productivity' has no meaning within the Marxian tradition. It is only labour that creates value; hence, it is only the labour that can be meaningfully termed as productive. Capital productivity, or strictly speaking the output–capital ratio, here simply captures the quantitative relation between capital and the output.

2. Explaining the current crisis

The dominance of finance and the phenomenon of financialisation are no doubt important aspects of any account of the current crisis.[4] What distinguishes Marxist explanations is that while they recognise the importance of financialisation and the role of financial speculation in triggering the crisis, they seek structural explanations for the rise to dominance of finance and for the real component of the current crisis.

Marxist accounts of the causal mechanisms of crisis fall very broadly into those focusing on aggregate demand and those focusing on profitability. The former focus on the growing gap between the productivity of workers and their earnings. Growing inequality exacerbates the problem of effective demand, with investment failing to fill the gap. The latter trend, i.e. the one focusing on profitability, focuses on the specific pattern of technical change induced by capitalist competition. Labour productivity is increased by increasing mechanisation and capital intensity of the production process, with a consequent tendency, with stable profit shares, for a fall in the profit rate. There is of course a link between problems of demand and problems of profitability. Stagnation of demand could erode profitability and rates of return on capital investment, and declining profitability itself could lead to a fall in investment demand.

In the competing explanations of the current crisis too we find this dual focus on stagnation of demand and the declining rate of profit.

2.1 The alternative explanations

2.1.1 Stagnation under monopoly-finance capital. Bellamy-Foster and Magdoff (2009) base their argument on the characterisation of contemporary capitalism as the phase of monopoly-finance capitalism. This argument draws on the analytical tradition of Kalecki, Steindl, Baran and Sweezy. Monopolisation erodes price competition and dampens the dynamic impetus to new innovations. At the same time, growing income and wealth inequality acts as a limit to consumption demand. The investment-seeking surplus generated by the enormous and growing productivity of the system is increasingly unable to find sufficient new profitable investment outlets. Monopoly capitalism faces a tendency towards stagnation as a consequence of the gap between the growing economic surplus and existing outlets for profitable investment. There is a continual need to find new ways to profitably invest its surplus and new sources of demand. But rather than invest in socially useful projects that would benefit the vast majority, capital has constructed a financialised 'casino'. Capitalism in its monopoly-finance capital phase becomes increasingly reliant on the ballooning of the credit–debt system in order to escape the worst aspects of stagnation. Thus it is this tendency to stagnation that engenders financialisation. Finance has served as a lucrative outlet for economic surplus while also indirectly stimulating demand through asset price appreciations and bubbles. The housing bubble is then seen as an attempt to counteract this inherent tendency towards stagnation. With the bursting of the bubble, demand collapsed, leading to a deep crisis.

2.1.2 Overcompetition and overaccumulation. In contrast to the monopoly-finance phase argument, Brenner's (2010) argument stresses globalisation and the intensification of competition since the 1970s as new manufacturing powers entered the world

[4] For accounts of the role of finance in the unfolding of the crisis, see Gowan (2009), Blackburn (2008), Lapavitsas (2009), and Crotty (2008).

market—Germany and Japan, the newly industrialising countries, the South-East Asian 'Tigers' and, most recently, China. This has led to a persistent tendency to overcapacity in global manufacturing and a consequent decline of the rate of return on capital investment since the 1970s. The stagnation of real wages in this period is insufficient to counteract the dampening impact of chronic overcapacity on profitability. In response, capital has been cutting back on the growth of plant and equipment, and retrenching and rationalising the workforce; it has also successfully pushed the agenda for slashing social expenditures. All of which has contributed to a persistent weakness of aggregate demand. This is the source of the vulnerability of the economy.

The vulnerability is manifested in overinvestment, declining capacity utilisation, a squeeze of manufacturing prices and declining profitability. The growth of finance temporarily alleviated some of the shortfall of demand—through a form of asset Keynesianism—however, this underlying structural weakness continued to plague the economy, fostering an increasing dependence on finance.

2.1.3 Overinvestment. An alternative thesis posited by Kotz (2009, 2011) also ascribes a central causal role to developing overcapacity. However, it is not excessive competition but asset price bubbles that fosters overcapacity. Such bubbles temporarily push demand above its normal level, spurring the creation of growing productive capacity, i.e. overinvestment. With debt deflation, demand returns to its normal level, precipitating excess productive capacity. Overinvestment results in too much fixed capital being produced *relative* to demand in the economy as a whole. The housing bubble encouraged debt-financed consumer spending, thus stimulating excessive investment in relation to normal level demands. The growing gap between the increase in labour productivity and the wage earnings of production workers, implies a more limited normal level of consumer demand. Stoked by the asset bubble and rising indebtedness, household consumer demand rises above its normal relation to household income and firms step up investment. Unsustainable expectations about future profit and demand led to overinvestment. As the expectations failed to materialise with the collapse of the bubble, capacity utilisation rates fell, driving down the profit rate and, finally, the rate of investment was sharply cut back. The crisis manifests itself in declining capacity utilisation that exerts a downward pressure on the rate of profit.

2.1.4 Profitability and debt. Shaikh (2010) focuses on the underlying trends in profitability as the principal driver of accumulation. In particular he focuses on the 'rate of profit of enterprise', the difference between the general rate of profit (where profits are measured gross of interest payments) and the rate of interest as the crucial variable that governs investment. The competitive impetus towards increasing mechanisation and labour-substituting technical change engenders the underlying long-term tendency towards a fall in the profit rate. However, the concerted attack on labour launched in the 1980s stemmed the tendency of the rate of profit to fall, as real wages stagnated through this period. Along with the suppression of the growth of real wages, there was a sharp fall in the interest rate. Together, these two trends acted to raise the rate of profit of enterprise and fuelled the neoliberal boom. This boom and the regime of low interest rates had the contradictory effect of stoking a surge of debt and borrowing. The boom was halted when the fall in interest rates and the rise in degree of indebtedness reached their limits. The favourable upward trend in the rate of profit of enterprise came to an end, precipitating the crisis.

Moseley (2010) offers a similar explanation, according primacy of place to both profitability and debt. Declining profitability, driven primarily by the rising cost of unproductive labour, in the 1960s pushed the economy towards a phase of prolonged stagnation. Two sets of factors were adopted to counter declining profitability. On the one hand, wage suppression in the USA, increasing the exploitation of labour in the form of 'speed-up', and globalisation in the worldwide search for lower wages; and, on the other, unprecedented levels of credit flows to both capitalist firms and working-class households. Over time, this led to a historically high level of debt, a significant portion of which is external debt, built-up relative to aggregate income flows. This debt overhang is a source of continued fragility and stagnation for the US economy. Resnick and Wolff (2010) offer a similar explanation of the crisis and argue that the best way to deal with such repeated instances of crises of capitalism is not to reform capitalism, but to abolish it altogether.

2.1.5 Liquidity trap and disproportionality. Michl (2010) also focuses on the role of profitability in driving investment. The puzzle of sluggish growth of non-residential investment despite a favourable trend in profitability is explained by greater uncertainty about prospective yields and weaker expectations about the future in the face of rising external imbalances and import penetration of the US market by Chinese manufactures. The erosion of investor confidence due to the relocation of global manufacturing and the rise of competing centres of production around China propelled the descent into a liquidity trap. The recovery after the 2001 recession was largely concentrated on residential investment, so that the current crisis, in this account, appears to be a crisis of disproportionality rather than one of 'overinvestment'.

2.1.6 Crisis of financial hegemony. Duménil and Lévy (2010A), and Mohun (2010) do not see the current crisis as the outcome of falling profitability. Both focus on the growing disparity in the incomes of the managerial and supervisory class in relation to the production worker and the popular classes (including commercial and clerical employees). The alliance of this managerial class with capitalist classes, under the hegemony of the latter, was the foundation of the neoliberal revolution and increasing economic power of the former class. This class configuration underlies what Duménil and Lévy (2004, 2010) characterise as the hegemony of finance (defined as the upper fractions of capitalist classes and their financial institutions).[5] The unbridled quest for enrichment by the ruling classing coalition spurred the process of financialisation and globalisation. In the process, persistent macrodisequilibria were generated in the form of rising indebtedness, growing global imbalances (boosted by a rising share of consumption in the USA) and the slowdown of accumulation. The growth of finance and speculation is explained not through the exhaustion of investment opportunities and falling profitability, but rather the changing class configuration that favours short-term risk taking. The slowdown in investment is also the outcome of the success of the ruling elite to capture a growing share of surplus.

2.2 State of the debate

Thus, the current crisis has been characterised, at one end, as that of a structural inadequacy of aggregate demand that might only be temporarily alleviated

[5] Paitaridis and Tsoulifidis (2012) use the categories of unproductive and productive labour, and show that even though the general rate of profit was rising, the rate of profit declined when profits were calculated net of deductions for outlays on unproductive sectors, which gradually choked off accumulation.

by asset price bubbles or stock-market Keynesianism (Bellamy-Foster, 2009; Brenner, 2010; Kotz, 2011). The inadequacy of demand is seen alternatively as a reflection of growing monopoly (Bellamy-Foster, 2009) and of intensification of competition (Brenner, 2010). At the other end, Duménil and Lévy (2010) point to the declining personal savings rate and growing external deficits of the USA to suggest that the current conjuncture is marked by overconsumption. Again there is the argument that the crisis was preceded by an investment boom because of a temporary boost to demand (Kotz, 2011), on the one hand, and a temporary alleviation of the trend of falling profitability (Shaikh, 2010), on the other. In stark contrast to this is the argument of a persistent slowdown in investment (Duménil and Lévy, 2010). Again, the crisis is seen as being characterised by declining profitability in some explanations (Brenner, 2010; Kliman, 2011), while other explanations (Duménil and Lévy, 2010; Mohun, 2010) dispute the characterisation of the crisis as a crisis of profitability. Even within these explanations, Mohun (2010), on the one hand, sees the upswing in profitability and speculative excess as culminating in a financial crisis that makes its impact on the real sector felt through the consequent evaporation of demand. On the other hand, Duménil and Lévy (2010) argue that the current crisis cannot be explained through the conventional mechanisms of demand or profitability; hence, the alternative typology of a 'crisis of financial hegemony'. Lastly , the rise of finance itself is explained in some approaches as the outcome of the stagnation of the real economy (Bellamy-Foster, 2009) and in others as a manifestation of increasing profitability, euphoric speculative excess and the rules of the neoliberal order that draws surplus away from investment, towards interest and dividends (Duménil and Lévy, 2010; Mohun, 2010).

Not only is there intense debate on the structural causes of the crisis, there seems to be no agreement even on the more easily resolvable issues of the underlying empirical trends. A survey of the literature is confronted by a daunting excess of conflicting characterisations.[6] As a first step towards resolving the debate, it is necessary to clarify these underlying empirical trends. We might not come closer to a consensus on explaining the crisis, but for constructive debate there has to be some coherence to the account of the empirical contours of the crisis.

The first question to be addressed concerns the underlying trend of profitability. Was the rate of profit rising or falling in the prelude to the crisis? There is broad agreement that profitability is central to capitalist reproduction. However, even though there is broad agreement about the importance of profitability, the precise measure of the rate of profit remains a contentious issue.

Estimates of the profit rate differ, for example, on the treatment of direct profit taxes, i.e. taxes on corporate income. Duménil and Lévy (2011A) argue that profit taxes would also need to be deducted for a more realistic yardstick of profit flows. The measure of 'capital stock' could be valued at historical values or replacement cost values. Replacement cost measures are favoured by most Marxist economists as being more reflective both of business practice (Shaikh, 1999; Duménil and Lévy, 2011A) and

[6] See Duménil and Levy (2011) for a critical, empirically grounded review of some of these alternative interpretations.

Marx's own writings.[7] Economists who work within the temporal single-system interpretation of Marx's work, instead, use the historical measure of the capital stock (Kliman, 2011). The stock, no matter how it is valued, could be measured net or gross of the depreciation allowance. Net stock measures impart an upward bias to profit rates since net stocks decline with the age of the machine (Shaikh, 1999). While, in principle, gross stocks of capital could be used, there is a question regarding the availability of the relevant data for the US economy. With the 1995 comprehensive revision of the National Income and Product Accounts (NIPAs), the US Bureau of Economic Analysis (BEA) started to use geometric as opposed to straight-line depreciation. With geometric depreciation, gross stocks cannot be computed accurately because some assets in each vintage of the stock have infinite service lives. Hence, estimates of the gross capital stock used in this paper, which is arrived at by adding the net capital stock and depreciation, are only approximations.[8] Again, demand factors that impart short-term fluctuations to the profit rate could be removed from the picture, by deflating the observed rate of profit with the capacity utilisation rate, to arrive at longer term trends of profitability (Shaikh, 1999). The measure of choice could then drive the empirical outcome.

It is equally important to untangle the drivers of profitability, to decompose the rate of profit into its underlying determinants. The trends in labour productivity, capital productivity and profit share are important in unravelling the role of technology and distribution in determining the trajectory of the profit rate. Were shifts in income distribution important, were technological factors salient or were demand factors more important? Even here, as we discuss in detail later, there are differences in how the decomposition is implemented.

The second empirical question relates to demand. To what extent has consumption demand been a constraint on investment? Can we empirically assess the prevalence of overinvestment in relation to either demand or profitability? In the context of globalisation the question becomes more vexed as consumption could be growing buoyantly without a commensurate impact on domestic investment, as a larger share of consumption demand is fulfilled by imports. Domestic investment could stagnate even as domestic capital steps up foreign direct investment and offshore production in the search for lower-wage locations in the periphery.

Clarity on these two major issues, the question of profitability and the question of aggregate demand, would help answer the question of whether the rise of finance, one of the key characteristic features of contemporary capitalism, reflects the stagnation of the real economy—either in the form of low profitability or low demand—or a reconfiguration of class relations of advanced capitalism. While issues surrounding the question of aggregate demand are important and deserve serious analyses, this

[7] We believe Marx was quite unambiguously in favour of using replacement cost valuation of the capital stock. Discussing the scenario where a new and less costly (in terms of labour hours required for its production) machinery has been inducted into the production process, he notes: 'As the value of the raw material may change, so too may that of the instruments of labour, the machinery, etc. employed in the [production] process; and consequently that portion of the value of the product transferred to it from them may also change. If, as a result of a new invention, machinery of a particular kind can be produced with a lessened expenditure of labour, the old machinery undergoes a certain amount of depreciation, and therefore transfers proportionately less value to the product' (Marx, 1990, p. 318).

[8] For more details on this point, see US Department of Commerce (2003). We would like to thank Thomas R. Michl for pointing this out.

paper will attempt to address the first question. It will primarily focus on disentangling the profitability issue in two steps. First, it will present profitability trends for the post-war US economy for a wide range of definitions. Second, it will try to analyse the trends in technology and distribution to throw light on the drivers of profitability.

3. Profitability trends

There is a broad consensus within the Marxist tradition, as we have already indicated, to see the rate of profit as one of the crucial variables determining the decidedly turbulent dynamics of any capitalist economy and crucially affecting its reproduction through time. As indicated by Marx (1992) in *Capital II* and demonstrated rigorously within a formal mathematical model by Foley (1982), the rate of expansion of a capitalist economy is limited by the general rate of profit that it can generate. The intuition is straightforward. Expansion of a capitalist economy *is* the accumulation of capital; accumulation, in its turn, rests on capitalising surplus value, i.e. generating and realising surplus value. Since profit is a form of expression of surplus value, it follows that the rate of profit governs the rate of expansion of the system. On the demand side it has an impact on the inducement to investment; on the supply side it determines the financing of investment. There is also, in addition, a link between profitability and stability (Duménil and Lévy, 1993).[9]

The rate of profit is defined as the ratio of profit flows in a given time period to the capital value tied up (stock of capital) in production and circulation that supported the generation and realisation of the profit flow. Disagreement among Marxist political economists arises because there are different ways to measure both profit flows and the stock of capital. Profit flows could be defined, in the broadest sense, to include all income flows other than compensation of employees. Starting from the broad measure, we could gradually remove depreciation, indirect taxes on production and imports, direct taxes, interest payments, and dividend payments, to arrive at progressively narrower definitions of profit flows.

The broadest measure of the 'stock of capital' that underlies the profit flows should include productive capital (undepreciated fixed assets, raw materials and inventories of unfinished commodities), commodity capital (inventories of finished commodities awaiting sale) and financial capital (money, including depreciation funds, and financial assets). Since it is difficult to come across consistent time-series data on all these forms in which stocks of value appear in a capitalist economy, most researchers narrow down the measure of capital to fixed assets.[10] Even with this narrow definition, measures could vary across at least four dimensions. First, the stock of fixed assets could be measured net of depreciation to give the net stock of fixed assets or could include depreciation to give the gross stock of fixed assets. Second, the stock could be valued at historical costs (i.e. at prices paid when they were originally installed and inducted into the production and circulation process) or they could be valued at replacement cost

[9] Duménil and Levy (1993) argue that the profit rate conditions the manner in which firms react to demand and supply disequilibria. Low profitability exacerbates instability by prompting large quantity adjustments (rather than price adjustments).

[10] In the Appendix, we include the value of inventories of the non-farm sector to estimate a broader measure of capital stock. The profitability trends and decomposition analysis do not change when this broader measure is used; for details, see the Appendix.

(i.e. at the current market value that would be sufficient to replace the stock of fixed assets). Third, the stock of assets could be valued net of financial liabilities to give us the net worth. Fourth, since a given stock of capital can be utilised at or below capacity, depending on conditions of demand, deflating by the capacity utilisation rate could be used to arrive at the 'normal capacity' measure of the capital stock.

Instead of taking a stand right away on the 'correct' measure of the rate of profit, this section summarises trends in *all the measures* of the profit rate. This evidence regarding profitability trends in the post-war US economy is meant to offer a chance for readers to see how the different measures evolve over time and, if possible, to push researchers to come to an agreement about a common measure to use. We use annual data and in defining the (various measures of the) rate of profit terms we follow the following timing convention: the profit rate for a given year has been computed by dividing the profit income for a particular year by the estimate of the stock of *fixed assets at the end of the previous year*. This timing convention is meant to capture the idea that the stock of fixed assets at the beginning of a year (or end of the previous year) 'earned' the profit income for that year.

In this section, we present profitability trends for the US economy using data from two different sources: (i) NIPA and Fixed Assets data of the BEA; and (ii) Flow of Funds (FOF) data from the Federal Reserve Board of Governors (details provided in Appendix A1). The NIPA data, in turn, are presented for two different large sectors of the US economy: (a) the corporate business (CB) sector; and (b) the non-financial corporate business (NFCB) sector. The FOF data are presented for the non-farm non-financial corporate business (NNFCB) sector.

3.1 BEA data: NIPA and Fixed Assets Tables

3.1.1 Corporate business sector. Figures 1 and 2 plot the *annual* rate of profit for the US CB sector computed from NIPA data using replacement cost and historical cost values, respectively, for the *net* stock of total fixed asset. The data for various measures of the flow of profit come from NIPA Table 1.14 and run up to 2010, and the data for the stock of total fixed assets come from NIPA Tables 6.1–6.4, with the latter giving year-end estimates of the stock. The profit rate for a given year, as already noted, has been computed by dividing the profit income for a particular year by the estimate of the stock of fixed assets at the end of the previous year.

The broadest measure of profit flows, in Figures 1 and 2, is the net value added less the compensation of employees, including inventory valuation and capital consumption adjustments.[11] Starting from this broad measure we arrive at narrower measures of profit flows by removing different categories of income flows. Our broad measure less production and import taxes gives the *net operating surplus*. When we further remove net interest payments and net business transfer payments we get *before-tax profits*; when we remove taxes on corporate income from this we arrive at *after-tax profits*.[12]

[11] In computing profit flows we abstract from two potentially important issues. First, we do not take account of the fact that a large part of what is reported as compensation of employees is part of profit income, because it is part of managerial and other non-working class incomes; for a careful treatment of this issue, see Mohun (2010). Second, we do not distinguish between foreign and domestic profit flows. We plan to address these points in future research.

[12] The further deduction of dividend distribution would yield the narrowest measure corresponding to the retained earnings of the enterprises or the internally generated funds available for investment.

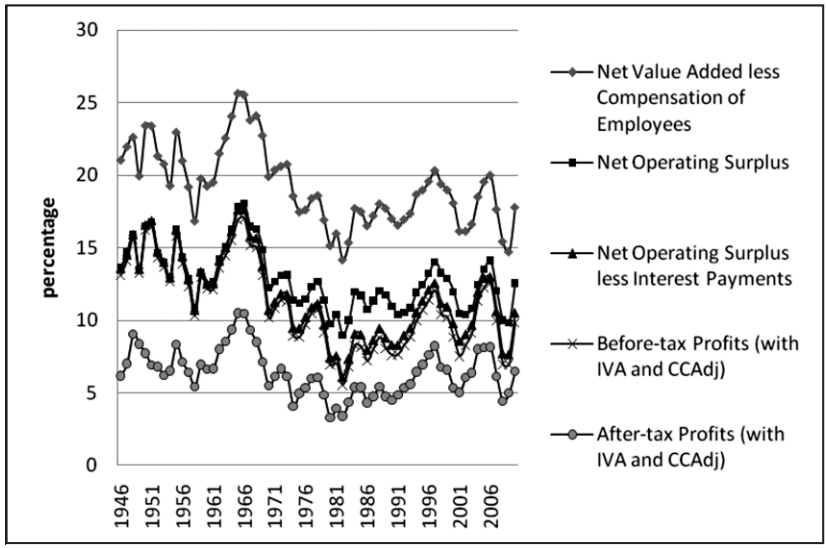

Fig. 1. *Rate of profit, US corporate business sector, 1946–2010 (capital stock: replacement cost net total fixed assets).*

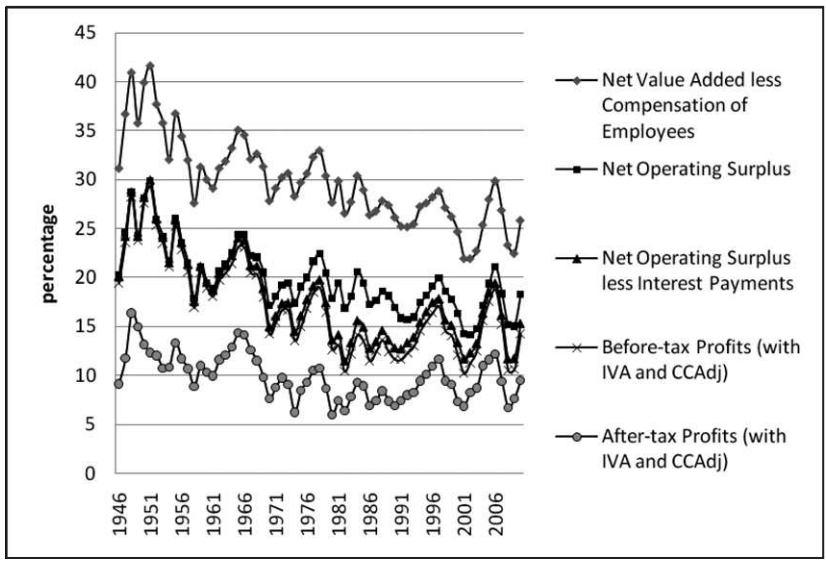

Fig. 2. *Rate of profit, US corporate business sector, 1946–2010 (capital stock: historical cost net total fixed assets).*

Figures 3 and 4 summarise profitability trends that are similar to those summarised in Figures 1 and 2. The only differences are that, in Figures 3 and 4, *gross* capital stock measures are used instead of net capital stock measures and *gross* profit flow measures have replaced net profit flow measures (where the gross profit is the net profit with depreciation).

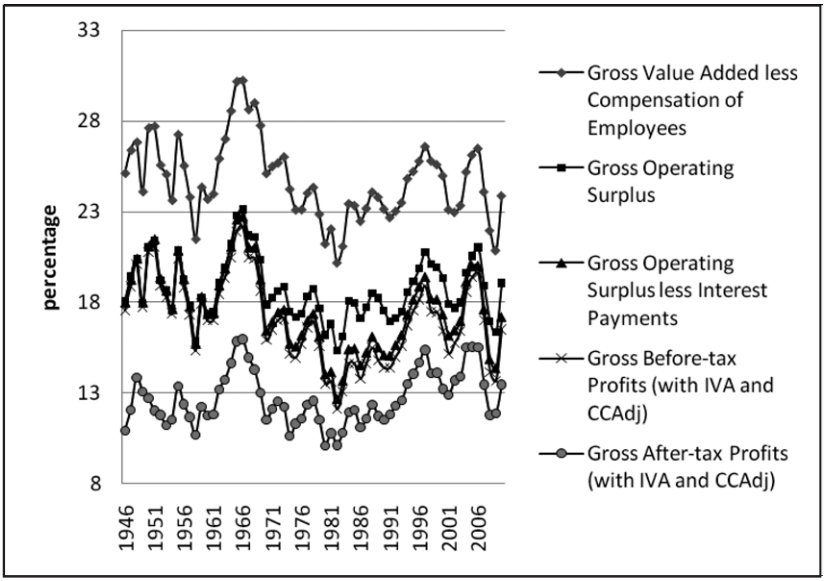

Fig. 3. *Rate of profit, US corporate business sector, 1946–2010 (capital stock: replacement cost gross total fixed assets).*

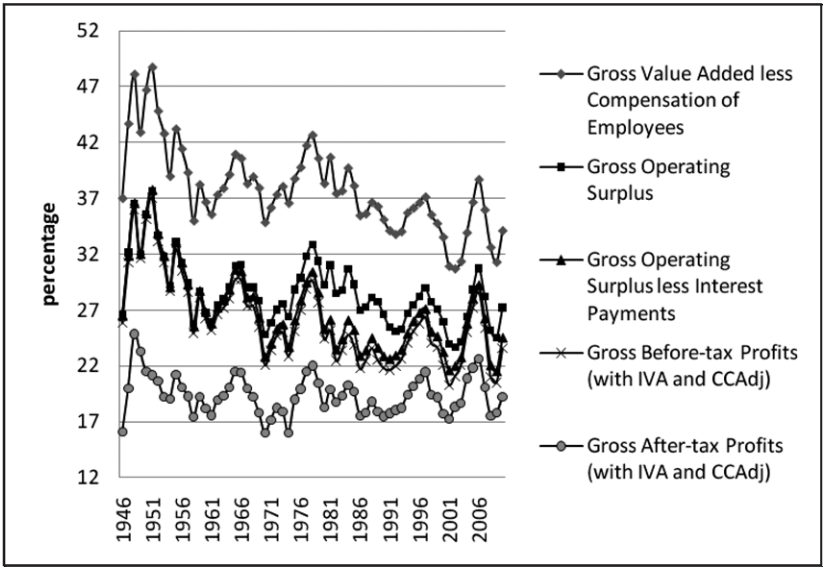

Fig. 4. *Rate of profit, US corporate business sector, 1946–2010 (capital stock: historical cost gross total fixed assets).*

3.1.2 Non-financial corporate business sector. Within a Marxian framework of analysis, financial sector incomes (and profits) are a transfer of the surplus value generated in the non-financial sectors of the economy. Hence, we next look at profitability trends solely in the NFCB sector.

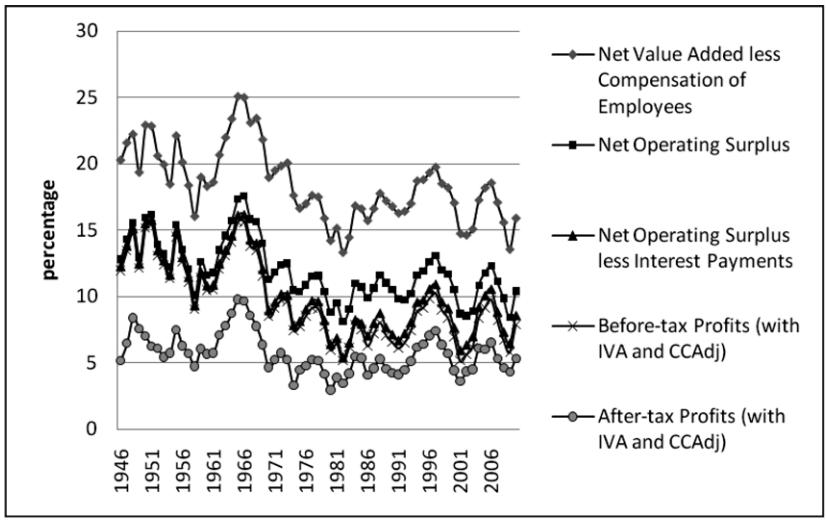

Fig. 5. *Rate of profit, US non-financial corporate business sector, 1946–2010 (capital stock: replacement cost net total fixed assets).*

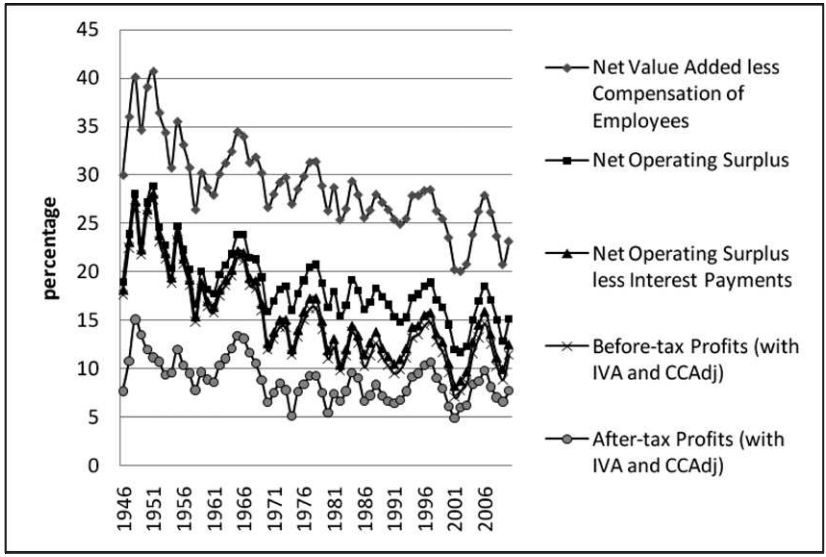

Fig. 6. *Rate of profit, US non-financial corporate business sector, 1946–2010 (capital stock: historical cost net total fixed assets).*

Figure 5 is the analogue of Figure 1. It plots the rate of profit for the NFCB sector using replacement cost valuation of the net total fixed asset (capital stock). Figure 6 corresponds to Figure 2 and plots the rate of profit for the NFCB sector using historical cost valuation of the capital stock. Figures 7 and 8 are the analogues of Figures 3 and 4 in that they plot the various measures of the rate of profit for the NFCB sector using gross total fixed assets as the measure of capital stock.

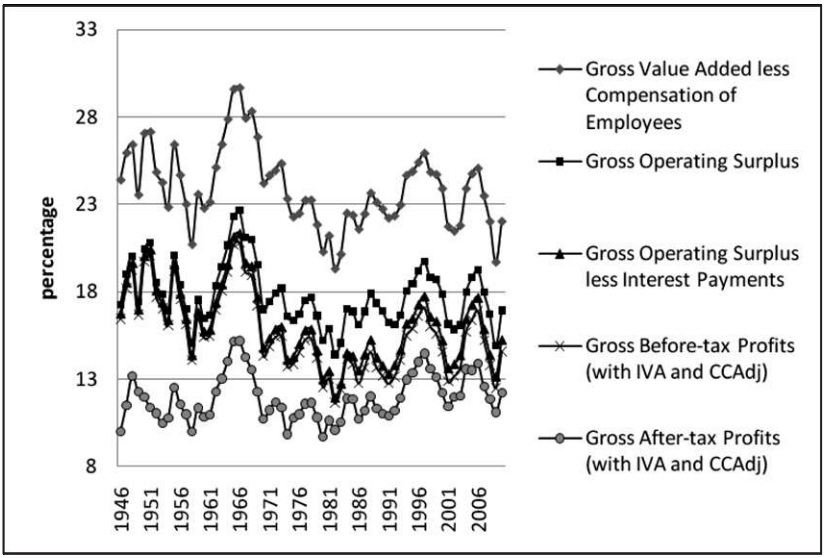

Fig. 7. *Rate of profit, US non-financial corporate business sector, 1946–2010 (capital stock: replacement cost net total fixed assets).*

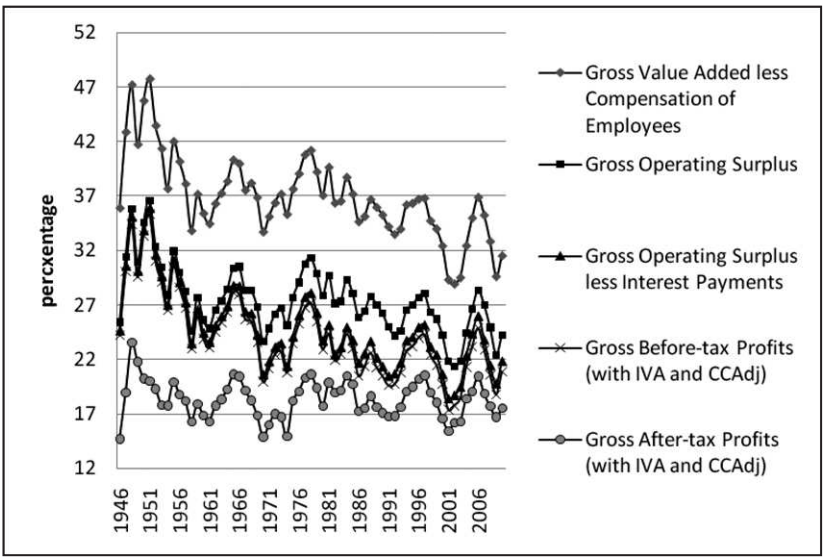

Fig. 8. *Rate of profit, US non-financial corporate business sector, 1946–2010 (capital stock: replacement cost net total fixed assets).*

3.1.3 Summary of profit rate trends: NIPA data. When replacement cost valuation of the capital stock is used, evolution of the rate of profit in both the CB and NFCB sectors (Figures 1, 13, 135 and 7) indicate two major periods; this periodisation, moreover, is independent of the measure of the profit that is used (before or after tax, with or without Inventory Valuation Adjustment (IVA) and Capital Consumption Adjustment

(CCAdj), including or excluding interest payments). The first, running from the late 1940s to the early 1980s, was a period of declining profitability (with fluctuations at business cycle frequencies imposed on top of this declining trend). This period ended in the early 1980s, when the declining trend was reversed and we entered into the second period, which saw an upward trend in profitability (with large fluctuations coinciding with the downturns in the late 1990s and the current Great Recession). The current crisis was not preceded by a long period of declining profitability as was in evidence during the structural crisis of the late 1970s; the fall in the rate of profit during the current crisis coincides with a short-term downward movement associated with fluctuations of the rate of profit at business cycle frequencies.

When historical cost valuation of the capital stock is used (Figures 2, 24, 26 and 8), we see two interesting patterns. First, *broader measures* of the rate of profit (e.g. using the net or gross operating surplus) display a trend of secular decline over the whole post-war period for both the CB and the NFCB sectors. Second, *narrower measures* of the rate of profit (e.g. using the after-tax, after-interest rate of profit) display a different pattern: a period of decline that runs up to the early 1980s is followed by a trendless period.

The conclusion from the analysis of the NIPA data seems to be that there is a *break in the declining trend of profitability in the early 1980s*; this emerges for all measures of profit flows when replacement cost valuation is used for the capital stock and it also emerges for narrower measures of profit flow when historical cost valuation is used. The only measures that fail to display this break in trend in the early 1980s are those using historical cost valuation (of the stock of capital) *and* the broad measures of profit flows.[13]

3.2 Flow of Funds

Using data from the FOF Accounts of the Federal Reserve, we compute various measures of the rate of profit for the US NNFCB sector. The FOF data are useful for two reasons. First, they allow us to analyse trends in the NNFCB sector, which is not possible on the basis of the NIPA data. Second, they allow us to use *net worth* as a measure of tied-up capital, which, again, is not possible with the NIPA data. We use two different measures of the tied-up capital: the total non-financial assets and net worth.

Figures 9 and 10 plot the rate of profit for the US NNFCB sector computed from FOF data from the Federal Reserve, using the stock of *non-financial assets valued at replacement cost* and the stock of *non-financial assets valued at historical cost*, respectively. The shaded region at the end indicates the Great Recession beginning in 2008.

Figures 11 and 12 are the analogues of Figures 9 and 10. They plot the rate of profit for the US NNFCB sector computed from FOF data from the Federal Reserve suing the *net worth valued at replacement cost* and *historical cost*, respectively.

3.2.1 Summary of profit rate trends: FOF data

3.2.1.1 Non-financial assets. Figures 9 and 10, computed from FOF data and using the year-end estimates of non-financial assets to measure capital stock, show trends very similar to those in Figures 1, 3, 5 and 7.

[13] Historical cost valuation basically 'rotates' the profit rate time series by raising the early observations and lowering the later ones. This is because historical cost valuation of the capital stock amounts to ignoring inflation in the price of fixed assets. Since the rate of profit is the ratio of the profit flow and the stock of capital, ignoring the inflation in the price of the term appearing in the denominator 'rotates' the whole series. We would like to thank Duncan Foley for this insight. For further details of 'rotation', see Basu (2012).

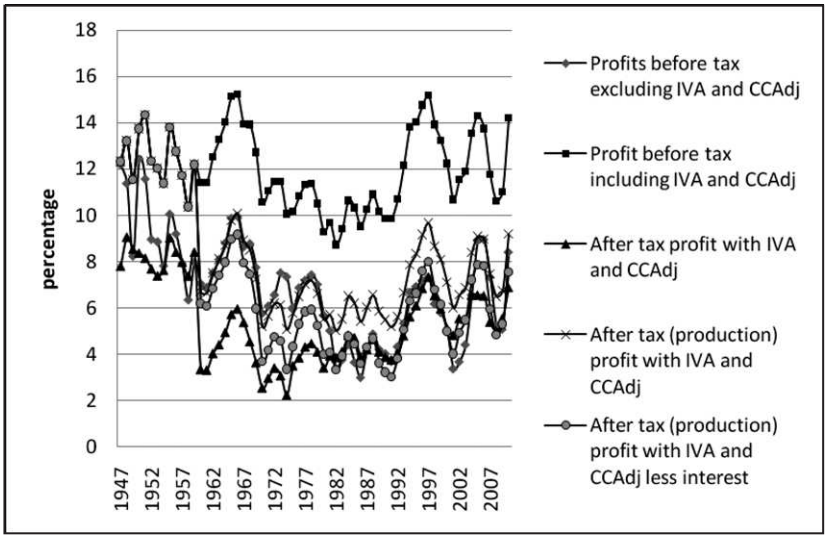

Fig. 9. *Rate of profit, US non-farm non-financial corporate business sector, 1946–2010 (capital stock: replacement cost non-financial assets).*

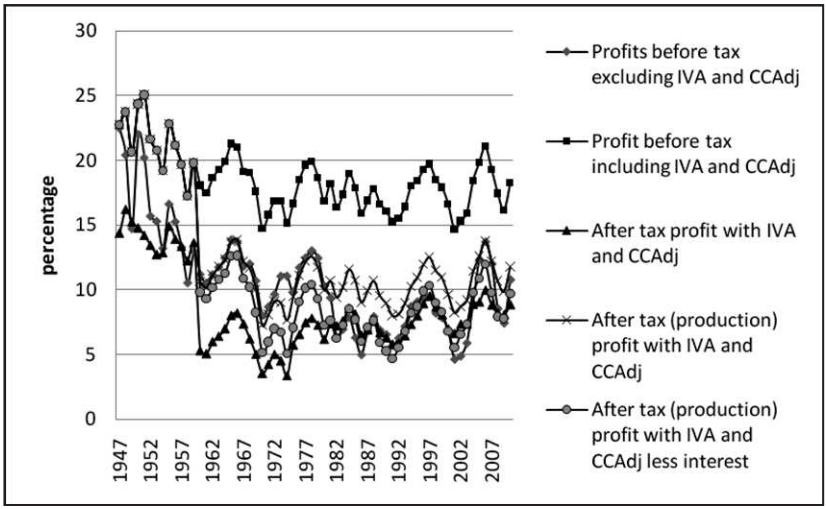

Fig. 10. *Rate of profit, US non-farm non-financial corporate business sector, 1946–2010 (capital stock: historical cost non-financial assets).*

In terms of trend, both sets of plots highlight the two major periods referred to earlier, irrespective of what measure of profit income is used (before or after tax, with or without IVA and CCAdj, including or excluding interest payments) and how the capital stock is valued (replacement cost or historical cost, gross or net). The first period of declining profitability ends in the early 1980s, and is followed by (i) a period with a rising trend (with large fluctuations coinciding with the downturns in the late 1990s and the Great Recession) if replacement cost valuation is used for the

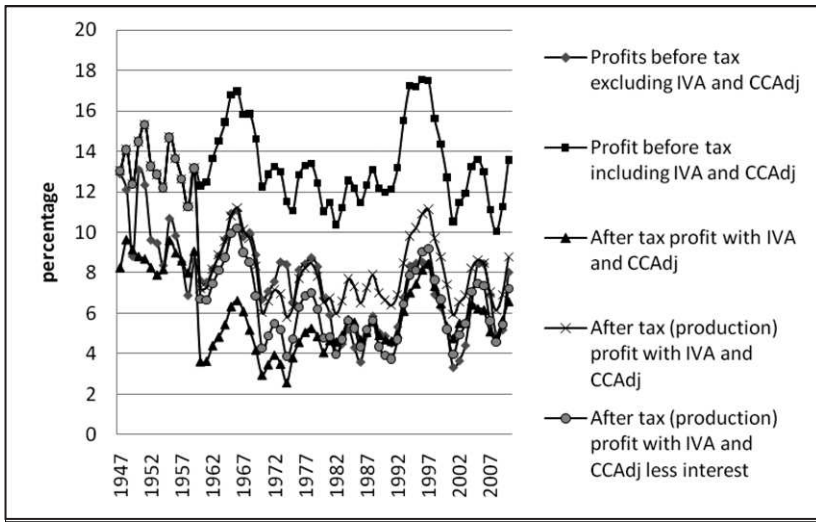

Fig. 11. *Rate of profit, US non-farm non-financial corporate business sector, 1946–2010 (capital stock: replacement cost net worth).*

non-financial assets, and (ii) a more or less trendless period if historical cost valuation is used.

In terms of levels, there is an interesting difference. With historical cost valuation of assets, the level of the after-tax and after-interest rate of profit since the 1980s is generally lower than that observed in the 1950s; with replacement cost valuation, the levels are closer together. The before-tax, before-interest rate of profit (including IVA and CCAdj) attains similar levels in both periods, irrespective of the asset valuation method.

Hence, from Figures 9 and 10 we can assert that the current crisis was not preceded by a long period of declining profitability as was in evidence during the structural crisis of the late 1970s.

3.2.1.2 Net worth. Figures 11 and 12 plot the rate of profit using the net worth instead of the stock of non-financial assets. With replacement cost valuation (Figure 11), we get the same trends as described above. With historical cost valuation (Figure 12), we get a slightly different picture: the before-interest, before-tax rate of profit shows a declining trend since the late 1970s, but the after-tax rate of profit is pretty much flat (with large fluctuations in the downturns of the late 1990s and the Great Recession).

4. Technology and distribution: drivers of profitability

4.1 Decomposing the profit rate

What are the drivers of the profitability trends that have been summarised in Figures 1–12? To address this question we will decompose the rate of profit into two

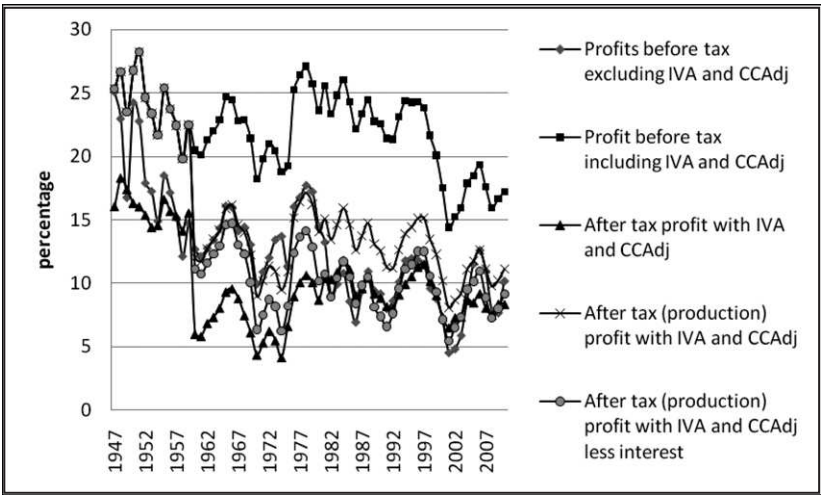

Fig. 12. *Rate of profit, US non-farm non-financial corporate business sector, 1946–2010 (capital stock: replacement cost net worth)*.

components, one capturing the class distribution of income and the other capturing technological factors as:

$$\text{rate of profit} = (\text{profit/output}) \times (\text{output/capital stock})$$

i.e. the rate of profit is decomposed as the product of the profit share and the output–capital ratio (also known as capital productivity). Of course, this is not the only way to decompose the rate of profit. Starting with Weisskopf (1979), many researchers have also included the capacity utilisation to capture short-term fluctuations in the rate of profit due to fluctuations of aggregate demand as follows:

$$\text{rate of profit} = (\text{profit/output}) \times (\text{output/capacity output}) \times (\text{capacity output/capital stock})$$

Here, the rate of profit is decomposed as the product of the profit share, capacity utilisation and the capacity–capital ratio.

Following a long tradition in Marxian economics going back at least to Duménil *et al.* (1984, 1985), Michl (1988), Duménil and Lévy (1993), and Foley and Michl (1999), we will use the former decomposition, instead of the latter. The advantage of using this decomposition (rate of profit = profit share × capital productivity) is that we can avoid estimating an unobservable quantity such as 'capacity output', without which the capacity utilisation rate cannot be defined. In effect this decomposition allows fluctuations in aggregate demand to impact on both profit shares and capital productivity instead of concentrating on its effect on the capacity utilisation rate alone. This is more realistic because aggregate demand fluctuations can impact not only aggregate output (in comparison to 'capacity' output) but also income distribution and technological factors.

Of course this does not imply that we believe aggregate demand factors to be unimportant; they are certainly important in the short term, i.e. over the phases of the business cycle. For instance, periods of deep recession marked by massive declines

in capacity utilisation can certainly drive the output–capital ratio down (e.g. as it did in the Great Depression of the 1930s), but, in addition to the fluctuations at business cycle frequencies, there are movements in capital productivity that occur over the span of several business cycles. These movements cannot be plausibly attributed to fluctuations of aggregate demand (because they span several business cycles, each of which is marked by periods of increasing and decreasing aggregate demand). It is these movements that we are interested in tracking as the long-term marker of biased technological changes—what Duménil and Lévy (1995) called 'technical change à la Marx' and Foley and Michl (1999) termed 'Marx-biased technical change'. This is the reason we abstract from fluctuations of capacity utilisation.

For the decomposition analysis, we will use NIPA data to provide direct information on the commonly used measure of 'broad' profit flows, the net operating surplus. The share of profit is, then, computed as the ratio of (i) net operating surplus (net value added less employee compensation less production and import taxes) with inventory valuation and capital consumption adjustments, and (ii) the net value added. The output–capital ratio (or capital productivity) is computed as the ratio of (a) the net value added and (b) net stock of total fixed assets.

4.1.1 Replacement cost capital stock. Figures 13 and 15 display the decomposition of the profit rate into its technology and distribution components for the CB and NFCB sector, respectively, where the *replacement cost valuation* of the capital stock has been used. What trends in income distribution and technology emerge from the data? Both Figures 13 and 15 (which use replacement cost capital stock) display very interesting trends regarding technology and income distribution.

Let us first take up technology. Figures 13 and 15 show that there were four different periods of technological evolution in the post-war USA. The first period, running up to 1968, witnessed improving capital productivity, with a burst of capital-saving technological change over the decade 1958–68. With 1968 (for CB) and 1966 (for NFCB) marking the apogee of capital productivity in the post-war USA, we enter the second

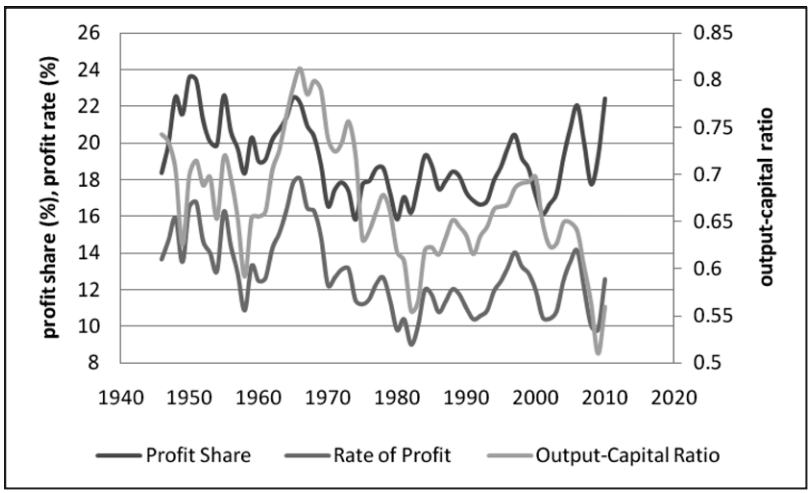

Fig. 13. *Profit rate decomposition, US corporate business sector, 1946–2010 (capital stock: replacement cost net total fixed assets).*

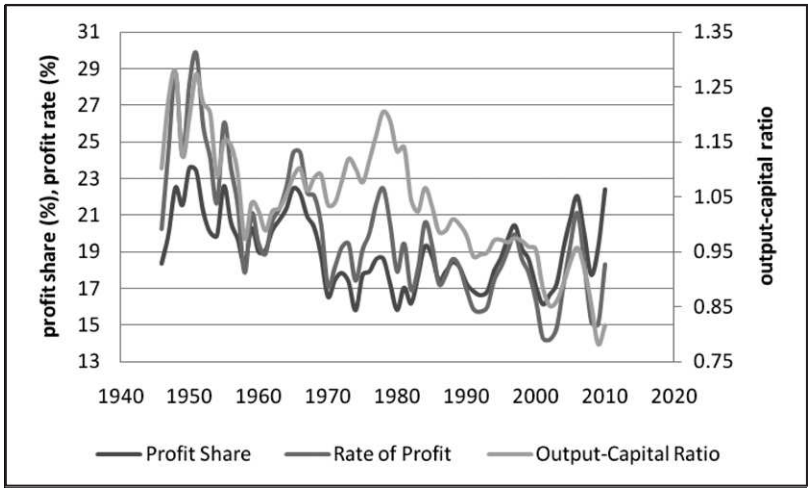

Fig. 14. *Profit rate decomposition, US corporate business sector, 1946–2010 (capital stock: historical cost net total fixed assets).*

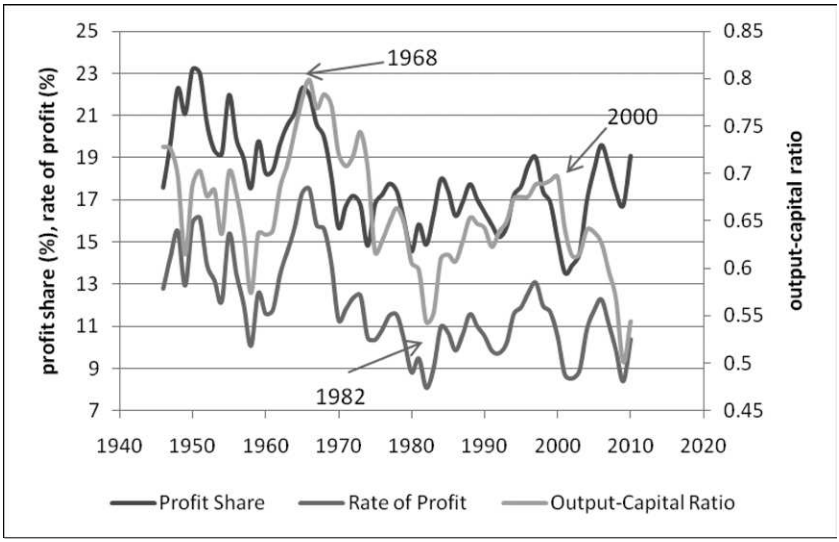

Fig. 15. *Profit rate decomposition, US non-financial corporate business sector, 1946–2010 (capital stock: replacement cost net total fixed assets).*

period of declining capital productivity, which continues for the next decade and a half until 1982. For NFCB, capital productivity declines from 0.799 in 1966 to 0.543 in 1982, a massive 32% fall in a decade and a half; for the CB sector, the output–capital ratio declines from 0.800 in 1968 to 0.555 in 1982, a similar 31% decline. The declining trend is reversed in 1982, which marks the beginning of the third period of technology, a period of slowly rising capital productivity. The third period runs from 1982 to 2000, with capital productivity rising by 25% for CB and 28% for the NFCB sector over the whole period (with a significant acceleration during the 1990s), but attaining

a peak that is significantly lower than its peak in 1968. There is a very significant trend reversal in 2000, which takes us into the fourth period of declining capital productivity. Since 2000, capital productivity has trended downward and the magnitude of decline (between 2000 and 2009) has been a massive 27% for the CB sector and 28% for the NFCB sector.[14] Thus, the previous period's gain has been completely wiped out, with the value of the output–capital ratio now at its *lowest in the whole post-war period*.

Let us now turn to income distribution between the two fundamental social classes in capitalism. This displays interesting, but less complicated, trends. Figures 13 and 15 show that the whole post-war period can be divided into two broad periods in terms of the evolution of income distribution between capitalists and workers. The first period runs until the early 1980s and witnessed a significant decline in the share of income accruing to the capitalist class, with most of that decline taking place after the late 1960s. Between 1948 and 1980, the share of profit income in the NFCB sector declined from 22.27% to 14.46% of total corporate income, a massive drop by all accounts; for the CB sector, the corresponding decline was from 22.52% in 1948 to 15.81% in 1980. The trend of declining profit share was reversed in 1982, which begins the second period marked by rising profit shares, much more so for the whole CB than the NFCB sector (giving evidence of the rising share of profits accruing to the financial sector). The second period of rising (or flat) profit share also shows major fluctuations. The rising trend that continues almost unbroken from 1982 is reversed for brief periods significantly by the two recessions. Both the 2001 and the 2008 recessions display a period of rapid decline in the profit share, starting about two to three years before the start of recession; but the decline over the 2001 downturn is quickly reversed, and even surpassed, during the ensuing recovery.

Bringing together trends in the evolution of technology and income distribution, we can now offer an explanation of profitability trends in the USA over the post-war period and a hypothesis for the structural crisis that many have identified as having begun in 2008. The decades immediately following World War II saw stable (or rising) profits because profit shares were stable and capital productivity was rising. The period since the mid-1960s saw a significant deterioration of the technological underpinnings of US capitalism, with capital productivity falling. With profit shares falling as well, this meant declining profitability, which resulted in the first structural crisis of post-war capitalism in the late 1970s. The neoliberal counter-revolution restored the income share of the capitalist class, especially of those related to the financial sector. The information technology revolution gave an impetus for capital-saving technological change, so that capital productivity started increasing once again. These extremely favourable trends in both distribution and technology helped a revival of the profit rate. Duménil and Lévy (2010), and Mohun (2010) have highlighted these favourable developments.

However, the favourable technological impetus worked itself out by the late 1990s. Faced with falling capital productivity, profitability was shored up by a further shift in income distribution towards the capitalist class, helped no doubt by financialisation and the growth of working class debt (Lapavitsas, 2009). When the share of profit income collapsed, preceding the downturn of 2007, this reinforced adverse technological trends

[14] The decline in capital productivity since 2000 is a little exaggerated because the years since 2007 have witnessed low capacity utilisation. But if we instead look at the peak-to-peak period 1997–2007, we see a similar, though smaller, decline in the output–capital ratio of 12% and 13% for the CB and NFCB sectors, respectively.

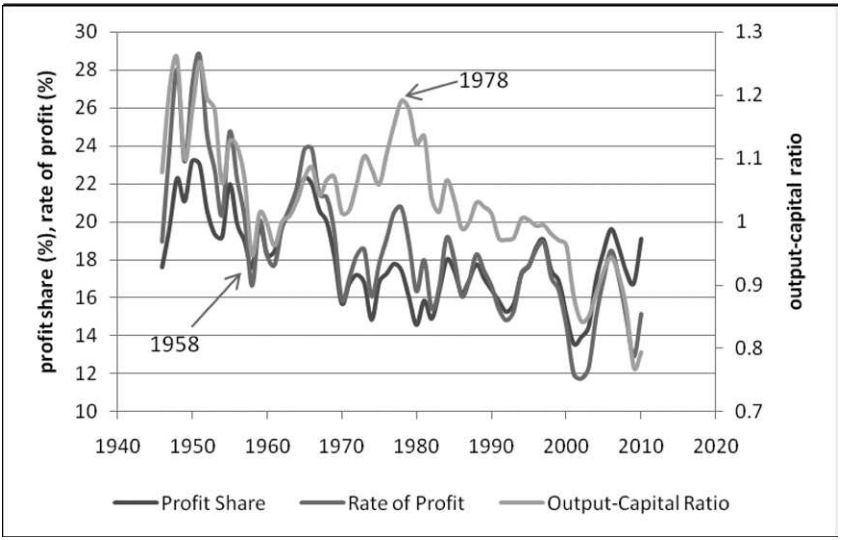

Fig. 16. *Profit rate decomposition, US non-financial corporate business sector, 1946-2010 (capital stock: historical cost net total fixed assets).*

to precipitate another structural crisis of capitalism. The build-up of working class debt, which had helped fuel the housing price boom and also effected a regressive income redistribution, ushered in a long period of deleveraging when the Great Recession struck, prolonging a downturn into the severest crisis since the Great Depression.

4.1.2 Historical cost valuation of capital stock. Figures 14 and 16 present the decomposition results for historical cost capital stock data. The results are pretty similar to those for replacement cost capital stock. The main difference is that, with historical cost capital stock, the decline in capital productivity starts in the late 1970s and continues right into the current period. If historical cost valuation is used, it is difficult to locate the structural crisis of global capitalism in the late 1970s.

4.2 Patterns of technological change

The decomposition of the profit rate helps identify the technological and distributional underpinnings of the current crisis. Marx's discussion of technological change, accumulation and profitability gives a primacy to technology in driving profitability. Capitalist competition compels a process of technical change that deploys increasing capital intensity and mechanisation as a means of extracting a larger surplus from labour. This pattern of labour-saving technological change is critical to Marx's formulation of the law of tendency of the falling rate of profit. The insights from the profit decomposition exercise could be sharpened with an analysis of the specific patterns of technological change over the decades.

To explore patterns of technological change, Figure 17 plots capital productivity and two measures of labour productivity (output per person and output per hour) for the US NFCB sector for the period 1958–2010. With labour and capital productivity juxtaposed, it is immediately clear that the NFCB sector has witnessed three distinct periods of technological evolution since 1968. The first period, running from 1966 to 1982, witnessed what Foley and Michl (1999) have termed Marx-biased technological

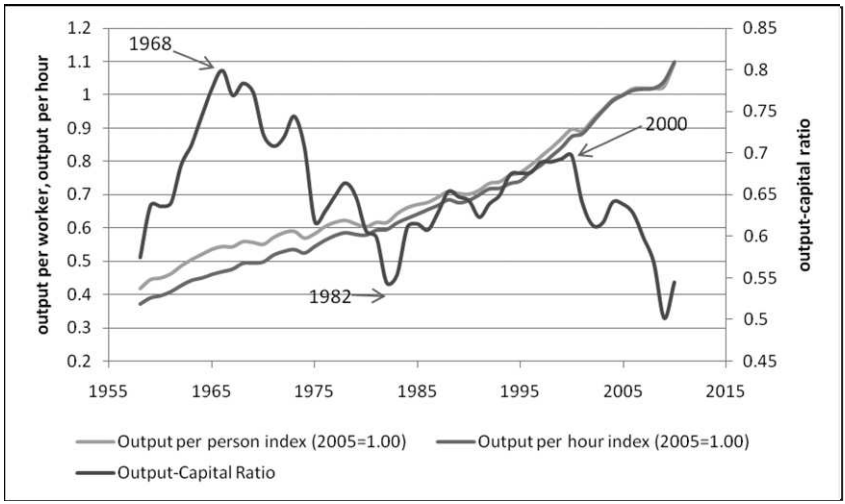

Fig. 17. *Patterns of technological change, US non-financial corporate business sector, 1958–2010 (capital stock: replacement cost net total fixed assets).*

change: growing labour productivity and falling capital productivity.[15] Essentially, productivity of labour is increased, during such periods, through increasing capital intensity. This is the period that saw the collapse of the capital labour accord that had buttressed the golden age as profit rates declined. The decline in profitability is however related to unfavourable (Marx-biased) technical change rather than to a decrease in labour productivity.

Restoring profitability depended in the first instance on squeezing workers to ensure a rising profit share—reversing the erosion in the preceding period. However, the second period, stretching from 1982 to 2000, also saw a different pattern of technological evolution when both labour and capital productivity increased. This pattern of technological change, which is favourable to profitability, does not conform to the classic pattern of Marx-biased technical change. The twin trends of rising capital productivity and rising profit share propelled the recovery of profitability in this period.

The third period begins in 2000 and is currently still running its course. In this third period, the US NFCB sector is back to a regime of Marx-biased technological change: labour productivity has continued to grow, along with the profit share, but capital productivity has declined to its lowest in the post-war period. This period poses potential profitability problems for capitalism. In the current period since 2000, profitability has so far (for about a decade) been propped up by the regressive redistribution of income away from the working class while ruling class coalition, aided by the housing bubble and financialisation, pursued a successful campaign of enrichment. While there does not appear to be any sign that this quest for enrichment is being curbed in the wake of the financial meltdown, there would be a limit to the extent to which profit shares can continue to be increased. At the same time the persistent decline in capital productivity

[15] Duménil and Lévy (1995, 2011) develop a classical-Marxian evolutionary model of technical change that derives the historical trajectories of rising organic composition of capital and declining profitability—technological change à la Marx—from the principle of the selection of the most profitable techniques.

is exerting an inexorable downward pull on profitability. The sharp decline in capital productivity is a significant factor shaping the current crisis.

4.3 Behind declining capital productivity

What lies behind the evolution of capital productivity over the past few decades? What is driving its sharp decline since 2000? We will approach such questions through two routes. First, we will look at capital productivity from the perspective of capital intensity; second, we will approach capital productivity through relative rates of technological progress in the capital goods sector.

4.3.1 Labour productivity and capital intensity. Capital productivity is, by definition, the ratio of the labour productivity (Y/L) and the capital intensity (K/L).[16] Hence, the growth rate of capital productivity is the difference between the growth rate of labour productivity and capital intensity. Figure 18 summarises the growth rates of capital productivity and its two components for the three different periods of technological evolution that we have identified for the post-war US economy: 1966–82, 1982–2000 and 2000–10.

In the first period between 1966 and 1982, which was the prelude to the first post-war structural crisis of the early 1980s, capital productivity fell by 2.38% per annum; during the same period, labour productivity (output per person) increased by 0.78% per annum and capital intensity increased by 3.16% per annum. During the recovery between 1982 and 2000, capital productivity grew at an annual compound rate of 1.39% per annum; however, in the run-up to the current structural

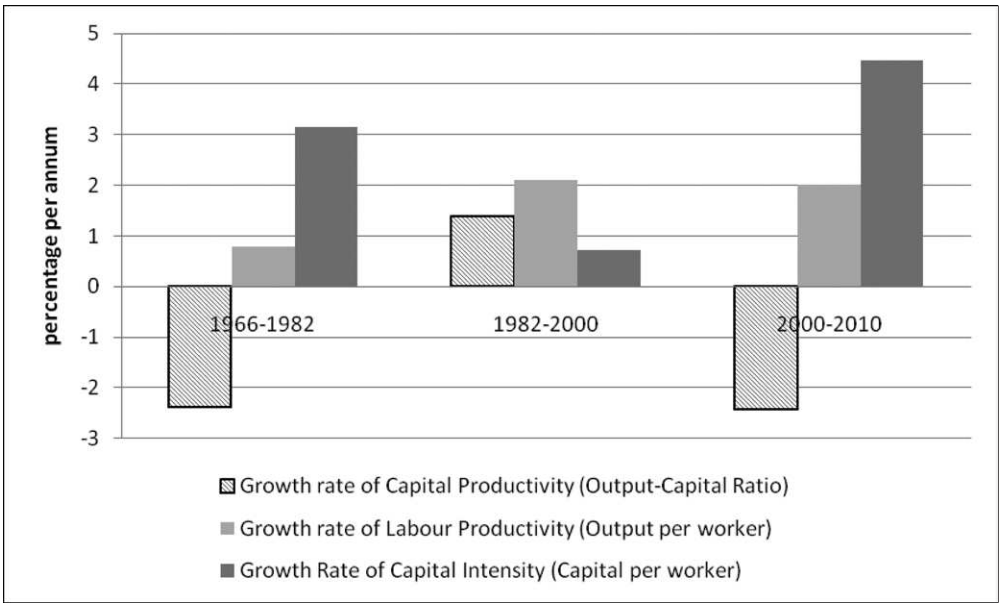

Fig. 18. *Growth of capital productivity, labour productivity and capital intensity, US non-financial corporate business sector (capital stock: replacement cost net total fixed assets).*

[16] This is also the sense in which capital productivity refers not to the inherent productivity of capital, but to how the application of capital affects labour productivity.

crisis between 2000 and 2010, it *fell* at the rate of 2.43% per annum. Between 1982 and 2000, labour productivity grew at an annual compound rate of 2.11% per annum; between 2000 and 2010, it grew at 2.03% per annum. Thus, labour productivity grew more rapidly after 1982 and at roughly the same rate during these two later periods, but capital productivity displayed sharply divergent trends.

The difference in the evolution of capital productivity during the recovery from the last structural crisis and the prelude to the current crisis (the second and third period) reflects the different evolutions of capital intensity in these two periods. Between 1982 and 2000, capital intensity grew very slowly at about 0.73% per annum, suggesting that the increase in labour productivity in this period was not driven by Marx-biased technical change. Between 2000 and 2010, on the other hand, capital intensity grew six times faster at 4.46% per annum. Compared with the first period, it seems that both the technologically positive period during 1982–2000 and the technologically regressive period since 2000 have been driven by the unusual growth of capital intensity.

During the former period, a very slow growth of capital intensity allowed for a relatively rapid growth of labour productivity, This pattern ran its course by 2000, after which only a very high growth of capital intensity has managed to keep labour productivity growing at a similar rate. The question, therefore, really boils down to explaining this transformation in the pattern of technological change evidenced in the different pace of growth of capital intensity in the two periods.

Marx's discussion of mechanisation and capital-intensive technical change viewed the trend as an outcome of a rapid growth of accumulation. It was capitalism's dynamic drive to accumulate and innovate that led to the potential erosion of profitability. The current period is paradoxical in that it is also the period when *capital accumulation has slowed down even as capital intensity has risen sharply*.[17]

4.3.2 Real capital productivity and the relative price of capital. The other way to approach this question is, following Michl (1988), to decompose capital productivity into the ratio of (i) real capital productivity (ratio of real net value added and real capital stock) and (ii) the relative price of capital (ratio of implicit price deflator for capital stock and the GDP deflator). Note that a rising trend in real capital productivity and a falling trend in the relative price of capital can increase the rate of profit, and therefore correspond to what Marx termed the countervailing tendencies for the rate of profit to decline with capitalist development. The real output–capital ratio captures the effect of technological change that is independent of relative price changes. It shows, in real terms, the output per unit of labour power (labour productivity) that is engendered by mechanisation (capital per unit of labour power). The relative price of capital (ratio of implicit price deflator for capital stock and the GDP deflator) is what Marx had called the 'cheapening of the elements of capital'. When it falls, it gives an indication of relatively rapid technological change in the capital goods sector in contrast to the whole economy.

Figures 19 and 20 plot the nominal and real capital productivity, and the relative price of capital for the period 1946–2010 for the NFCB sector; the former uses the net stock of *total* fixed assets (TFA) and the latter uses the net stock of *non-residential* fixed assets (NRFA) as measures of the capital stock. Both display similar trends; hence, the results are not driven by the pronounced boom in residential asset prices in the 2000s.

[17] The rate of accumulation (non-residential investment as a share of fixed non-residential assets) has fallen from a peak of about 4.5% in 1999/2000 to about 0.5% in 2009 (Kotz, 2011).

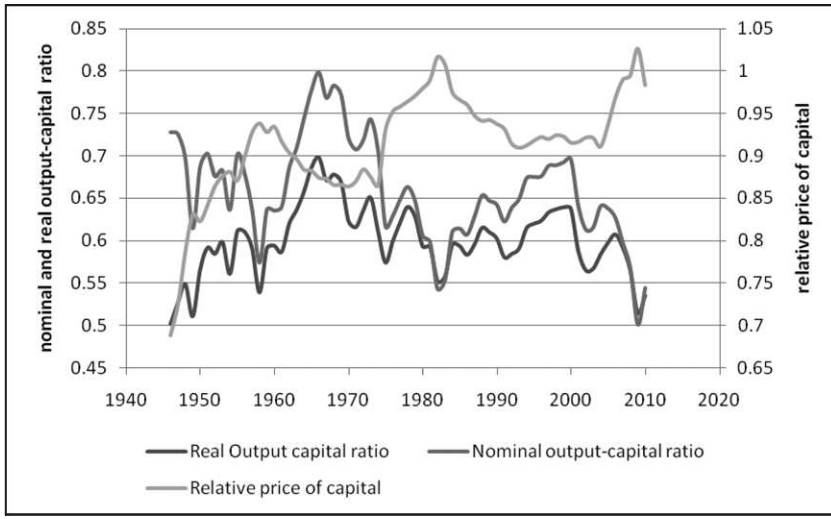

Fig. 19. *Nominal and real output–capital ratio, and relative price of capital, US non-financial corporate business sector (capital stock: replacement cost net total fixed assets).*

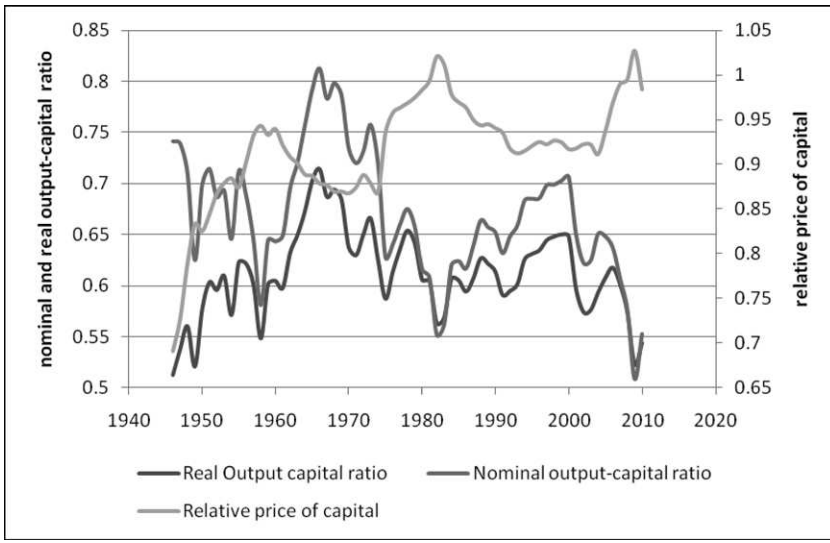

Fig. 20. *Nominal and real output–capital ratio, and relative price of capital, US non-financial corporate business sector (capital stock: replacement cost net non-residential fixed assets).*

Figures 19 and 20 show that since the early 1980s, the real output–capital ratio has been more or less stable, hovering around a value of 0.6, so that movements in the nominal output–capital ratio have been driven completely by movements in the *relative price of capital*. After rising significantly between 1966 and 1982, the relative price of capital saw a steady decline for a decade, with the declining trend broken in 1993. Between 1993 and 2004, the relative price of capital remained stable at around 0.91 and started increasing again after 2004. Shaikh (1999) has pointed to a systematic

upward bias in durable and capital good price indexes due to inadequate adjustment for quality changes. Hence, we should interpret the relative price trends cautiously, but the decline in capital productivity in the run up to the current crisis would reflect the relatively slower pace of technological progress in the capital goods industry.

4.3.3 Capital productivity and the crisis. The preceding analysis suggests that the sharp fall in capital productivity since 2000 after a period of fairly steady rise for almost two decades reflected the basic structural weakness of the US economy as it plunged into crisis. In this paper, we have attempted to unravel what lay behind the evolution of capital productivity.

The pervasive adoption and growth of information technology would have almost certainly played an important role in shaping the particular evolution in the 1990s when capital productivity showed an upward trend. New forms of managerial control and organisation, including just-in-time and lean production systems, have been deployed to enforce increases in labour productivity since the 1980s. The phenomena of 'speed-up' and stretching of work have enabled the extraction of larger productivity gains per worker hour, as evidenced by the faster growth of labour productivity after 1982. People have been working harder and faster. Information technology has facilitated the process. It enables greater surveillance and control of the worker, and also rationalisation of production to 'computerise' and automate certain tasks.

Moreover, these productivity gains would have been possible with smaller increases in investment, since this technology does not necessarily require increasing capital intensity on a commensurate scale. Information technology has also been realising rapid gains in cost reductions so that information technology infrastructure is becoming less costly to adopt. Further, a large part of the initial R&D cost was borne and subsidised by the State, further lowering the cost of capital investment. Thus, labour productivity was increased without necessitating increasing capital intensity.

The favourable trend in capital productivity is also fostered by globalisation and offshoring of production. This allows a further cheapening of capital and intermediate inputs with some of the more labour-intensive and lower-productivity (low value added) sectors being outsourced. This would also be reflected in declining and stable relative prices of capital until 2004, which ameliorated the effect of slower technological change in the capital goods sector through cheap imports (aided by the weak dollar). After 2000, as larger sections of the production process got relocated globally, this advantage was exhausted. In the 1990s, US multinationals added 4.4 million jobs in the USA and 2.7 million jobs overseas—i.e. for every one outsourced job about two jobs were being created in the USA (Wessel, 2011). The pattern changed drastically in the 2000s: 2.9 million jobs were axed in the USA, even as 2.4 million jobs were added abroad. It is clear that the process of offshoring was accelerated in the last decade. The global relocation of production would also be an important factor underlying the twin phenomena of declining rates of accumulation and increasing capital intensity in the USA.

5. Conclusion

There are two broad strands in the Marxist theorisation of crisis: those focusing on demand problems and those focusing on profitability. In the context of a lack of consensus on both the appropriate measure of the profit rate, and the characterisation of its role and trend in the prelude to the crisis, this paper is concerned with an empirical investigation of the

profit rate that would help clarify the theoretical debates. The main conclusion that we can derive from inspecting the time-series plots of various measures of the rate of profit for the US economy (Figures 1–12) is that, other than one case, all the measures display similar trends: there is a break in the declining trend of profitability in the early 1980s; the subsequent period is marked by either a trendless or a slowly rising trend in profitability. The only exception is a measure of the rate of profit that uses historical cost valuation for the capital stock and before-tax (both direct and indirect taxes), before-interest profit flow; this measure displays a secularly declining trend for the whole post-war period.

The weight of evidence thus suggests clearly that the current crisis was *not* preceded by a prolonged period of declining profitability. In fact, the current crisis was preceded by a period of rising profitability, buoyed by favourable trends in both the profit share and technology. Capital productivity increased through the 1990s along with rising labour productivity and declining capital intensity. The tentative hypothesis provided here is that these favourable trends can be explained as the outcome of the specificities of information technology, globalisation and the global relocation of production, and the intensification of managerial control to enforce a steep increase in labour productivity.

Duménil and Lévy (2010A), and Mohun (2010) argued that the current crisis cannot be viewed as a crisis of profitability. They have pointed to the similarities with the pattern of capital productivity and profitability before the Great Depression. We present the profit rate decomposition using the Duménil–Lévy data set (Duménil and Lévy, 2010B) in Figure 21, in order to make a broad comparison. The noteworthy feature about the Great Depression (that emerges in Figure 21) is the sharp drop in capital productivity after 1929; this breaks the longer term upward trend of capital productivity between 1910 and 1950. Once again, the factors that held the pattern of Marx-biased technical change in check and fostered favourable trends in capital productivity failed in the end to prevent the precipitous fall in capital productivity after 1929. The post-war recovery enabled the resumption of these favourable trends with the capital–labour accord and the post-New Deal state apparatus.

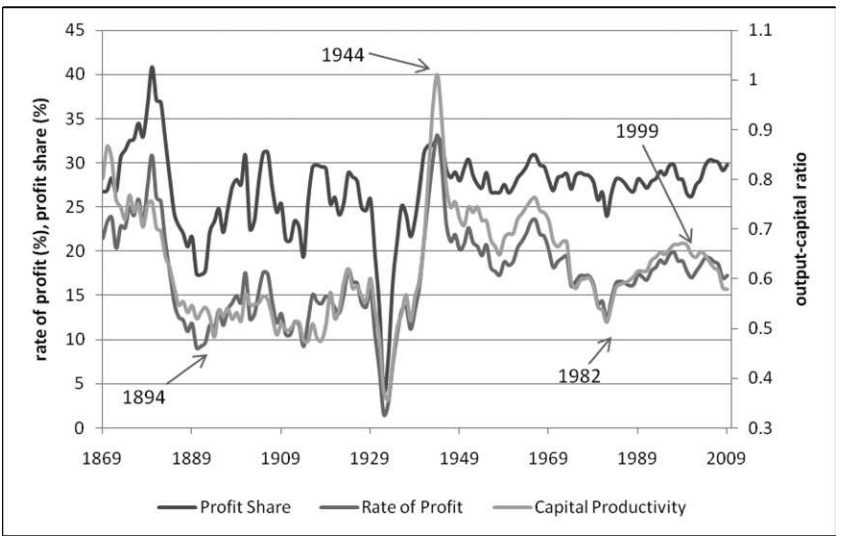

Fig. 21. *Profit rate decomposition, US private economy, 1869–2010.*
Source: *Duménil and Lévy, 2010B.*

We believe there is reason to be a little cautious about this conclusion. The critical factor that emerges from the decomposition analysis is the sharp decline in capital productivity *prior* to the crisis, providing indication of deeper technological problems. There also seems to be a difference between the current crisis and the Great Depression. The current crisis began in 2008 and was preceded by an eight-year period of declining capital productivity. The Great Depression, which began in 1929, was not preceded by declining capital productivity. In fact, it was preceded by, and marked a break in, a period of rising capital productivity (as Figure 21 indicates)—what Duménil and Lévy have termed 'the great leap forward'. It seems, therefore, that while the Great Depression cannot be characterised as a profitability crisis (because both capital productivity and profit shares were favourable to capital), the current crisis requires a more nuanced characterisation (because capital productivity was declining and profitability has been propped up by the regressive redistribution of income).

Of course, once the crisis hits, there is a precipitous fall in aggregate demand, leading to a fall in capacity utilisation; this reduces the rate of profit during the crisis, as is seen both during the Great Depression and the current crisis. What is important, therefore, is to look at the period preceding the crisis. In that respect, the current crisis seems to be different from the Great Depression.

Declining profitability might not have caused the Great Recession, but it certainly is an intimation of an impending profitability problem. Profitability still matters. The attack on public sector unions and the continual push for corporate tax breaks signal a drive to further shore up the profit share. It is difficult to see the process going much further without exacerbating social tensions. The slowdown in accumulation and the fall in capital productivity, however, portend a fragile recovery. What complicates matters further is the class configuration underlying neoliberalism that has allowed the siphoning of surplus towards the enrichment and consumption of the rich. This configuration is depressing capital accumulation in the USA, using the fears of a growing budget deficit to rein in fiscal stimulus or redistributive spending programmes, and possibly stifling technological innovation and R&D spending too (Lazonick and O'Sullivan, 2000; Duménil & Lévy, 2010). Without a deeper structural transformation of this configuration there would be little scope for a sustained recovery of accumulation.

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Appendix

A1. Data Sources

A1.1 BEA data: NIPA and Fixed Assets Tables (http://www.bea.gov/national/)

(i) Gross value added, profits, taxes and other flow variables are taken from NIPA Table 1.14 for both CB and NFCB sectors: 1929–2010. Data were downloaded on 22 June 2011.

(ii) Replacement cost *net* capital stock (total fixed asset) data are from BEA Fixed Assets Table 6.1 and replacement cost depreciation data are from NIPA Table 6.4; these are year-end estimates: 1929–2010. *Gross* capital stock is computed as net capital stock plus depreciation. Data were downloaded on 29 June 2011.

(iii) Historical cost *net* capital stock (total fixed asset) data are from BEA Fixed Assets Table 6.3 and historical cost depreciation data are from NIPA Table 6.6; these are year-end estimates: 1929–2010. *Gross* capital stock is computed as net capital stock plus depreciation. Data were downloaded on 29 June 2011.

(iv) Data on the labour productivity index (output per hour and output per person) are from the Bureau of Labour Statistics: 1958–2010. Data were downloaded from FRB St Louis on 23 June 2011.

(v) Data on the GDP deflator are from NIPA Table 1.1.4. Data were downloaded on 3 July 2011.

(vi) The relative price of fixed capital is computed as the ratio of (i) an implicit price deflator for the fixed capital stock and (ii) the GDP deflator. The implicit price deflator for the net stock of private fixed assets is computed in two steps using the formulae in the NIPA Guide (US Department of Commerce, 2005) . In the first step the chained dollar value of the stock of fixed assets is computed as: chained dollar value = (chain-type quantity index × current dollar value in 2005)/100, where data for the chain-type quantity index of fixed assets are available from BEA Fixed Assets Table 6.2, the base year is 2005 and the current dollar value of the fixed asset stock is taken from BEA Fixed Assets Table 6.1. In the second step the implicit price deflator is computed as: implicit price deflator = (current dollar value × 100)/chained dollar value.

A1.2 Flow of Funds data (http://www.federalreserve.gov/datadownload/Choose.aspx?rel=Z.1)

(i) Non-financial assets: series FL102010005.A.
(ii) Non-financial assets at historical cost: series FL102010115.A.
(iii) Net worth: series FL102090005.A.
(iv) Net worth at historical cost: series FL102090115.A.
(v) Corporate profits before tax excluding IVA and CCAdj: series FA106060005.A.
(vi) Taxes on corporate income: series FA106231005.A.
(vii) Taxes on production and imports less subsidies, payable with corporate farms: series FA106240181.A.
(viii) Capital consumption allowance: series FA106300015.A.
(ix) Inventory valuation adjustment: series FA105020601.A.

All the data used occur at an annual frequency. The following variables were used:
All data are for the NNFCB sector and were downloaded on 17 June 2011. We use the following variables at an annual frequency for our analysis:
In the text of the paper we have used various measures of fixed assets (or net worth) as an estimate of the capital stock that supports the extraction and realisation of surplus value. In a more complete analysis of the process of capitalist reproduction, e.g. the one presented by Marx in volume II of *Capital* and formalised in Foley (1982) and Basu (2011), one needs to clarify that what we have denoted as capital stock really refers to stocks of value that attain three different forms in a typical capitalist economy: productive capital (undepreciated fixed assets, raw materials, inventory of unfinished products), commercial capital (inventory of finished commodities awaiting sale) and financial capital (money and other financial assets held by firms).

A2. Profitability using broader measures of capital stock

While it is difficult to obtain data on every component of the three forms of capital, there are relatively reliable data on inventories of finished goods for the non-farm sector in the US economy. In this section of the Appendix, we add the value of non-farm inventories to the various measures of replacement value fixed assets to arrive at a broader measure of capital stock and carry out the profit rate decomposition with this broader measure. The results are presented in Figures A1–A4. The conclusion that we draw from these figures is that the inclusion of inventories does not change the profitability, distribution or technology trends in any way. Hence, the results presented in the text of the paper are valid even for the broader measure of capital stock that includes inventories.

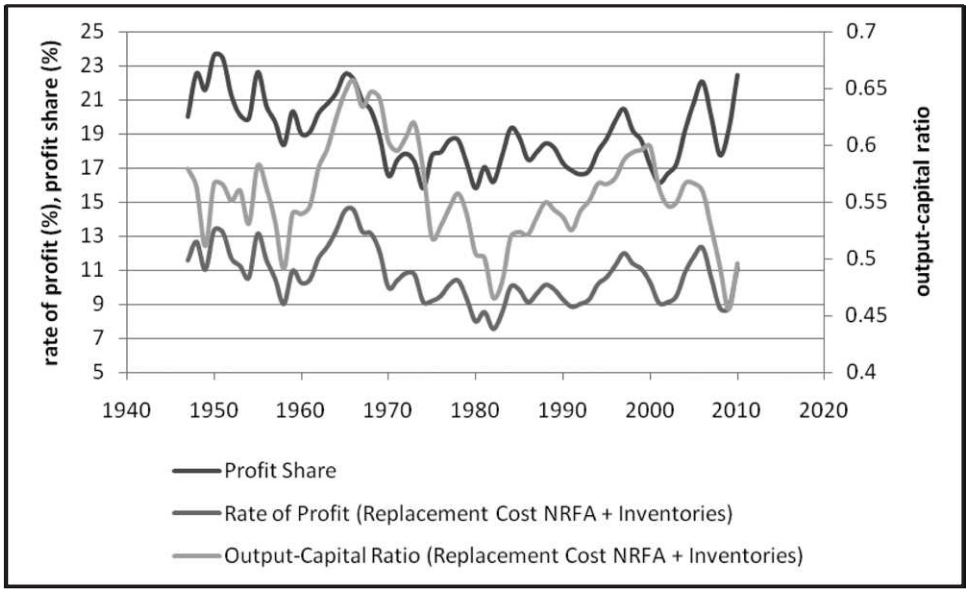

Fig. A1. *Rate of profit, US corporate business sector, 1946–2010 (capital stock: replacement value net non-residential fixed assets and non-farm inventories).*

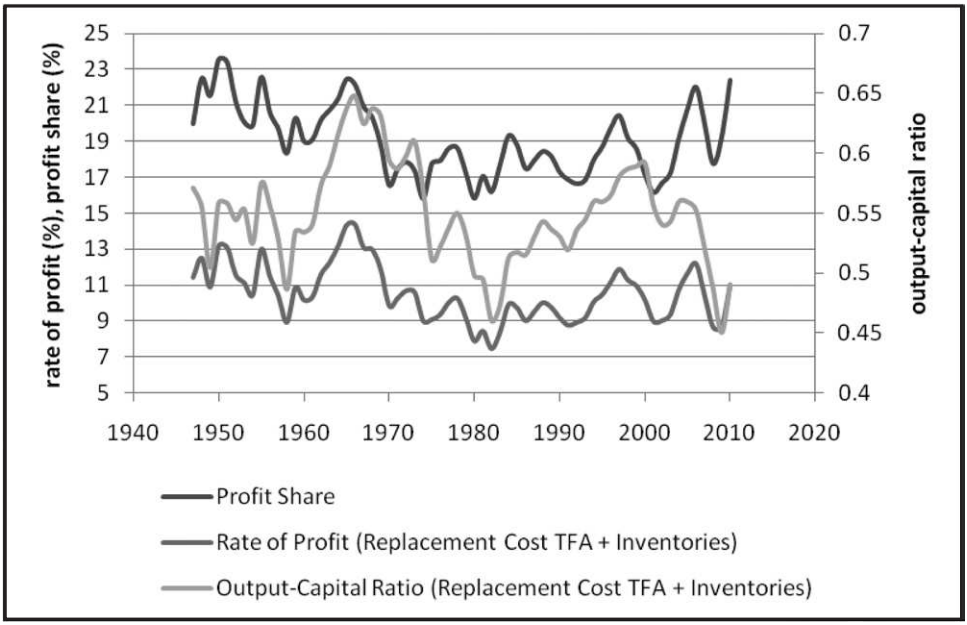

Fig. A2. *Rate of profit, US corporate business sector, 1946–2010 (capital stock: replacement value net total fixed assets and non-farm inventories).*

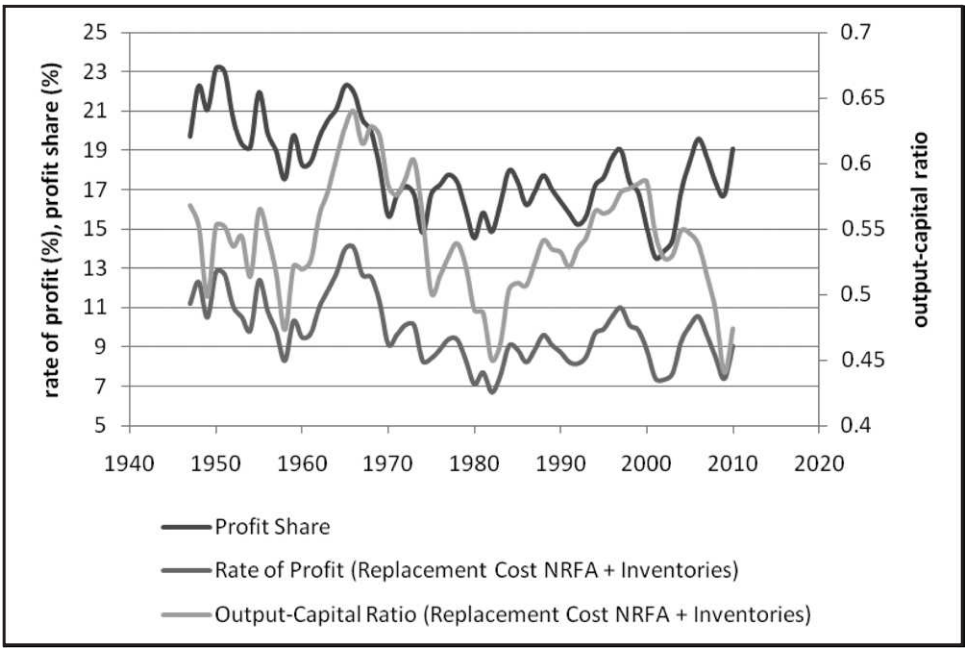

Fig. A3. *Rate of profit, US non-financial corporate business sector, 1946–2010 (capital stock: replacement value net non-residential fixed assets and non-farm inventories).*

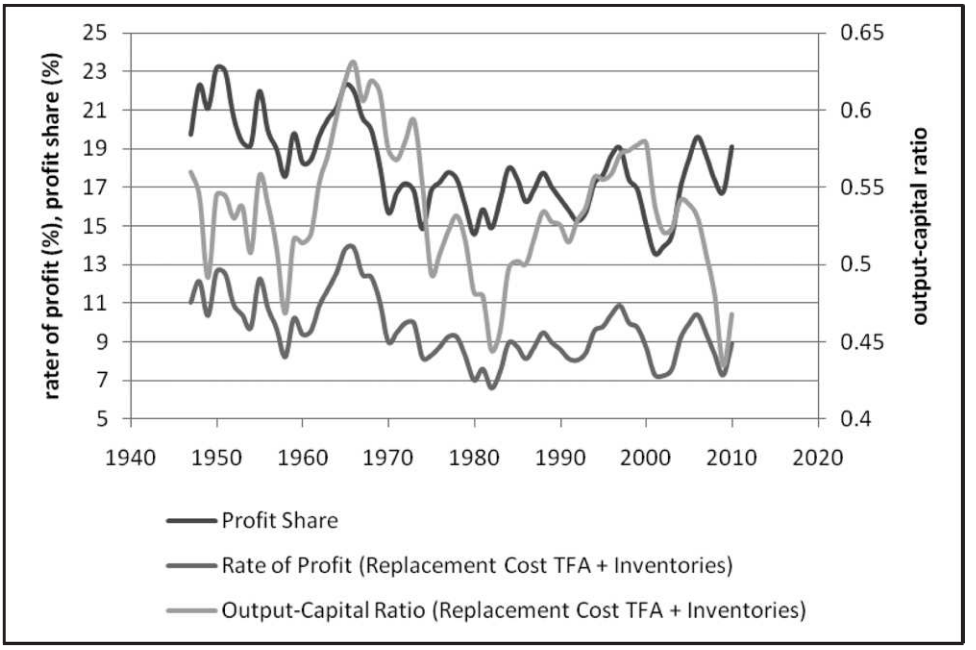

Fig. A4. *Rate of profit, US non-financial corporate business sector, 1946–2010 (capital stock: replacement value net total fixed assets and non-farm inventories).*