

2011

Technology, Distribution and the Rate of Profit in the US Economy: Understanding the Current Crisis

Deepankar Basu

University of Massachusetts Amherst, dbasu@econs.umass.edu

Ramaa Vasudevan

Follow this and additional works at: https://scholarworks.umass.edu/econ_workingpaper



Part of the [Economics Commons](#)

Recommended Citation

Basu, Deepankar and Vasudevan, Ramaa, "Technology, Distribution and the Rate of Profit in the US Economy: Understanding the Current Crisis" (2011). *Economics Department Working Paper Series*. 140.

Retrieved from https://scholarworks.umass.edu/econ_workingpaper/140

This Article is brought to you for free and open access by the Economics at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Economics Department Working Paper Series by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

DEPARTMENT OF ECONOMICS

Working Paper

**Technology, Distribution and the Rate of Profit in
the US Economy: Understanding the Current Crisis**

By

Deepankar Basu
Ramaa Vasudevan

Working Paper 2011-32



**UNIVERSITY OF MASSACHUSETTS
AMHERST**

Technology, Distribution and the Rate of Profit in the US Economy:

Understanding the Current Crisis

Deepankar Basu* and Ramaa Vasudevan**

August 11, 2011

Abstract: This paper offers a synoptic account of the state of the debate within 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 Nonfarm Nonfinancial Corporate Business, the Nonfinancial Corporate Business and the Corporate Business sectors in post-War U.S. are summarized. A broad range of profit rate measures are covered and data from both the U.S. Bureau of Economic Analysis (NIPA and Fixed Asset 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.

JEL Codes: B51, E11.

Keywords: profitability, technological change, income distribution, structural crisis.

1. Introduction

The US 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 such deep structural crisis – the Long Depression in the 1880's, the Great Depression in the 1930's, the Stagflation of the seventies and the current crisis. Marxist analysis sees these recurrent crises as reflections of the inherently

* Department of Economics, University of Massachusetts, Amherst; email: dbasu@econs.umass.edu

** Department of Economics, Colorado State University; email: Ramaa.Vasudevan@colostate.edu. Both of us would like to thank Duncan Foley and Thomas R. Michl for very helpful comments on an earlier draft of the paper. The usual disclaimers apply.

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.

The structural crisis of the seventies 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 labor productivity with a fall in the intensity of work (Bowles, Gordon and Weisskopf, 1987). 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, while Shaikh (1987) explains the crisis of the seventies as stemming from a falling rate of profit due to a process of increasing capital intensity and labor saving technical change that is reflected in a rising “materialized composition of capital”. Moseley (1992, 2000) highlights the growth of the ratio of unproductive to productive labor 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 seventies. 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

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

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 organized as follows. Section 2 offers a brief overview of the main competing accounts of the current crisis. Section 3 investigates and summarizes profitability trends; Section 4 presents results on profit rate decomposition in order to investigate the roles of technology and distribution as drivers of profitability². This investigation offers some interesting insights into the different regimes of technological change in Postwar United States. Specifically it points to the significance of the sharp fall in capital productivity in the period preceding the crisis. 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.

2. Explaining the Current Crisis

The dominance of finance and the phenomena of financialization is no doubt an important aspect of any account of the current crisis³. What distinguishes Marxist explanations is that while they recognize the importance of financialization 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 focuses on the growing gap between

² Information about data sources is provided in the Appendix.

³ For accounts of the role of finance in the unfolding of the crisis see Gowan (2009), Blackburn (2009), Lapavistas (2010), Crotty and Epstein (2009)

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. Labor productivity is increased by increasing mechanization 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 characterization of contemporary capitalism as the phase of monopoly-finance capitalism. This argument draws on the analytical tradition of Kalecki, Steindl, Baran and Sweezy. Monopolization 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 toward 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 financialized "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 financialization. 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. Over-competition and Over-accumulation

In contrast to the monopoly-finance phase argument, Brenner's (2010) argument stresses globalization and the intensification of competition since the seventies as new manufacturing powers entered the world market – Germany and Japan, the Newly Industrializing Countries (NICs), 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 seventies. 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 rationalizing the workforce and 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 vulnerability of the economy.

The vulnerability is manifested in over-investment, declining capacity utilization, 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. Over-Investment

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 over-capacity. Such bubbles temporarily push demand above its normal level, spurring creation of growing productive capacity – over investment. With debt deflation, demand returns to its normal level, precipitating excess productive capacity. Over-investment 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 stimulating excessive investment in relation to normal level demands. The growing gap between wages and profits, between increase in labor productivity and 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 fail to materialize with the collapse of the bubble, capacity utilization rates fell, driving down the profit rate and finally the rate of investment was sharply cut back. The crisis manifests itself in declining capacity utilization 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 mechanization 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 eighties,

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 to economy towards a phase of prolonged stagnation. Two sets of factors were adopted to counter declining profitability. First, wage suppression in the U.S., increasing exploitation of labour in the form of “speed-up”, widespread bankruptcies and globalization as the worldwide search for lower wages; and second, 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, build-up relative to aggregate income flows. This debt overhang is a source of continued fragility and stagnation for the U.S. economy.

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 centers 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 that of “over-investment”.

2.1.6. Crisis of financial hegemony

Dumenil and Levy (2010), 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) and increasing economic power of the former class. This class configuration underlies what Dumenil and Levy characterize as the hegemony of finance (2004, 2010)⁴. The unbridled quest for enrichment by the ruling classing coalition spurred the process of financialization and globalization. In the process persistent macro-disequilibria were generated in the form of rising indebtedness, growing global imbalances (boosted by a rising share of consumption in the US) 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 this ruling elite to capture a growing share of surplus.

2.2. State of the Debate

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

⁴ Paitaridis and Tsoulifidis (2011) use the categories of unproductive and productive labor and show that even though the general rate of profit was rising, the rate of profit when profits were calculated net of deductions for outlays on unproductive sectors declined, gradually choking off accumulation

2010). At the other end, Dumenil and Levy (2010) point to the declining personal savings rate and growing external deficits of the US to suggest that the current conjuncture is marked by over-consumption. 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 persistent slowdown in investment (Dumenil and Levy 2010). Again, the crisis is seen as being characterized by declining profitability (Brenner 2010, Kliman 2010) in some explanations and rising profitability (Dumenil and Levy 2010, Mohun 2010) in other explanations. Even within the explanations based on rising profitability, Mohun (2010), on the one hand, sees the crisis coming from the upswing in profitability and speculative excess culminating in a financial crisis that makes its impact on the real sector felt through the consequent evaporation of demand, while Dumenil and Levy (2010), on the other, argue that the current crisis cannot be categorized either as demand or profitability crisis – hence the alternative typology of a “crisis of financial hegemony”. Finally 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 from investment, towards distribution in the form of capital incomes - interest and dividends (Dumenil and Levy 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 literature is confronted by a daunting excess of conflicting characterizations⁵. 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.

⁵ See Dumenil and Levy (2011) for a critical, empirically grounded review of some of these alternative interpretations.

The first question 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 instance, on the treatment of direct profit taxes, i.e. taxes on corporate income. Dumenil and Levy (2011) 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 values. Replacement cost measures are favored as being more reflective both of business practice (Shaikh 1999, Dumenil and Levy 2011) and Marx's own writings.⁶ The stock 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). Again, demand factors which impart short run fluctuations to the profit rate could be removed from the picture, by deflating the observed rate of profit with capacity utilization 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 labor productivity, capital productivity, and profit share are important in unraveling the role of technology and distribution in determining the trajectory of the profit rate. Were shifts in income distribution important, or 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.

⁶ We believe Marx was quite unambiguously in favor of using replacement cost valuation of the capital stock. Discussing the scenario where a new and less costly (in terms of labor 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 labor, 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 labor, the old machinery undergoes a certain amount of depreciation, and therefore transfers proportionately less value to the product.” (Marx, 1990, p. 318).

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 globalization 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 off-shores 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 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 U.S. economy for a wide range of definitions. Second, it will try to analyze 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 in Volume II of Capital 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 capitalizing surplus value, i.e., generating and realizing 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 (Dumenil and Levy (1993)⁷).

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 realization 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.⁸ 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

⁷ Dumenil 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).

⁸ In the Appendix, we include the value of inventories of the nonfarm 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.

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 (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 liabilities to give us the net worth. Fourth, since a given stock of capital can be utilized at or below capacity depending on conditions of demand, deflating by the capacity utilization 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 summarizes trends in *all the measures* of the profit rate. This evidence regarding profitability trends in the post War U.S. Economy is meant to offer a chance to readers to see for themselves 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 U.S. economy using data from two different sources: (1) National Income and Product Accounts (NIPA), and Fixed Asset data of the U.S. Bureau of Economic Analysis (BEA), and (2) Flow of Funds (FOF) data from the Federal Reserve Board of Governors. The NIPA data, in turn, is presented for two different large sectors of the U.S. Economy: (a) the Corporate Business (CB) sector, and (b) the Nonfinancial Corporate Business (NFCB) sector. The FOF data is presented for the Nonfarm Nonfinancial Corporate Business (NNFCB) sector.

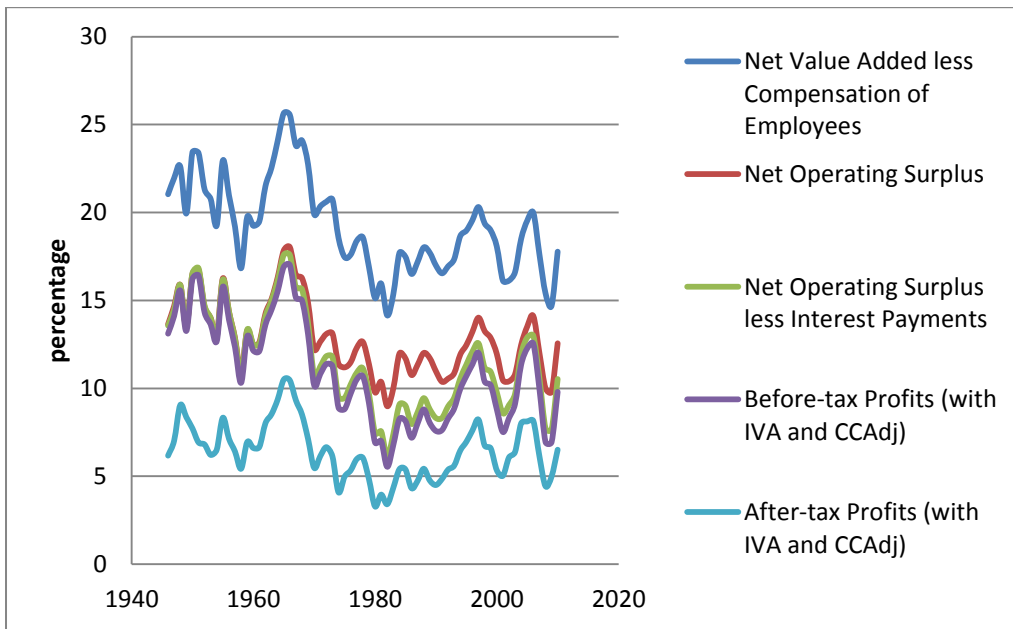


FIGURE 1: Rate of Profit, U.S. Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Cost Net Total Fixed Assets)

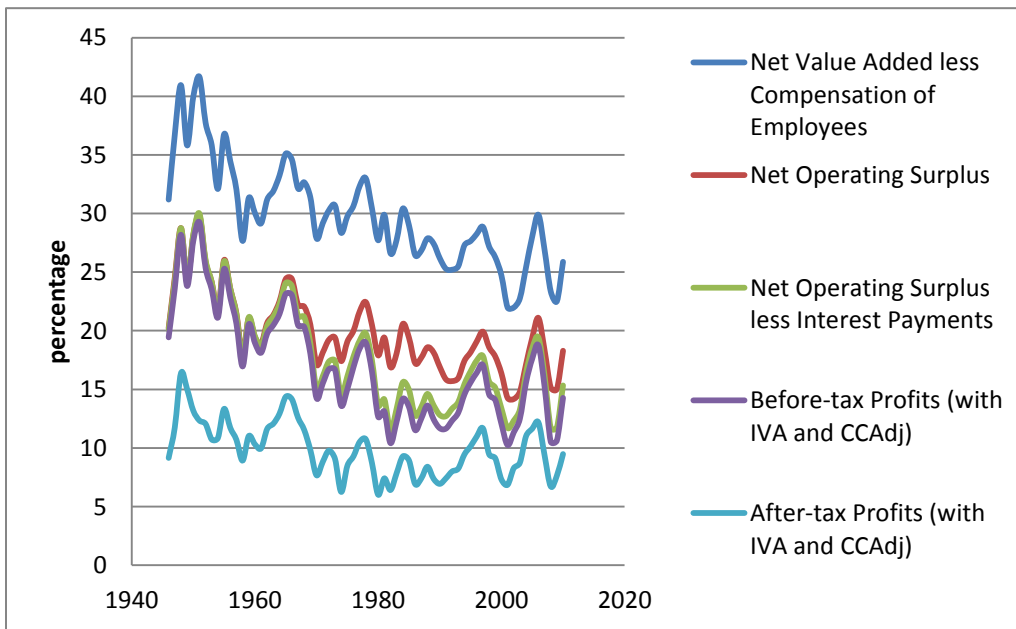


FIGURE 2: Rate of Profit, U.S. Corporate Business Sector, 1946-2010 (Capital Stock: Historical Cost Net Total Fixed Assets)

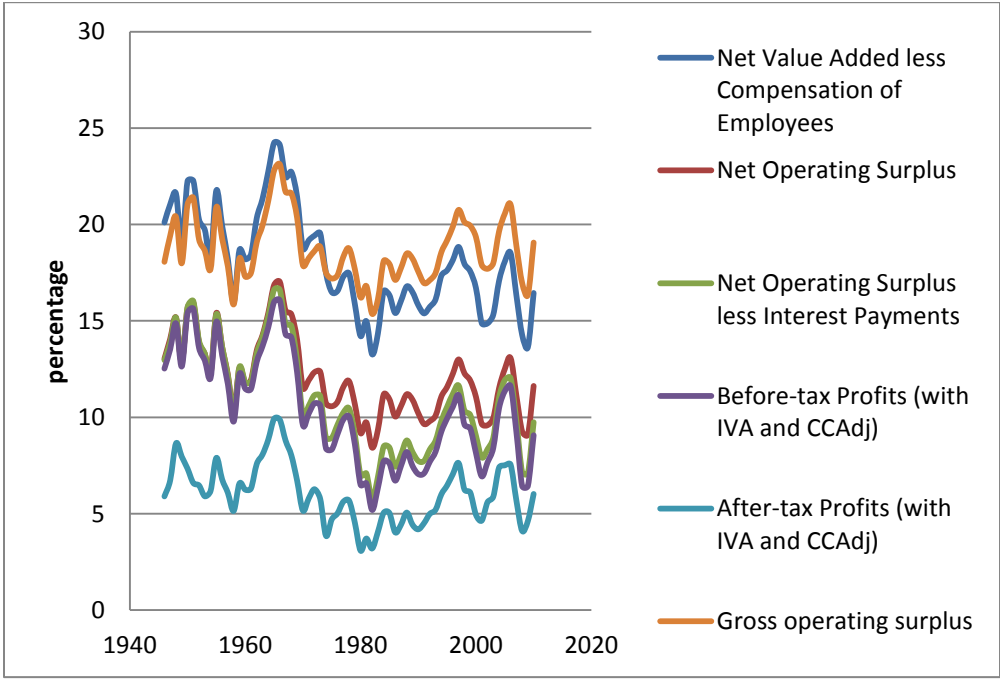


FIGURE 3: Rate of Profit, U.S. Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Cost Gross Total Fixed Assets)

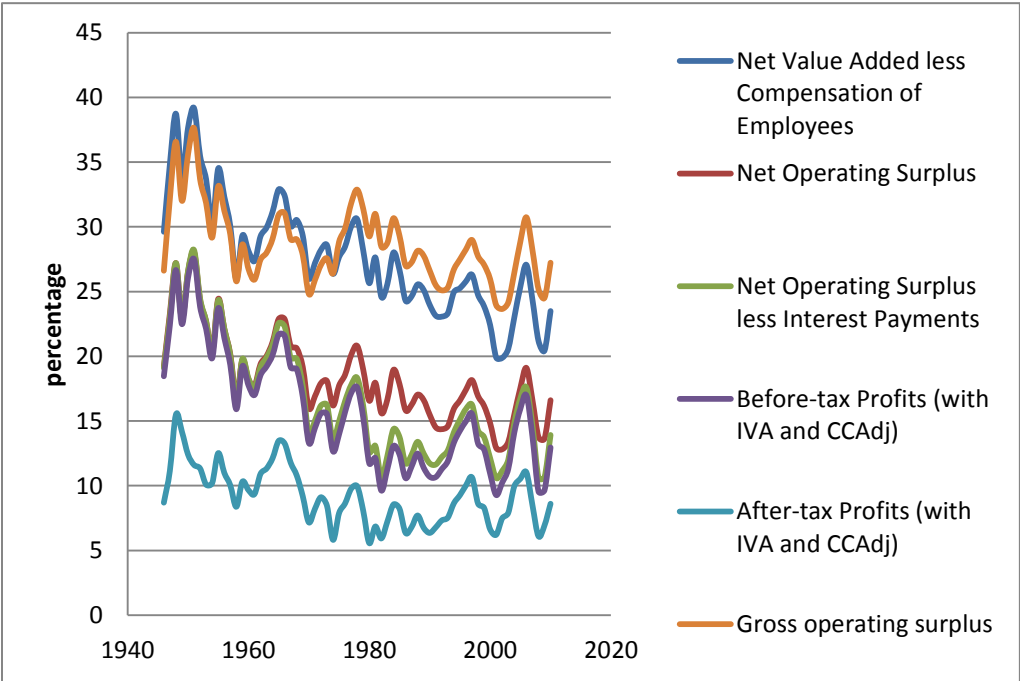


FIGURE 4: Rate of Profit, U.S. Corporate Business Sector, 1946-2010 (Capital Stock: Historical Cost Gross Total Fixed Assets)

3.1. BEA Data: NIPA and Fixed Asset Tables

3.1.1. Corporate Business (CB) Sector

Figure 1 and 2 plot the *annual* rate of profit for the U.S. corporate business 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 Table 6.1 through 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 net value added less compensation of employees including inventory valuation and capital consumption adjustments. 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 *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*⁹.

Figure 3 and 4 summarize profitability trends that are similar to those summarized in Figures 1 and 2. The only difference is that, in Figures 3 and 4, *gross* capital stock measures are used instead of net capital stock measures.¹⁰ The profit flow measures are exactly the same, with one addition, gross operating surplus, which is defined as the sum of net operating surplus and depreciation.

⁹ The further deduction of dividend distribution would yield the narrowest measure corresponding to retained earnings of the enterprises or the internally generated funds available for investment.

¹⁰ With the 1995 comprehensive revision of the NIPAs, the BEA started using 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, our estimates of the gross capital stock used in this paper are only approximations. For more details see U.S. Department of Commerce (2003). We would like to thank Thomas R Michl for pointing this out.

3.1.2. Nonfinancial Corporate Business (NFCB) Sector

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

Figure 5 is the analog 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; it plots the rate of profit for the NFCB sector using historical cost valuation of the capital stock. Figures 7 and 8 are the analogs of Figures 3 and 4 in that they plot the various measures of the rate of for the NFCB sector using gross total fixed assets as the measure of capital stock.

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 sector (Figures 1, 3, 5 and 7) indicate two major periods; this periodization, moreover, is independent of the measure of profit that is used (before or after tax, with or without IVA & 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; the declining trend was reversed and we enter into the second period, which saw an upward trend in profitability (with large fluctuations coinciding with the downturns in the late 1990s and the 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 run downward movement associated with fluctuations of the rate of profit at business cycle frequencies.

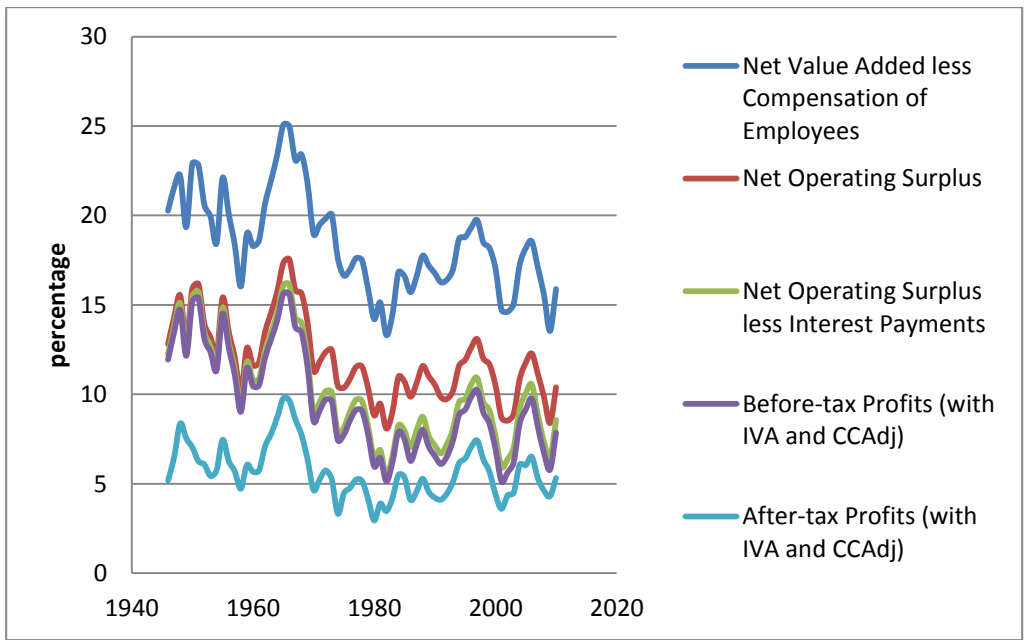


FIGURE 5: Rate of Profit, U.S. Nonfinancial Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Cost Net Total Fixed Assets)

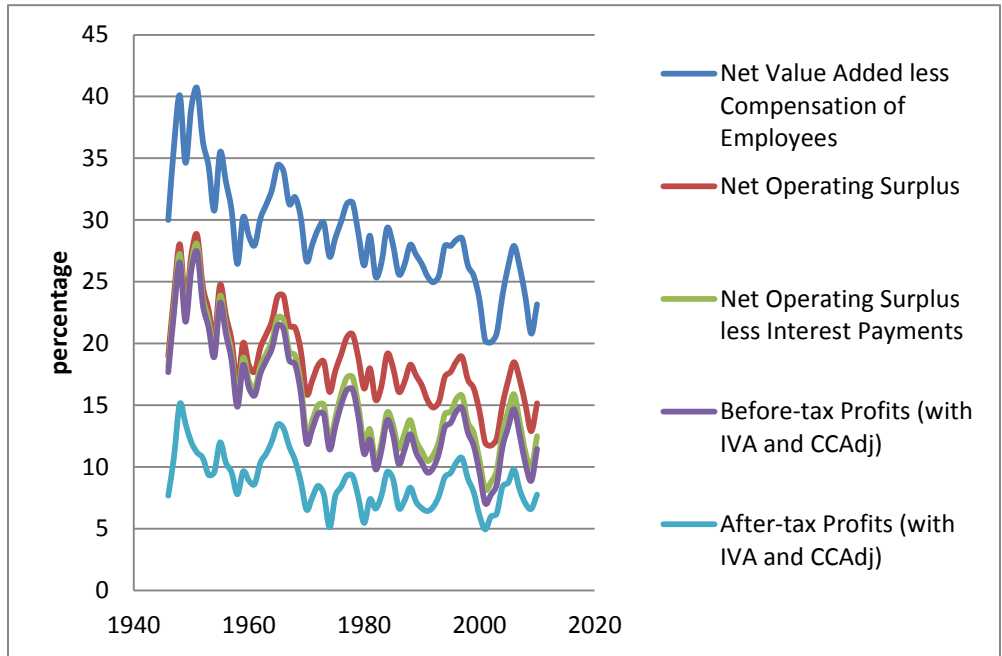


FIGURE 6: Rate of Profit, U.S. Nonfinancial Corporate Business Sector, 1946-2010 (Capital Stock: Historical Cost Net Total Fixed Assets)

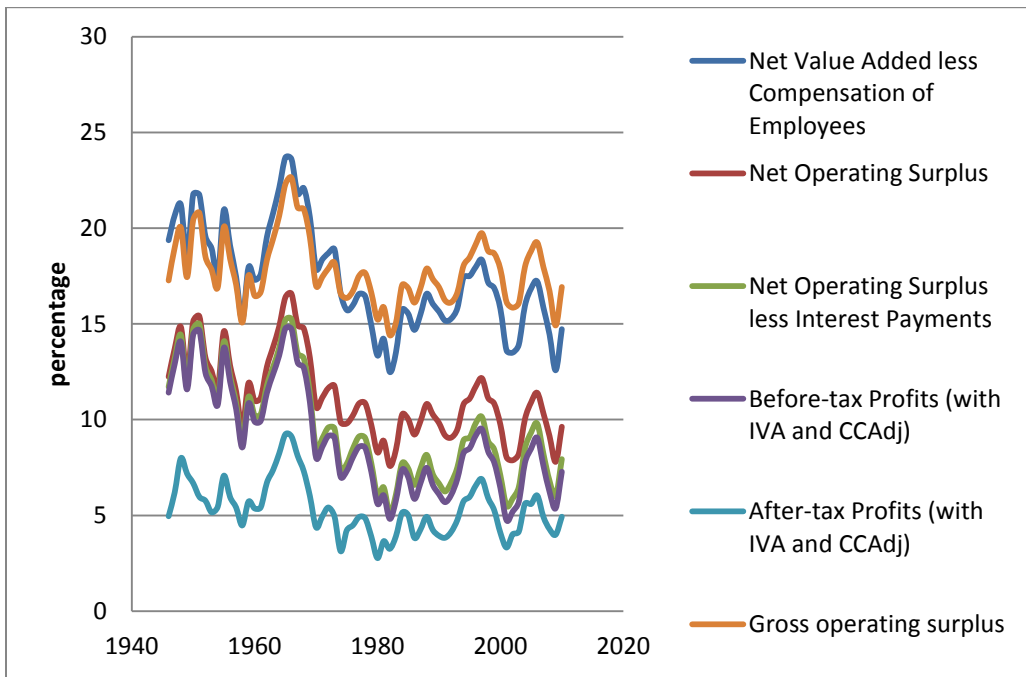


FIGURE 7: Rate of Profit, U.S. Nonfinancial Corporate Business Sector, 1946-2010 (Capital

Stock: Replacement Cost Net Total Fixed Assets)

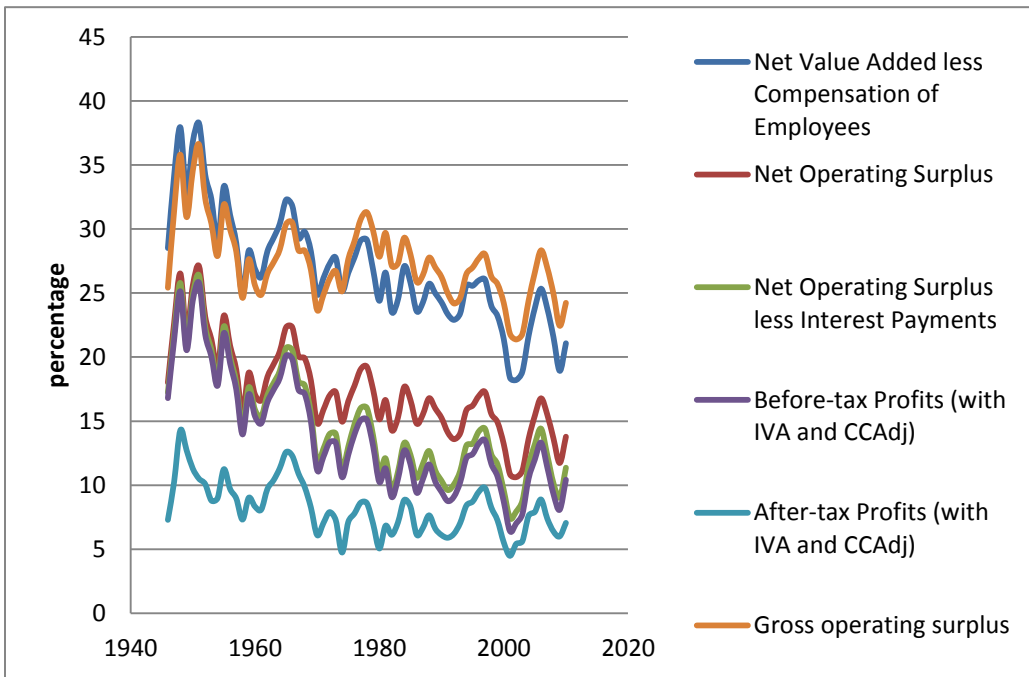


FIGURE 8: Rate of Profit, U.S. Nonfinancial Corporate Business Sector, 1946-2010 (Capital

Stock: Replacement Cost Net Total Fixed Assets)

When historical cost valuation of the capital stock is used (Figures 2, 4, 6 and 8), we see two interesting patterns. First, *broader measures* of the rate of profit (using the net or gross operating surplus, for instance) 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 (using after-tax, after-interest rate of profit, for instance) display a different pattern: a period of decline that runs up to the early 1980s is followed by a trend-less period after that.

The conclusion from the analysis of 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.¹¹

3.2. Flow of Funds

Using data from the Flow of Funds Accounts of the Federal Reserve, we compute various measures of the rate of profit for the U.S. Nonfarm Nonfinancial Corporate Business (NNFCB) sector. The FOF data is useful for two reasons. First, it allows us to analyze trends in the NNFCB sector, which is not possible on the basis of NIPA data. Second, it allows us to use *net worth* as a measure of tied-up capital, which, again, is not possible with NIPA data. We use two different measures of the tied-up capital: the total nonfinancial assets, and net worth.

Figures 9 and 10 plot the rate of profit for the U.S. Nonfarm Nonfinancial Corporate Business

¹¹ 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.

(NNFCB) sector computed from flow of funds data from the Federal Reserve, the first using the stock of *nonfinancial assets valued at replacement cost* and the second the stock of *nonfinancial assets valued at historical cost*. The shaded region at the end indicates the Great Recession beginning in 2008.

Figures 11 and 12 are the analogs of Figures 9 and 10. They plot the rate of profit for the U.S. Nonfarm Nonfinancial Corporate Business (NNFCB) sector computed from flow of funds data from the Federal Reserve using the *net worth valued at replacement cost* and *historical cost*, respectively.

3.2.1. Summary of Profit Rate Trends: Flow of Funds data

Nonfinancial Assets: Figure 9 and 10, computed from Flow of Funds data and using the year-end estimates of nonfinancial assets to measure capital stock arrive at pretty much the same trend as Figures 1, 3, 5 and 7.

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 & 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 (1) a period with rising trend (with large fluctuations coinciding with the downturns in the late 1990s and the Great Recession) if replacement costs valuation is used for the nonfinancial assets, and (2) 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 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 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.

Net Worth: Figure 11 and 12 plot the rate of profit using the net worth instead of the stock of nonfinancial assets. With replacement cost valuation (Figure 11), we get the same trends as before. 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 profitability trends that have been summarized in Figures 1 through 12? To address this question, we will decompose the rate of profit into two components, one capturing the class distribution of income and the other capturing technological factors as: rate of profit = (profit/output) * (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 utilization to capture the short run fluctuations in the rate of profit due to fluctuations of aggregate demand as follows: rate of profit = (profit/output) * (output/capacity output) * (capacity output/capital stock). Here, the rate of profit is decomposed as the product of the profit share, capacity utilization and the capacity-capital ratio.

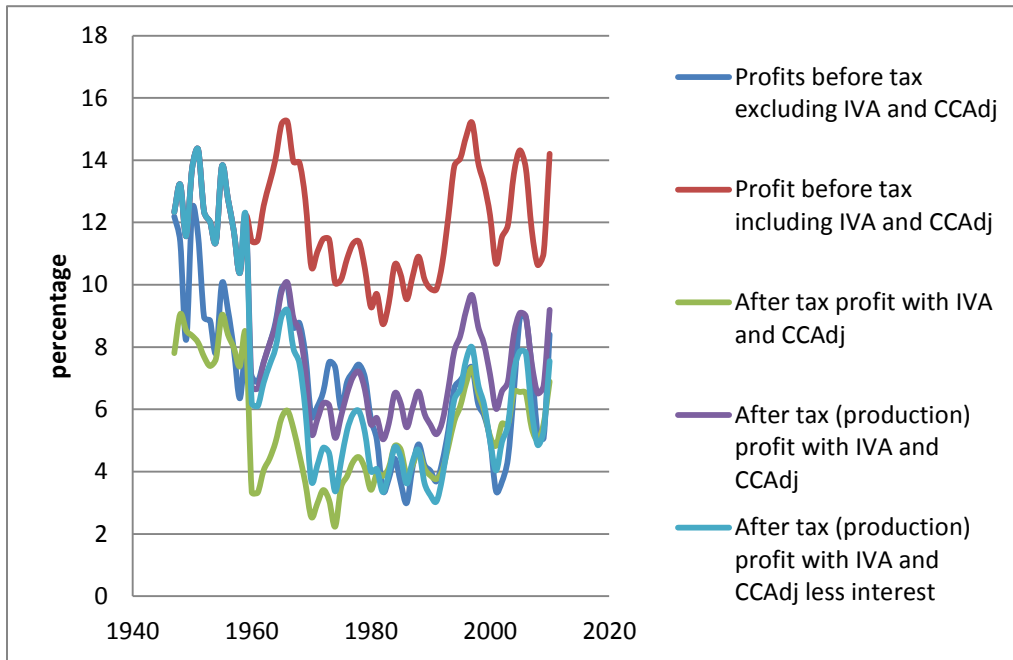


FIGURE 9: Rate of Profit, U.S. Nonfarm Nonfinancial Corporate Business Sector, 1946-2010

(Capital Stock: Replacement Cost Nonfinancial Assets)

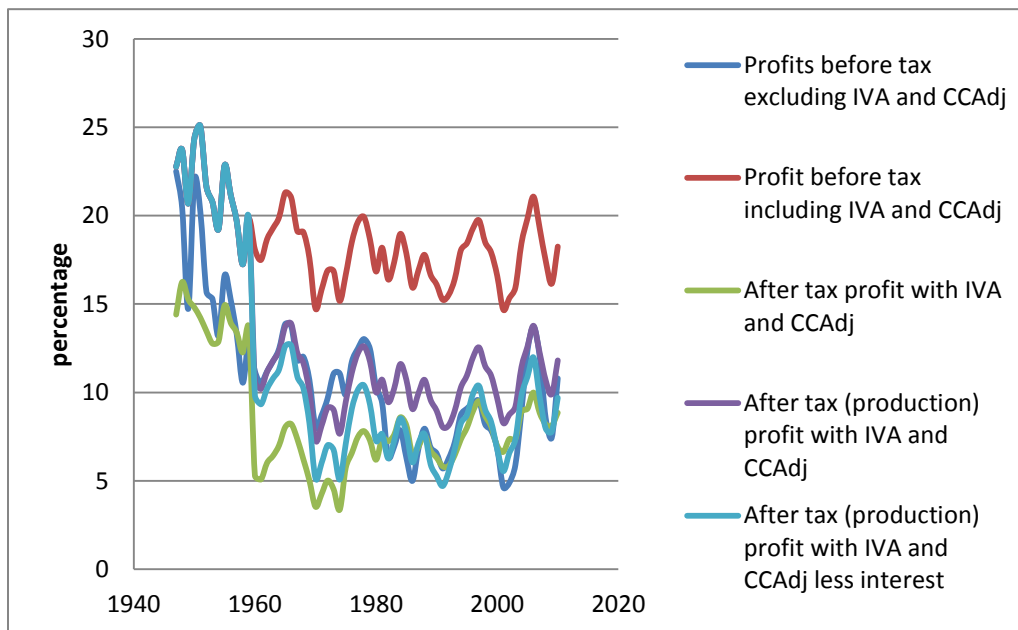


FIGURE 10: Rate of Profit, U.S. Nonfarm Nonfinancial Corporate Business Sector, 1946-2010

(Capital Stock: Historical Cost Nonfinancial Assets)

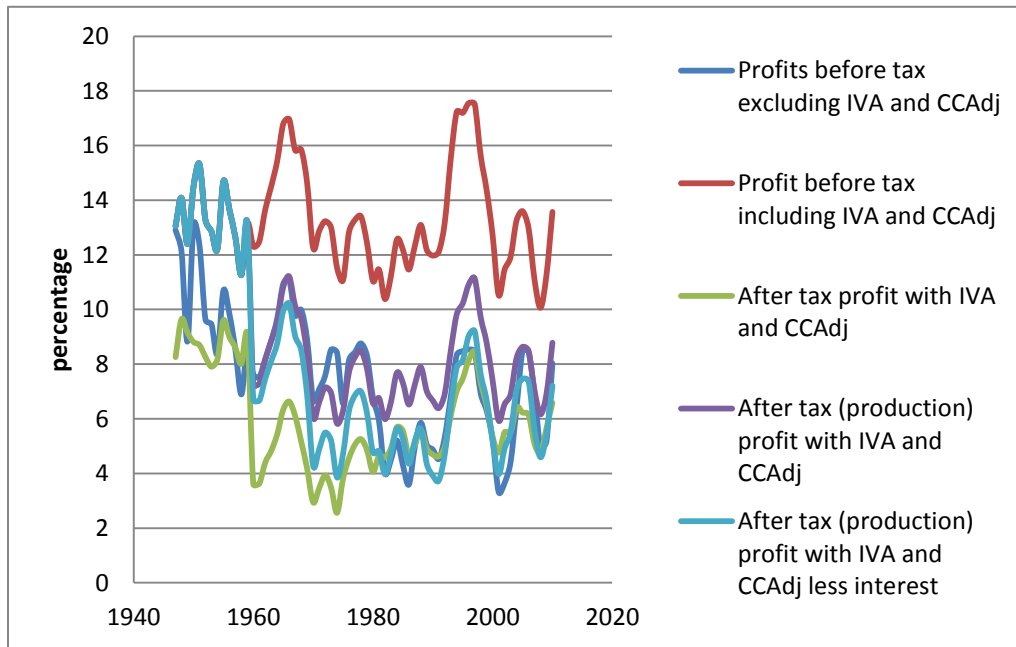


FIGURE 11: Rate of Profit, U.S. Nonfarm Nonfinancial Corporate Business Sector, 1946-2010

(Capital Stock: Replacement Cost Net Worth)

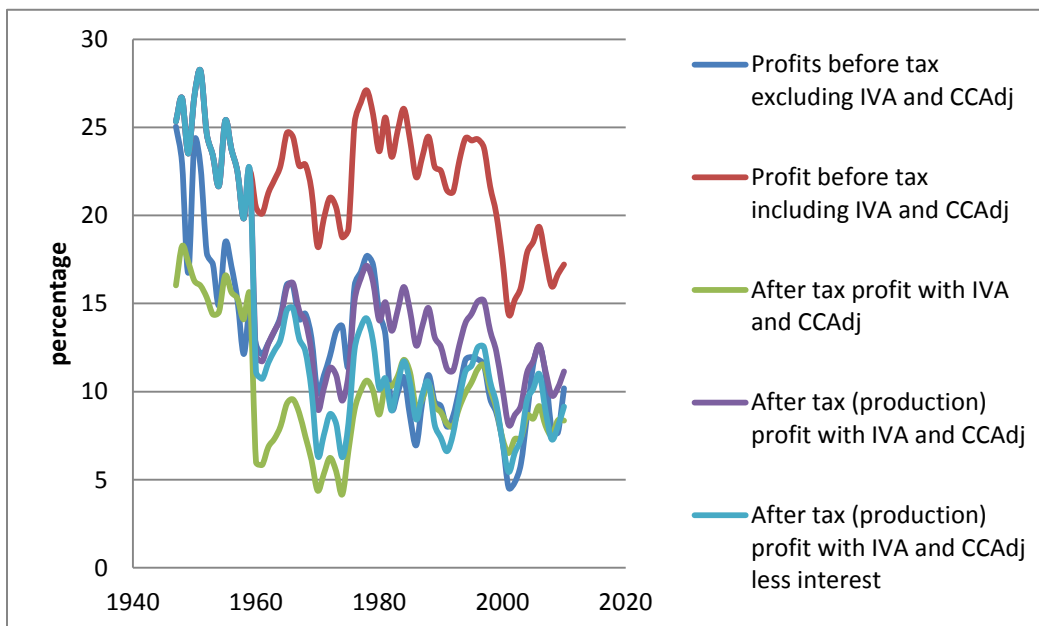


FIGURE 12: Rate of Profit, U.S. Nonfarm Nonfinancial Corporate Business Sector, 1946-2010

(Capital Stock: Replacement Cost Net Worth)

Following Michl (1988) 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 like “capacity output”, without which the capacity utilization 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 utilization rate. 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.

For the decomposition analysis, we will use NIPA data because that gives us the direct data on the commonly used measure of “broad” profit flows, the net operating surplus. The share of profit is, then, computed as the ratio of (a) net operating surplus (net value added less employee compensation less production & import taxes) with inventory valuation and capital consumption adjustments, and (b) 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. Figure 13 and 15 show that there were four different periods of technological evolution in post-War U.S. 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 post-War U.S., we enter the second period of declining capital productivity, which continues for the next decade and a half till 1982. For NFCB, capital productivity declines from 0.799 in 1966 to 0.543 in 1982, a massive 32 percent 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 percent 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 percent for CB and 28 percent 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 percent for the CB sector and 28 percent for the NFCB sector.¹² 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 postwar period can be divided into two broad periods in terms of the evolution of income distribution between capitalists and workers. The first period runs till 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 percent to 14.46 percent of total corporate income, a massive drop by all accounts; for the CB sector, the corresponding decline was from 22.52 percent in 1948 to 15.81 percent in 1980. The trend of declining profit share was reversed in 1982, which begins the second period

¹² The decline in capital productivity since 2000 is a little exaggerated because the years since 2007 have witnessed low capacity utilization. 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 percent for the CB and NFCB sectors respectively.

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 profit share starting about 2-3 years before the start of the 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 U.S. 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 the second World War 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 U.S. 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 favorable trends in both distribution and technology helped a revival of the profit rate. Dumenil and Levy (2010) and Mohun (2010) have highlighted these favorable developments.

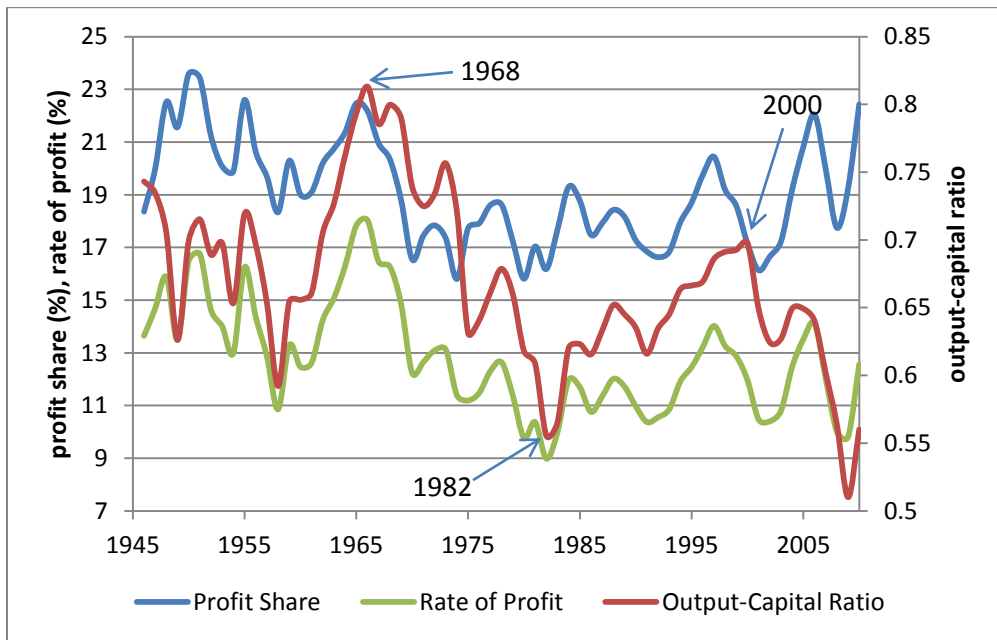


FIGURE 13: Profit Rate Decomposition, U.S. Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Cost Net Total Fixed Assets)

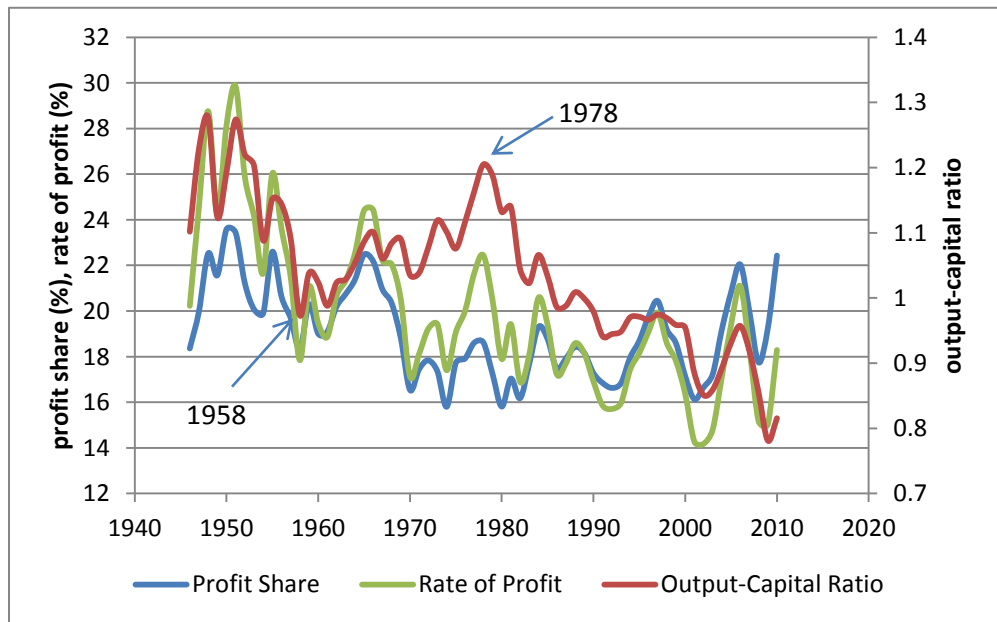


FIGURE 14: Profit Rate Decomposition, U.S. Corporate Business Sector, 1946-2010 (Capital Stock: Historical Cost Net Total Fixed Assets)

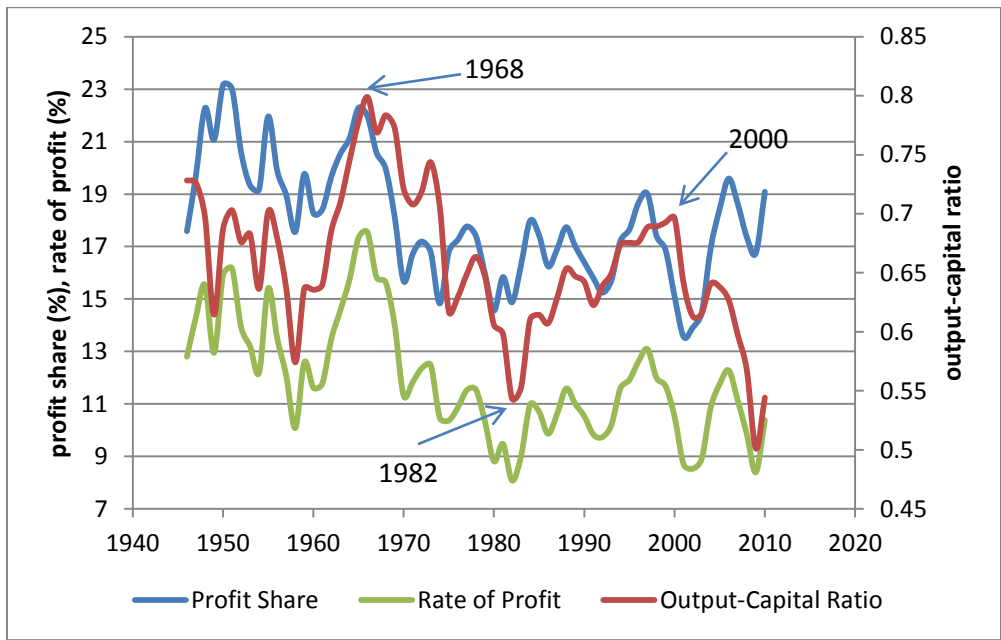


FIGURE 15: Profit Rate Decomposition, U.S. Nonfinancial Corporate Business Sector, 1946-2010
(Capital Stock: Replacement Cost Net Total Fixed Assets)

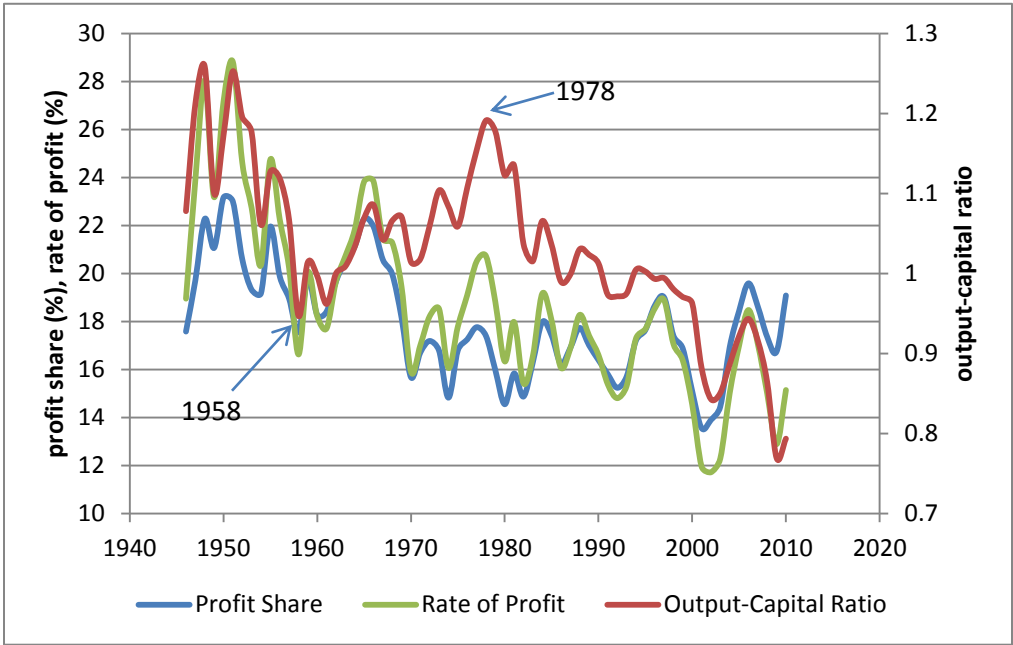


FIGURE 16: Profit Rate Decomposition, U.S. Nonfinancial Corporate Business Sector, 1946-2010
(Capital Stock: Historical Cost Net Total Fixed Assets)

However, the favorable 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 financialization and the growth of working class debt (Lapavistas, 2010). When the share of profit income collapsed, preceding the downturn of 2007, this reinforced adverse technological trends 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

Figure 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 profit rate decomposition 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 mechanization as a means of extracting a larger surplus from labor. This pattern of labor-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 labor productivity (output per person and output per hour) for the U.S. nonfinancial corporate business sector for the period 1958-2010. With labor 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 change: growing labor productivity and falling capital productivity. Essentially productivity of labor is increased, during such periods, through increasing capital intensity. This is the period which saw the collapse of the capital labor accord that had buttressed the golden age as profit rates declined. The decline in profitability is however related to unfavorable (Marx-biased) technical change rather than to any decrease in labor productivity.

Restoring profitability depended in the first instance on squeezing workers to ensure a rising profit share – reversing the erosion in preceding period. However, the second period, stretching from 1982 to 2000, also saw a different pattern of technological evolution when both labor and capital productivity increased. This pattern of technological change, which is favorable 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 U.S. NFCB sector is back to a regime of Marx-biased technological change: labor 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

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

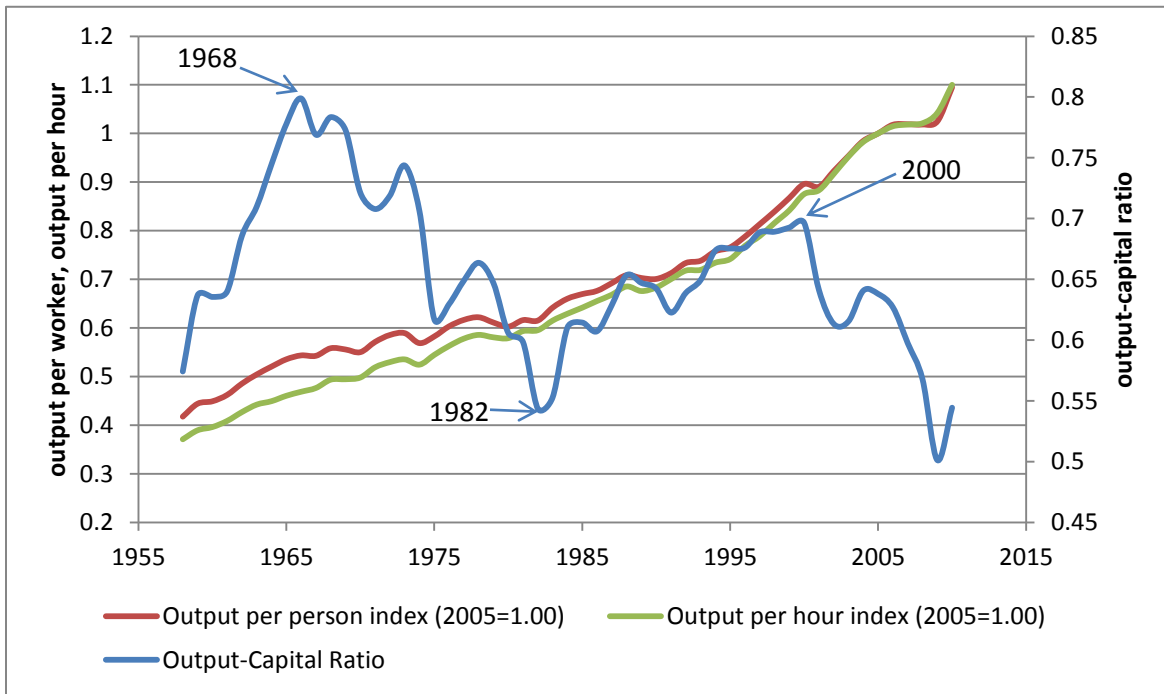


FIGURE 17: Patterns of Technological Change, U.S. Nonfinancial Corporate Business Sector, 1958-2010 (Capital Stock: Replacement Cost Net Total Fixed Assets)

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. Labor Productivity and Capital Intensity

Capital productivity is, by definition, the ratio of the labor productivity (Y/L) and the capital intensity (K/L). Hence, the growth rate of capital productivity is the difference between the growth rate of labor productivity and capital intensity. Figure 18 summarizes the growth rates of capital productivity and its two components for the three different periods of technological evolution that we have identified for the postwar U.S. economy: 1966-1982, 1982-2000 and 2000-2010.

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 percent per annum; during the same period, labor productivity (output per person) increased by 0.78 percent per annum and capital intensity increased by 3.16 per cent per annum. During the recovery between 1982 and 2000, capital productivity grew at an annual compound rate of 1.39 percent per annum; however in the run-up to the current structural crisis between 2000 and 2010, it *fell* at the rate of 2.43 percent per annum. Between 1982 and 2000, labor productivity grew at an annual compound rate of 2.11 percent per annum; between 2000 and 2010, it grew at 2.03 percent per annum. Thus, labor 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 percent per annum, suggesting that the increase in labor 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 percent per annum. Comparing with the first period, it seems that

both the technologically positive period during 1982 to 2000 and the technologically regressive period since 2000 has 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 labor productivity, This pattern ran its course by 2000, after which only a very high growth of capital intensity has managed to keep labor 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.

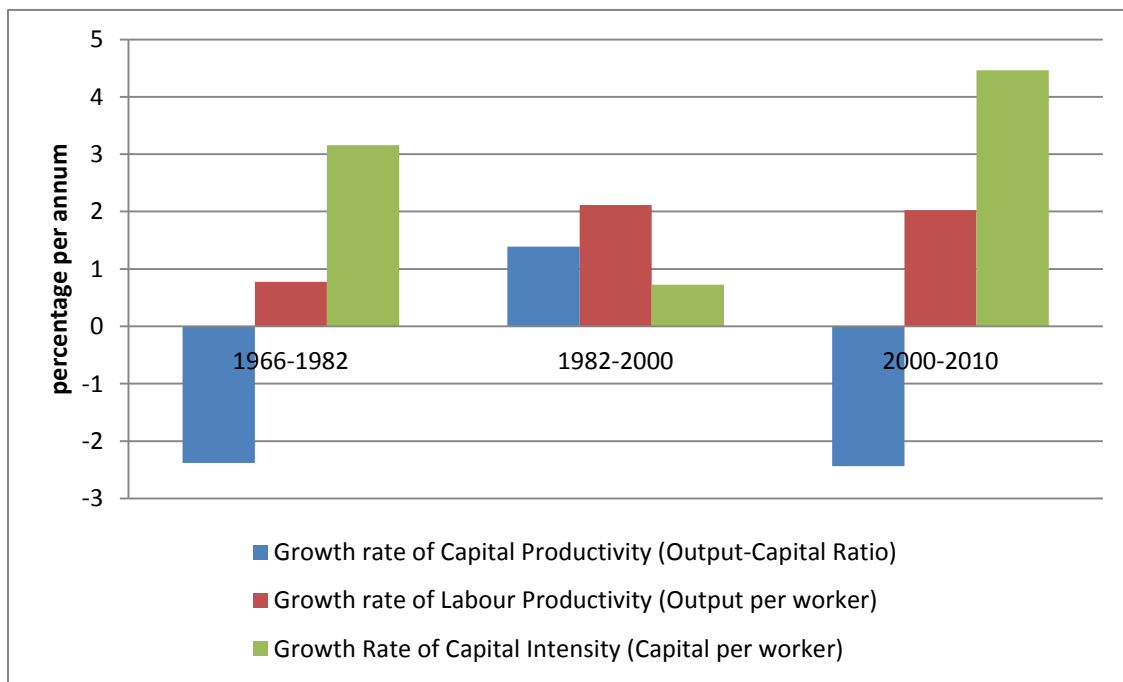


FIGURE 18: Growth of Capital Productivity, Labour Productivity and Capital Intensity, U.S. Nonfinancial Corporate Business Sector (Capital Stock: Replacement Cost Net Total Fixed Assets)

Marx’s discussion of mechanization 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 period when *capital accumulation has slowed down even as capital intensity has risen sharply*¹³.

4.3.1. 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 (a) real capital productivity (ratio of real net value added and real capital stock) and (b) 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 corresponds to what Marx termed the countervailing tendencies to the tendency 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 labor-power (labor productivity) that is engendered by mechanization (capital per unit of labor-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 indication of relatively rapid technological change in the capital goods sector in contrast to the whole economy.

Figure 19 and 20 plot the nominal & real capital productivity and the relative price of capital for the period 1946-2010 for the Nonfinancial Corporate Business Sector; the former uses the net stock of *total* fixed assets and the latter uses the net stock of *nonresidential* fixed assets 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.

Figures 19 and 20 show that since the early 1980s, the real output-capital ratio has been more or

¹³ The rate of accumulation (non-residential investment as a share of fixed nonresidential assets) has fallen from a peak of about 4.5% in 1999/2000 to about 0.5% in 2009 (Kotz 2011).

less stable, hovering around a value of 0.6, so that movements in the nominal output-capital ratio has 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 a value of 0.91 and started increasing again since 2004. Shaikh (1998) 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.

4.3.2. 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 nearly a two decade period, 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 nineties when capital productivity showed an upward trend. New forms of managerial control and organization, including just-in-time and lean production systems have been deployed to enforce increases in labor productivity since the 1980's. The phenomena of 'speed-up' and stretching of work has enabled the extraction of larger productivity gains per worker hour as evidenced the faster growth of labor 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 rationalization of production to "computerize" and automate certain tasks.

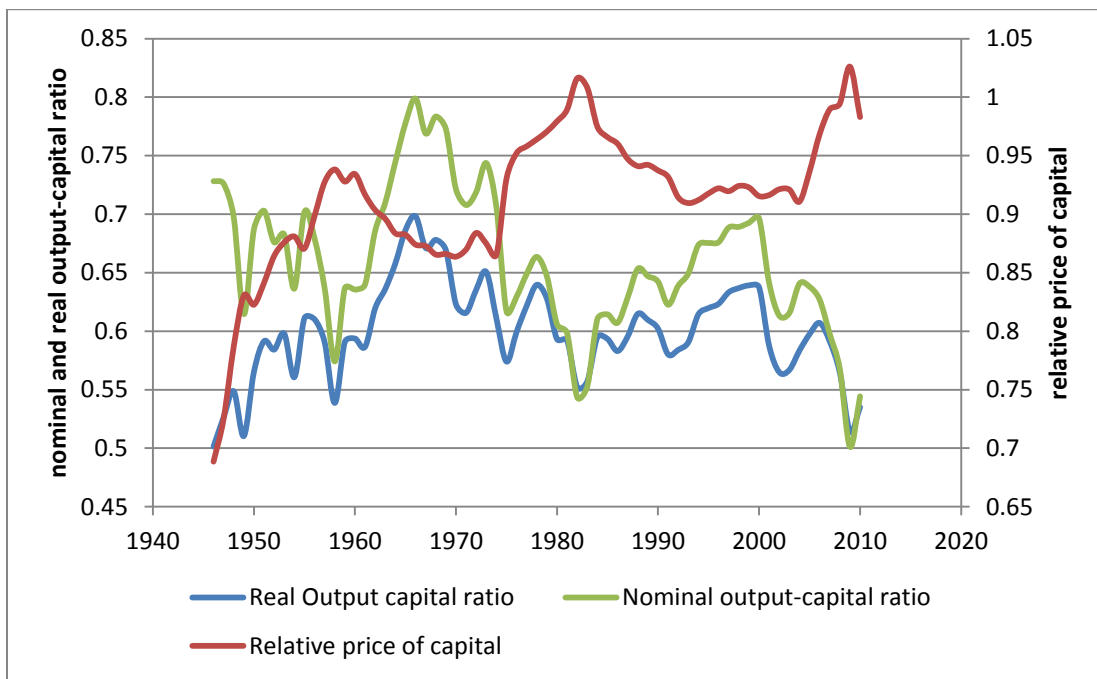


FIGURE 19: Nominal & Real Output-Capital Ratio and Relative Price of Capital, U.S. NFCB

Sector (Capital Stock: Replacement Cost Net Total Fixed Assets)

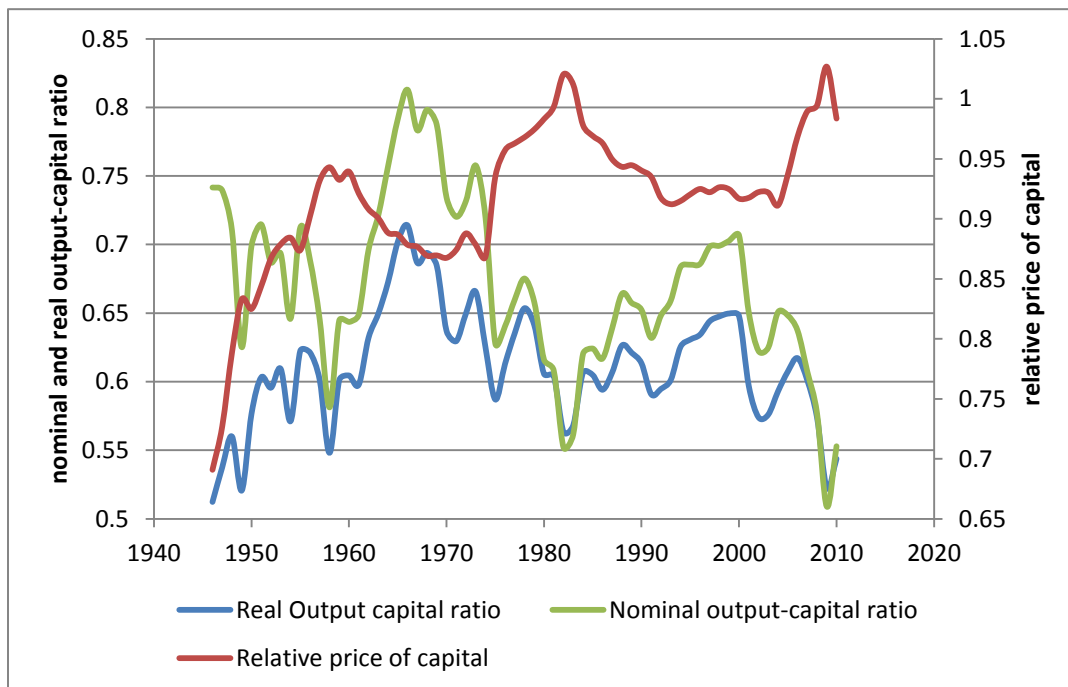


FIGURE 20: Nominal & Real Output-Capital Ratio and Relative Price of Capital, U.S. NFCB

Sector (Capital Stock: Replacement Cost Net Nonresidential Fixed Assets)

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 realizing rapid gains in cost reductions so that IT infrastructure is becoming less costly to adopt. Further, a large part of the initial R&D cost was borne and subsidized by the State, further lowering the cost of capital investment. Thus labor productivity was increased without necessitating increasing capital intensity.

The favorable trend in capital productivity is also fostered by globalization and off-shoring of production. This allows a further cheapening of capital and intermediate inputs with some of the more labor intensive and lower productivity (low value added) sectors being outsourced. This would also be reflected in declining and stable relative prices of capital till 2004, which ameliorated the effect of slower technological change in the capital goods sector through cheap imports (aided by the weak dollar) and the retention of the higher productivity – high technology sectors within the US. After 2000 as larger sections of the production process got relocated globally, this advantage was exhausted. In the 1990's US multinationals added 4.4 million jobs in the US and 2.7 million jobs overseas – that is for every one outsourced job about two jobs were being created in the US (Wessel 2011). The pattern changed drastically in the 2000's. 2.9 million jobs were axed in the US even as 2.4 million jobs were added abroad. It is clear that the process of off-shoring was accelerated in the past 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 US.

5. Conclusion

There are two broad strands in the Marxist theorization 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 characterization 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 U.S. economy (Figure 1 through 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 trend-less or a slowly rising trend in profitability. The only exception is a measure of the rate of profit which 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 postwar 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 favorable trends in both profit share and technology. Capital productivity increased through the nineties along with rising labor productivity and declining capital intensity. The tentative hypothesis provided here is that these favorable trends can be explained as the outcome of the specificities of the information technology, globalization and the global relocation of production, and the intensification of managerial control to enforce a steep increase of labor productivity.

Dumenil and Levy (2010) and Mohun 2010 have highlighted the favorable movements in profitability to argue that the current crisis cannot be viewed as a crisis of profitability. They have pointed to the similarities with the favorable pattern of capital productivity and profitability before the Great Depression. We present the profit rate decomposition using the Dumenil-Levy data set (Dumenil and Levy 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 - with increasing capital intensity - in check and fostered favorable trends in capital productivity - failed to prevent the precipitous fall in

capital productivity. The postwar recovery enabled the resumption of these favorable trends with the capital-labor accord and the post New Deal state apparatus.

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 8 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 a period of rising capital productivity (as Figure 21 indicates) –what Dumenil and Levy have termed “The Great Leap Forward”. It seems, therefore, that while the Great Depression cannot be characterized as a profitability crisis (because both capital productivity and profit shares were favorable to capital), the current crisis requires a more nuanced characterization (because capital productivity was declining, and profitability has been propped up by regressive redistribution of income).

Of course, once the crisis hits, there is a precipitous fall in aggregate demand leading to a fall in capacity utilization; 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 US, using the fears of a growing budget deficit to rein in fiscal stimulus or redistributive spending programs and possibly stifling technological innovation and R&D spending too (Lazonick & O'Sullivan, 2000; Dumenil & Levy, 2010). Without a deeper structural transformation of this configuration there would be little scope for a sustained recovery of accumulation.

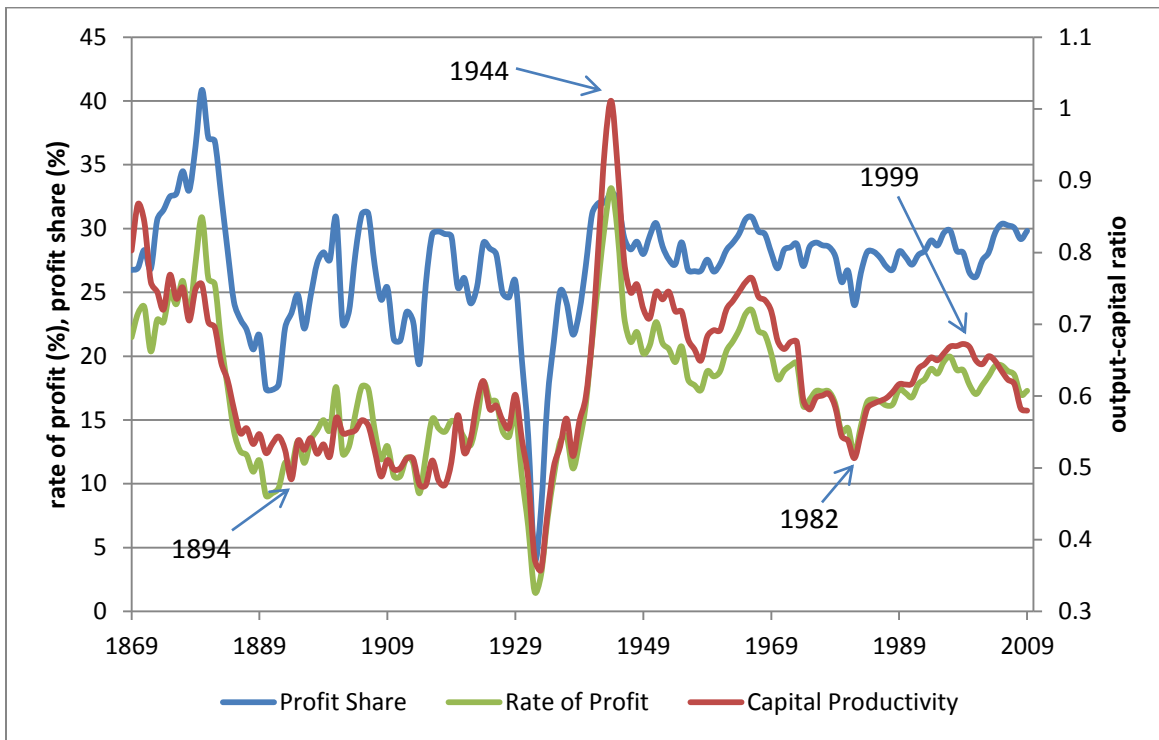


FIGURE 21: Profit Rate Decomposition, U.S. Private Economy, 1869-2010 (Data Source: Dumenil & Levy, 2010)

References

Baran, P. and P. Sweezy. *Monopoly Capital*. New York: Monthly Review Press. 1966.

Basu, D. Financialization, "Household Credit and Slowdown under Neoliberalism." Discussion Paper 20, *Research on Money and Finance*, June 2011; available for download at:

<http://researchonmoneyandfinance.org/media/papers/RMF-30-Basu.pdf>

Bellamy-Foster, J. and H. Magdoff. *The Great Financial Crisis: Causes and Consequences*. New York: Monthly Review Press. 2009

Blackburn, R. "The Subprime Crisis." *New Left Review*. 50, (March-April), 2008.

Body, R. and J. Crotty. "Class Conflict and Macro Policy: The Political Business Cycle," *Review of Radical Political Economy*, 7 (1) 1975.

Bowles, S., Gordon, D. and T. E Weisskopf. *Beyond the Waste Land*. New York: Anchor Press-Doubleday, 1983.

Brenner, R. *Economics of Global Turbulence*. London: Verso, 2006.

---. "What is Good for Goldman Sachs is Good for America: The origins of the Current Crisis," Prologue to the Spanish Translation of *Economics of Global Turbulence*, Akal.

Crotty, J. "Structural Causes of the Global Financial Crisis: A Critical Assessment of the 'New Financial Architecture'," University of Massachusetts, Amherst, Working Paper 14, 2008.

Duménil, G., and D. Lévy. "Why does profitability matter? Profitability and Stability in the US since 1950's." *Review of Radical Political Economics*, 25(1), 1993.

---. *Capital Resurgent*, Harvard University Press: MA, 2004

---. *The Crisis of Neoliberalism*. Harvard University Press: MA, 2010a.

---. *United States Long Term*. Version, August 2010; available for download at

<http://www.jourdan.ens.fr/levy/uslt4x.txt>, 2010b.

---. "The Crisis of the Early 21st century: A Critical Review of Alternative Interpretations,"

<http://www.jourdan.ens.fr/levy>, 2011.

Foley, D. K. "Realization and Accumulation in a Marxian Model of the Circuit of Capital." *Journal of Economic Theory*, 28(2), 300–319, 1982.

Foley, D. K., and T. Michl. *Growth and Distribution*. Cambridge, MA: Harvard University Press, 1999.

Glyn, A., and B. Sutcliffe. *British Capitalism, Workers and the Profit Squeeze*. Harmondsworth: Penguin Books, 1972.

Gowan, P. "Crisis in the Heartland," *New Left Review*, 55,(January-February), 2009.

Kliman, A. "The Destruction of Capital and the Current Economic Crisis." Pace University working Paper, 2010.

Kaldor, N. "A Model of Economic Growth." *The Economic Journal* 67 (268), 591-624, 1975.

Kotz, D. "The Financial and Economic Crisis of 2008: A Systemic Crisis of Neoliberal Capitalism," *Review of Radical Political Economics* 41:3, 305-17, 2009.

---. "Overinvestment and the Crisis of 2008," Available for download at:
http://people.umass.edu/dmkotz/OverInvestment_and_the_Crisis_11_01.pdf, 2011.

Lapavitsas, C. "Financialized Capitalism and the Crisis," *Historical Materialism*, 2010

Lazonick, W., and M. O'Sullivan. "Maximizing shareholder value: a new ideology for corporate governance," *Economy and Society*, 2000.

Marx, K. *Capital: A Critique of Political Economy, Volume One*. London: Penguin Books (in association with New Left Review, 1990 [first published in 1867]).

Michl, T. R. "The Two-Stage Decline in U.S. Nonfinancial Corporate Profitability, 1948-1986," *Review of Radical Political Economics*, Vol. 20, No. 4, 1988.

---. "Falling into the Liquidity Trap: Notes on the Global Economic Crisis," Political Economy Research Institute Working Paper 215, University of Massachusetts, Amherst, 2010.

Mohun, S. 2010. "The Crisis of 2008 in Historical Perspective," Queen Mary University Working Paper.

Moseley, F. *The Falling Rate of Profit in the Postwar United States Economy*. New York: St. Martin's Press, 1992.

---. "Is the U.S. Economy headed for a Hard landing?" Mount Holyoke College Working Paper, 2010. (Available at:<http://www.mtholyoke.edu/courses/fmoseley/HARDLANDING.doc>)

Shaikh, A. "An Introduction to the History of Crisis Theories," in *U.S. Capitalism in Crisis*, Union for Radical Political Economy, New York: Monthly Review Press, 1978.

---. "Falling Rate of Profit and the economic crisis in the US," in *The Imperiled Economy*, Book I, edited by R. Cherry, et al. Monthly Review Press, 1987.

---, "The First Great Depression of the 21st Century," in *The Crisis this Time: Socialist Register 2011*, edited by L. Panitch, G. Albo and V. Chibber, Merlin Press.

Sweezy, P., and H. Magdoff. *The Deepening Crisis of US Capitalism*, New York: Monthly Review Press, 1981.

Weisskopf, T.E. "Marxian Crisis Theory and the Rate of Profit in the Postwar U.S. Economy," *Cambridge Journal of Economics* 3(4), 341-378, 1979.

U.S. Department of Commerce. Bureau of Economic Analysis. Fixed Assets and Consumer Durable Goods in the United States, 1925-99. Washington, DC: U.S. Government Printing Office, September, 2003.

Wessel, D. "Big US Firms Shift Hiring Abroad." *Wall Street Journal*, April 19, 2011.

APPENDIX

1. Data Sources

1.1. BEA DATA: NIPA and FIXED ASSET TABLES

All data that has been used occur at an annual frequency. The following variables have been used:

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 downloaded on June 22, 2011.

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

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

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

Data on the GDP deflator is from NIPA Table 1.1.4. Data was downloaded on July 03, 2011.

The relative price of fixed capital is computed as the ratio of (a) an implicit price deflator for the fixed capital stock, and (b) 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 (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 is 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.

1.2. FLOW OF FUNDS DATA

All data are for the Nonfarm Nonfinancial Corporate Business sector and have been downloaded on June 17, 2011. We use the following variables at an annual frequency for our analysis:

nonfinancial assets: series FL102010005.A

nonfinancial assets at historical cost: series FL102010115.A

net worth: series FL102090005.A

net worth at historical cost: series FL102090115.A

corporate profits before tax excluding IVA and CCAdj: series FA106060005.A

taxes on corporate income: series FA106231005.A

taxes on production and imports less subsidies, payable with corporate farms: series FA106240181.A

capital consumption allowance: series FA106300015.A

inventory valuation adjustment: series FA105020601.A

2. Profitability using Broader Measures of Capital Stock

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 realization of surplus value. In a more complete analysis of the process of capitalist reproduction, for instance the one presented by Marx in Volume II of Capital and formalized 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 (un-depreciated 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).

While it is difficult to get data on every component of the three forms of capital, there is relatively reliable data on inventories of finished goods for the nonfarm sector in the US economy. In this section of the Appendix, we add the value of nonfarm 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 Figure A1-A4. The conclusion that we draw from these figures is that the inclusion of inventories do 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 which includes inventories.

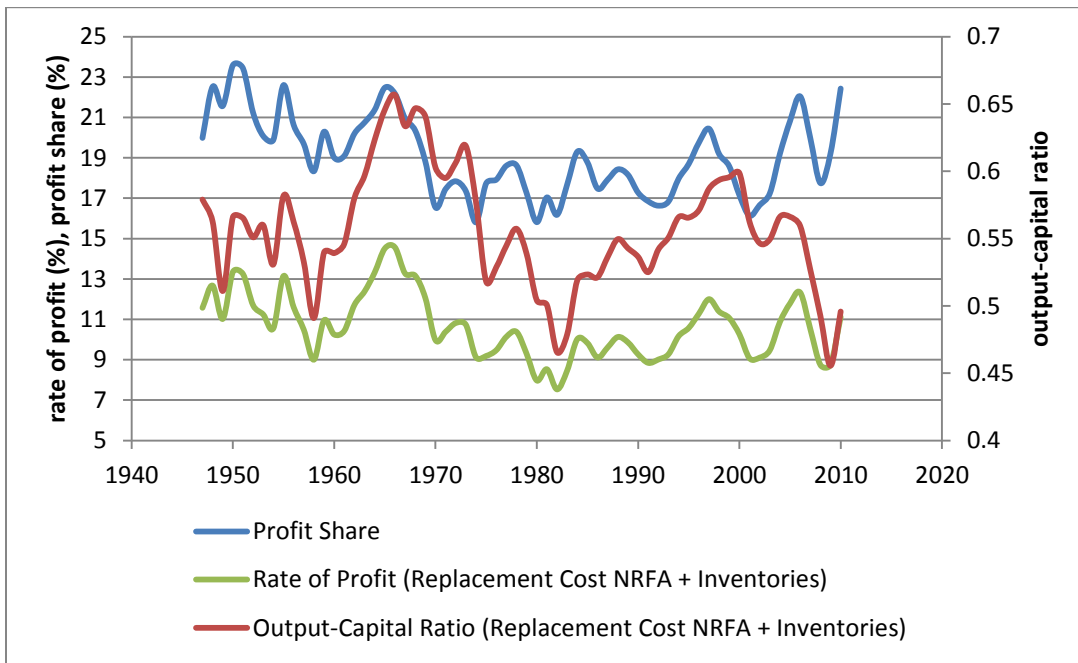


Figure A1: Rate of Profit, US Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Value Net Nonresidential Fixed Assets and nonfarm inventories)

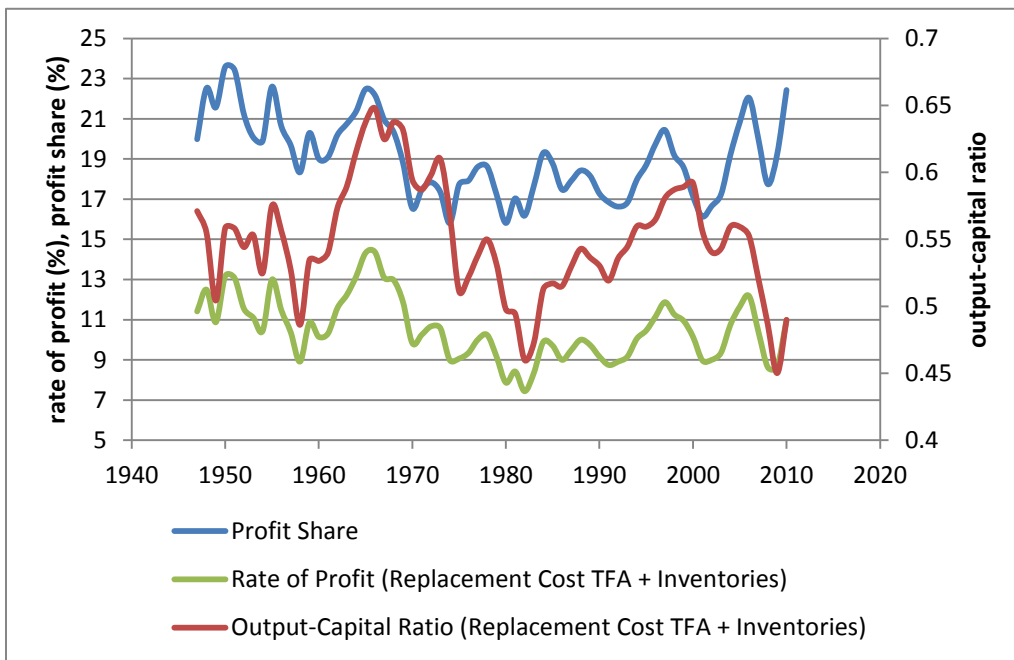


Figure A2: Rate of Profit, US Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Value Net Total Fixed Assets and nonfarm inventories)

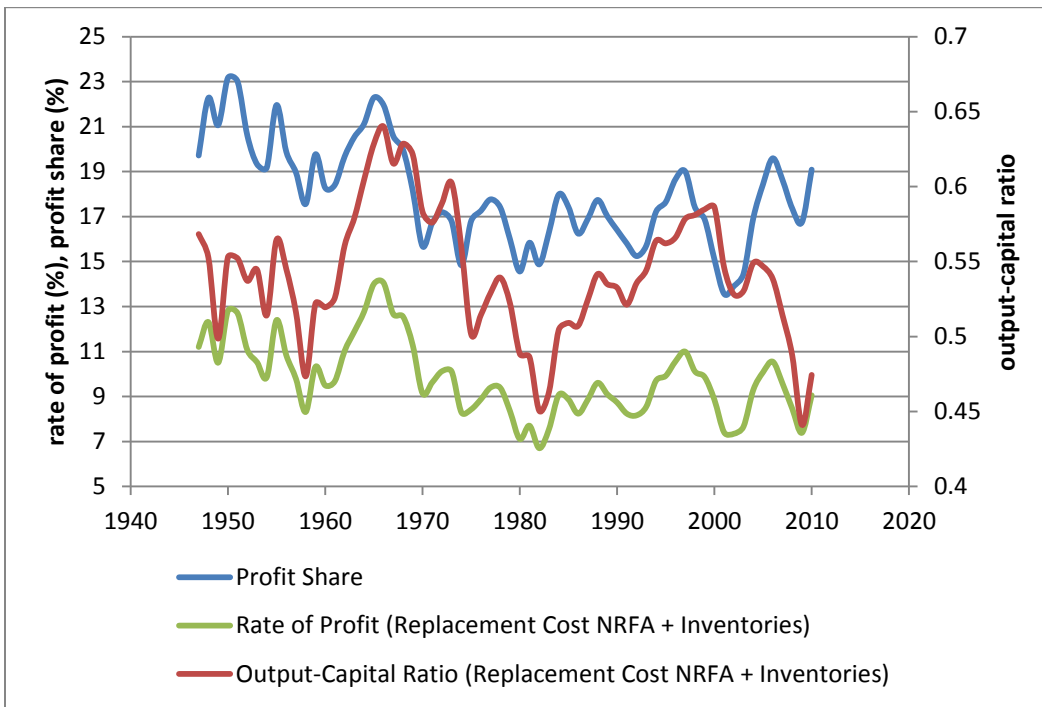


Figure A3: Rate of Profit, US Nonfinancial Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Value Net Nonresidential Fixed Assets and nonfarm inventories)

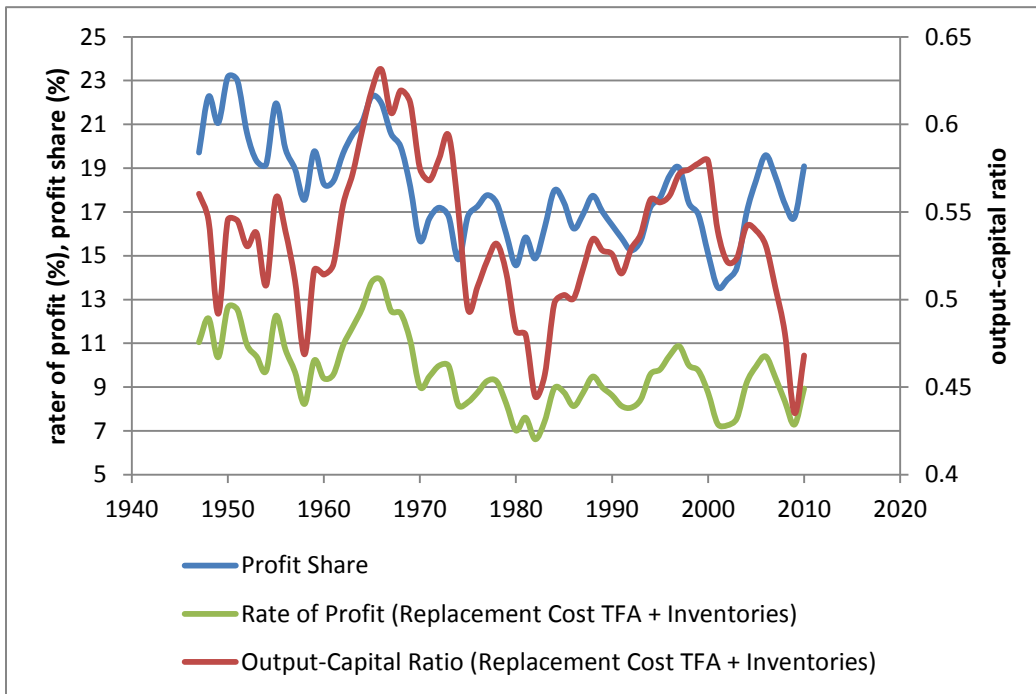


Figure A4: Rate of Profit, US Nonfinancial Corporate Business Sector, 1946-2010 (Capital Stock: Replacement Value Net Total Fixed Assets and nonfarm inventories)