



Working paper

2016

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How to cite

O'SULLIVAN, Mary. A Confusion of Capital in the United States. 2016

This publication URL: <https://archive-ouverte.unige.ch/unige:84675>

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Last deposit update in Archive ouverte UNIGE on 15.03.2023 01:28

A Confusion of Capital in the United States

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June 2, 2016

Abstract

Thomas Piketty's book, *Capital in the Twenty-First Century*, reopens fundamental questions about the role and rewards of capital that economists have never resolved. It does so by exploring the history of capital and derives much of its credibility from the evidence it marshals in defence of its claims. In this paper, I evaluate the basis for Piketty's arguments by considering them in light of the history of US capitalism. I argue that it is extremely difficult to make economic sense of Piketty's historical analysis of capital in the US in the 19th and 20th centuries. That is true, only in part, due to the distinctive choices he makes, compared to mainstream economists, in defining and measuring capital. Much more problematic, in fact, are theoretical commitments he shares with them that preclude an understanding of capital's historical role and rewards in the US economy. Based on a discussion of several important features of US economic history, I have argued that such an understanding demands an historical analysis of capital, both productive and financial capital, in relation to the evolving social organisation of capitalism in the US.

Keywords: history of capital, capitalism, capital theory, theory of distribution, finance capital, productive capital.

JEL: B00; D20; D21; D24; D33, D92; E13; N00; O00.

This paper will be published in Pat Hudson and Keith Tribe, eds., *The Contradictions of Capital in the Twenty-First Century : The Piketty Opportunity*, Agenda Publishing, 2016.

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The central issue addressed in Thomas Piketty's book, *Capital in the Twenty-First Century*, is the historical relationship between capital accumulation and inequality. It has gained widespread recognition, even notoriety, for its claim that capitalism systematically breeds inequality. Piketty's authority in making that controversial claim derives from the extensive historical analysis that he offers of long-term trends in the accumulation of capital and the returns that it generates. Yet, even though these trends are of central importance for determining the plausibility of Piketty's central thesis, his measurement and interpretation of capital's role and rewards has received only limited attention.

In this chapter I present a critical analysis of the image that Piketty constructs of the history of capital in the United States. The U.S. economy, to its champions and its critics, is often seen as exemplifying all that is characteristic of capitalism. Therefore, if one is interested in learning about capital in capitalism, the history of the United States is a promising source of insight. In Section 1, I sketch the image that Piketty presents of historical trends in capital's role in U.S. history and explain how he constructs it. He does so by departing from an approach to defining and measuring capital that has become standard in economics today and that is why the image of capital that he presents for the United States is a distinctive one.

The novelty of Piketty's treatment of capital raises the important question, which I address in Section 2, of whether it makes conceptual sense. Specifically, is it consistent with the way he understands the economic role of capital and the rewards that accrue to it? In fact, *Capital* offers surprisingly little insofar as conceptualising the economic role of capital is concerned and, when it comes to understanding capital's rewards, the book largely piggybacks on the standard model from mainstream economics. Doing so creates an important incoherence in Piketty's work since the neoclassical theory of distribution is based on an entirely different concept of capital than the one he favours. However, moving forward on the history of capital in the United States will not be achieved by moving backward to a mainstream analysis of capital, even if it offers more internal coherence, given significant problems of its own.

What we need instead is an alternative vision of the economic role and rewards of capital. The history of economic thought is an important source of inspiration for any such alternative but economists' debates on capital theory can take us only so far given their limited engagement with capital's empirical record. As I explain in Section 3, economic history offers fertile ground for developing new ways of thinking about capital. Based on a limited review of several important features of capital's history in the United States, I suggest a number of complexities that are ignored or misunderstood by existing approaches to capital. Taken together they imply the importance of an analysis of capital's role and rewards in the context of the evolving social organisation of capitalism.

1. Piketty's history of U.S. capital

To understand the importance of capital across economies and within these economies over time, Thomas Piketty estimates its significance relative to their total output to construct a measure of capital intensity that he describes as a "capital-output" ratio. The historical patterns that he generates for the United States present an image of capital in the United States that has some similarities to Britain and France but that is highly distinctive in its own right. At the dawn of the new American republic, Piketty suggests that capital mattered much less than in the Old World since land was more plentiful and, therefore, less valuable and immigrants had not had enough time to accumulate much real estate and business capital. Between 1770 and 1810, capital hovered around 300 per cent of national income in the United States, compared to more than 700 per cent in Britain and France.¹ Piketty does offer one qualification to this image that stems from recognising slavery as a form of capital; from 1770 to 1860, the market value of slaves adds about 100 per cent of national income to measured US capital (Figure 1) and proportionately more if we focus on the American south.²

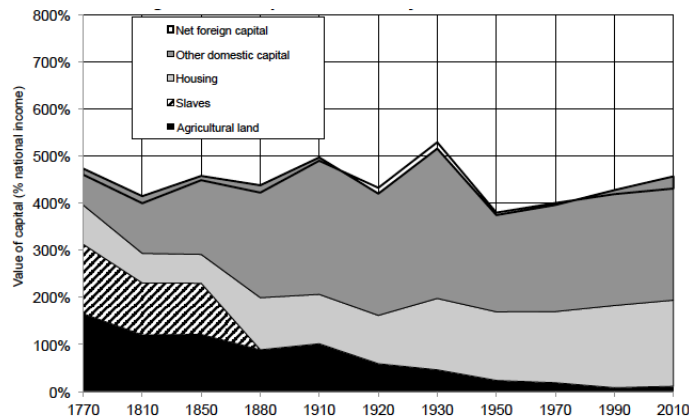
What that implies is that the Civil War, in ending the pernicious practice of holding human beings as chattels, reduces Piketty's measure of national capital. He emphasises too the decline in the value of US farmland in the 19th century, a trend he also observes for Europe. Nevertheless, he points to an overall increase in the US capital stock by the end of the century given the accumulation of a much larger stock of real estate and other domestic capital. By 1910, as a result, US capital had risen to nearly five times national income compared to only three times in 1810, bringing it closer to, if still well below, British and

¹ Thomas Piketty, *Capital in the Twentieth-First Century*, (Cambridge, Mass., 2014) 128, 150

² Piketty, 159-160. He acknowledges that both Britain and France incorporated major slave-based economies in the Caribbean as part of their empires in the late 18th century but suggests that the share of slaves in the total wealth of these economies was much lower than in the United States (Piketty, 162).

French capital-output ratios of about 6.5 times.³ As Piketty concludes: “The United States had become capitalist, but wealth continued to have less influence than in Belle Epoque Europe, at least if we consider the vast US territory as a whole. If we limit our gaze to the East Coast, the gap is smaller still”.⁴

Figure 1 The composition of US capital, 1770-2010



Source: Piketty, 2014, Figure 4.10, 160.

For the 20th century, Piketty presents an image of turbulence with the US capital-output ratio initially declining from 1910 to 1920, then soaring to almost 500 per cent of national income by 1930. It then collapsed with the Great Depression and remained at less than 300 per cent in 1970 even if the decline was less dramatic than in European countries where the capital-output ratio dropped from more than 700 per cent to less than 300 per cent over the same period. Since the 1970s, the United States has witnessed the same rebound in capital as European countries but, as Piketty notes, the U-shaped pattern in capital-income ratios in the 20th century has been less strong in the United States. Its capital rebounded to 500 per cent of national income by 2007, and then retreated sharply to about 400 per cent by 2010, compared with a steadier 600 to 700 per cent in Europe.⁵

1.1 Piketty's definition of capital

There are many aspects of the image that Piketty presents of the history of capital in the United States that invite questions. Certainly, the traces of a conventional understanding of different phases of US economic history are not easy to discern within it. However, it would be impetuous to try to make economic sense of Piketty's image without understanding

³ Piketty, 165.

⁴ Piketty, 152.

⁵ Piketty, 150-155.

the bases on which his estimates of capital are constructed. As Piketty himself notes, the question of 'what is capital' is central to his investigation,⁶ so it is only by understanding how he addresses it that we can hope to decipher the image of capital he presents for the US.

As is now well understood, Piketty proposes a particularly expansive definition of capital as "the sum total of nonhuman assets that can be owned and exchanged on some market. Capital includes all forms of real property (including residential real estate) as well as financial and professional capital (plants, infrastructure, machinery, patents, and so on) used by firms and government agencies".⁷ In fact, Piketty uses "capital" and "wealth" interchangeably, as if, as he puts it himself, "they were perfectly synonymous".⁸ That puts him on a very different wavelength to most of his fellow economists who define capital as the physical stuff and, in particular, the equipment and buildings, which are used to generate economic output.⁹

Economists' "physical" definition of capital is usually traced to Adam Smith's *The Nature and Causes of the Wealth of Nations* in which "Instead of making the capital a sum of money which is to be invested, or which has been invested in certain things, Smith makes it the things themselves".¹⁰ Yet, even as that concept of capital came to dominate in economics, it drew forceful criticism.¹¹ Thorstein Veblen emphasised just how much the physical meaning of capital departed from the monetary meaning that capitalists themselves assigned it.¹² Joseph Schumpeter too pointed out that the concept of capital had long had an essentially monetary meaning, "meaning either actual money, or claims to money, or some goods evaluated in money" and claimed that economists would have done well to stick with it: "What a mass of confused, futile, and downright silly controversies it would have saved us, if economists had had the sense to stick to those monetary and accounting meanings of the term instead of trying too 'deepen' them!"¹³

Nevertheless, it was a physical meaning of capital that prevailed in the economics mainstream as we see in neoclassical growth theory, the primary branch of economics where the concept of capital is invoked today. For that reason, in reviewing Piketty's book, Robert Solow, one of the originators of growth theory, highlighted just how much it departs from the

⁶ Piketty, 46.

⁷ Piketty, 46.

⁸ Piketty, 47.

⁹ Geoff Harcourt and Keith Tribe. "Capital and Wealth", ch. 2, this volume.

¹⁰ E. Cannan, "Early history of the term capital", *Quarterly Journal of Economics*, vol. 35 (1921) 480.

¹¹ Geoffrey Hodgson, "What is Capital? Economists and Sociologists have changed its meaning: should it be changed back?", *Cambridge Journal of Economics*, vol. 38 (2014) 1063-1086.

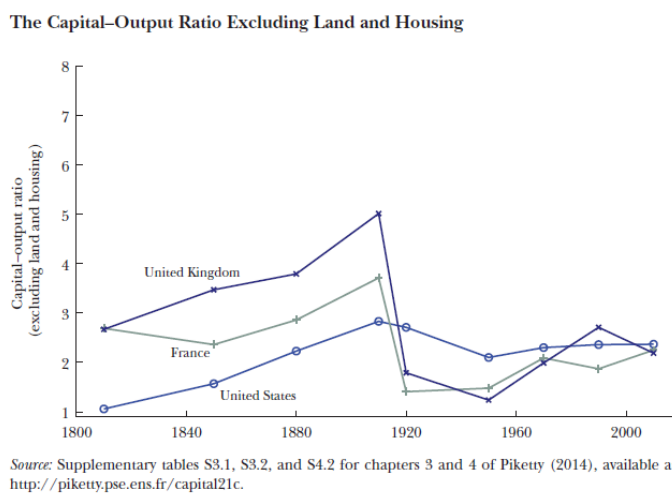
¹² Thorstein Veblen, "Professor Clark's economics", *Quarterly Journal of Economics*, vol. 22 (1908) 147-95.

¹³ Joseph Schumpeter, *History of Economic Analysis*, (Oxford, 1954), 322-3.

dominant concept of capital as a "factor of production".¹⁴ And what that means is that Piketty's definition of capital generates an image of capital in the US that is quite different from one that a mainstream economist might construct.

Residential capital is important in this regard since it plays a major role in driving Piketty's historical analysis but is excluded from most mainstream conceptions of 'productive' capital. For the United States, as Bonnet, Bono, Chapelle and Wasmer show, housing plays an important role in driving the increase in Piketty's capital-output ratio for the United States since 1950.¹⁵ Important though it is, residential capital is not the only feature of Piketty's capital that distinguishes it from the conventional one since his inclusion of land represents another contrast with most economists' focus on reproducible capital.¹⁶ We can see the difference the distinctive character of Piketty's definition of capital makes, as Charles Jones suggests, by using the French economist's data to construct an image of reproducible, non-residential capital in the US as shown in Figure 2. As Jones observes, it is different from Piketty's image but it 'corresponds much more closely to what we think of when we model physical capital in macro models'.¹⁷

Figure 2 The Capital-Output Ratio Excluding Land and Housing



Source: Charles Jones, 'Pareto and Piketty : The Macroeconomics of Top Income and Wealth Inequality', *Journal of Economic Perspectives*, vol. 29 (2015), 41.

¹⁴ Solow, Robert, "Thomas Piketty is Right. Everything you need to know about 'Capital in the Twenty-First Century'," *New Republic* 22 April 2014.

¹⁵ Odran Bonnet, Pierre-Henri Bono, Guillaume Chapelle, and Etienne Wasmer, 'Does Housing Capital Contribute to Inequality? A Comment on Thomas Piketty's Capital in the 21st Century', Sciences Po Economics Discussion Paper, 2014-07, 2014.

¹⁶ Charles Jones, 'Pareto and Piketty : The Macroeconomics of Top Income and Wealth Inequality', *Journal of Economic Perspectives*, vol. 29 (2015) 41.

¹⁷ Ibid; see also Keith Tribe, "Wealth and Inequality: Thomas Piketty's *Capital in the Twenty-First Century*", *Past and Present* vol. 227 (2015) 257-8.

1.2 Piketty's measurement of capital

Even so, what we see in Figure 2 is not what most economists would expect to observe for the capital-output ratio in US economic history. In a much-cited paper, Nicholas Kaldor claimed that a roughly stable capital-output ratio was one of six stylised facts that characterised economic growth in advanced economies over the long run.¹⁸ Despite the widespread acceptance of that fact by many economists, little empirical work has been undertaken to determine whether it is true, as Jakob Madsen and Russell Smyth point out in a recent paper. Their analysis suggests that the capital-output ratio in the United States has varied a good deal during the period from 1870 to 2000 although in the post-war period it fluctuated around an increasing trend that has stabilised since 1980 at roughly 2.00.¹⁹ The difference between their estimates and those derived from Piketty's data in Figure 2 is explained by the fact that Piketty departs from the mainstream approach to capital not only in how he defines capital but also in how he measures it.

Piketty acknowledges that measuring capital is “notoriously difficult” and he is right about that even if many economists blithely use the estimates of capital generated by national statistical agencies with little qualification.²⁰ The oldest method of calculating a nation's capital is based on a census approach in which economic units report the value of their assets and liabilities. In the United States, questions about households' wealth were integrated into federal decennial censuses from 1850 and a total of nine wealth censuses were generated on this basis until 1922.²¹ In principle, these censuses offer comprehensive coverage of wealth holdings in the United States but as Stephen Hoenack explained: “The potential usefulness of the censuses of wealth for analysis has been shown to be limited because of the inaccuracies and unclear meaning of their estimates and the lack of an adequate categorization for meaningful comparisons of the components of wealth”.²²

Thus, when the US wealth censuses were discontinued in 1922, there was good reason to develop alternative ways of measuring capital. In the interwar period, interest in

¹⁸ Nicholas Kaldor, “Capital Accumulation and Economic Growth,” in F. A. Lutz and D. C. Hague, editors, *The Theory of Capital* (New York, 1961).

¹⁹ Jakob Madsen, Vinod Mishra and Russell Smyth, “Is the Output-Capital Ratio Constant in the Very Long Run?”, *The Manchester School*, vol. 80 (2012) 214. In contrast to Piketty, they estimate the capital stock using the perpetual inventory method (see discussion in text below).

²⁰ Thomas Piketty and Gabriel Zucman, “Capital is Back: Wealth-Income Ratios in Rich Countries, 1700-2010, Data Appendix, (2013), 5 (<http://piketty.pse.ens.fr/files/PikettyZucman2013Appendix.pdf>)

²¹ 1850, 1860, 1870, 1880, 1890, 1900, 1904, 1912, 1922.

²² Stephen Hoenack, “Historical Censuses and Estimates of Wealth in the United States” in John Kendrick, ed., *Measuring the Nation's Wealth*, Report to US Congress Joint Economic Committee, (Washington, D.C., 1964) 177-218.

doing so was limited as estimates of national income took priority.²³ However, from the mid-20th century, a new method of measuring capital emerged, known as the perpetual inventory method (PIM). Developed by US economist, Raymond Goldsmith, the PIM constructs the capital stock as a perpetual function of cumulated investment expenditures, adjusted for estimates of depreciation and changes in prices, on top of an estimated initial capital stock. The PIM quickly gained ground among national statistical agencies to become the standard approach to the measurement of capital.

It is largely as a result of the PIM's widespread application that estimates of capital stock by industry, sector and economy were generated for much of the 20th century. As a result, the PIM is the foundation for the conventional estimates of the capital stock that mainstream economists employ. In theory, they may speak of capital as a composite physical stock but, from the 1950s, they increasingly relied on monetary estimates of capital in so-called “growth accounting” exercises. That such estimates were available reflected the widespread acceptance of PIM as a legitimate basis for constructing estimates of the capital stock.²⁴

However, in recent years, criticism of the PIM has exposed the host of heroic assumptions about depreciation and obsolescence on which it relies. For some economists, its deficiencies are sufficiently important to move back to census-based approaches to estimate market valuations of a nation's capital. Piketty is one such economist, proving both an articulate critic of the “pitfalls” of the PIM and an enthusiastic proponent of measuring capital at market valuations.²⁵ Still, calculating market prices for capital brings measurement challenges of its own. Estimates of house prices may be available based on census methods but that is not true of many important categories of assets. As Piketty himself acknowledges, “Whether we are speaking of a building or a company, a manufacturing firm or a service firm, it is always very difficult to set a price on capital”.²⁶

That difficulty begs the question of how Piketty applies his principle of measurement in practice, notably for the business sector, given the difficulties of finding market prices for the machines and structures it uses in the production of goods and services. Rather than attempting the impossible challenge of trying to establish these assets' market valuations based on census-like procedures, Piketty makes an assumption that greatly simplifies his task. He assumes the value of corporations' capital can be proxied by their stock market

²³ André Vanoli, *Une histoire de la comptabilité nationale* (Paris, 2002) 304.

²⁴ See, for example, OECD, *Measuring Capital : Measurement of Capital Stocks, Consumption of Fixed Capital and Capital Services*, OECD Manual (Paris, 2001), 43-62.

²⁵ Piketty and Zucman, 2013, 7-10.

²⁶ Piketty, 49.

capitalisations and, specifically, household and other sectors' holdings of corporate equity.²⁷

That assumption is a bold one given that the determinants of corporate stock prices have eluded the sustained efforts of financial economists to uncover them. Studying corporate valuations over long periods of time only deepens the mystery since there are significant changes over time in the relationships between the values the stock market assigns to corporate stocks and corporations' earnings or the book value of their physical assets. Piketty acknowledges that using market valuations "introduces an element of arbitrariness (markets are often capricious)",²⁸ but he relies heavily on the dubious assumption that the stock market can be taken as a reasonable arbiter of the value of the corporate sector's capital.²⁹

That means that his estimates of the corporate sector's capital differ from the ones that most economists propose. Specifically, the fact that stock market capitalisations have grown relative to the book value of their assets over the post-war period, albeit unevenly as Figure 3 shows, means that Piketty's estimates of corporate capital are higher than the standard ones for recent periods. Thus it contributes, along with rising market values of real estate, to Piketty's finding of a rising capital-output ratio in recent decades.³⁰ In contrast, as Bob Rowthorn explains, "conventional measures of this [capital-output] ratio indicate that it has been either stationary or has fallen in most advanced economies during the period in question". As Rowthorn notes, that suggests a rather different interpretation to Piketty's one, specifically that "the basic problem is not the over-accumulation of capital, but just the opposite. There has been too little real investment".³¹

We might take issue with Piketty's reliance on market capitalisation of corporate stock as a proxy for corporate capital but it does simplify his measurement challenges for the period from 1945 to 2010. However, that is not true for earlier periods given the limited availability of estimates of corporate valuations and the diminishing economic importance of corporations in the US economy as we go backwards, especially into the 19th century. What then does Piketty do as he moves back in time, indeed all the way back to 1770, to measure

²⁷ Piketty, 27.

²⁸ Piketty, 149.

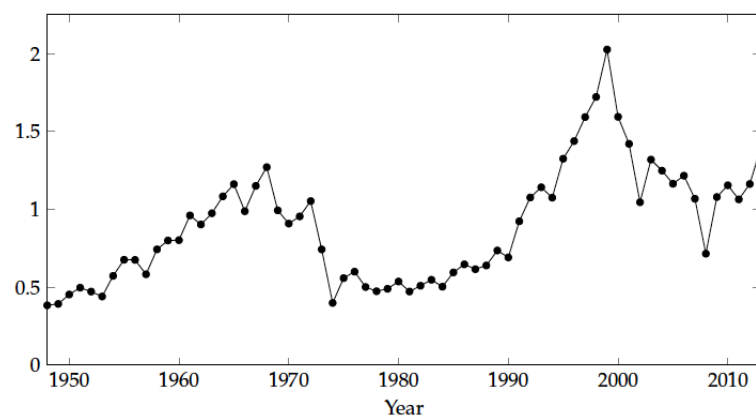
²⁹ Indeed that assumption has implications for his estimates of capital beyond the corporate sector since, as Piketty and Zucman explain, unlisted shares are valued 'on the basis of observed market prices for comparable, publicly traded companies' (Thomas Piketty and Gabriel Zucman, 'Capital is Back: Wealth-Income Ratios in Rich Countries, 1700-2010', *Quarterly Journal of Economics*, vol. 129, (2014) 1268.

³⁰ Indeed, if one digs deeply enough, Piketty and Zucman offer an estimate of how important the difference is for the US for 2012 with their market valuation of real estate and corporate capital increasing the capital-output ratio by 76 per cent and 36 per cent of national output respectively (Piketty and Zucman, 2013, 33).

³¹ Rowthorn, Robert "A Note on Piketty's Capital in the Twenty-First Century", *Cambridge Journal of Economics*, vol. 38 (2014) 1275-84.

the capital employed in the US economy?

Figure 3 Ratio of total market value to the book value of equipment, structures, and land, US corporate sector.



Source: Matthew Rognlie, “Deciphering the fall and rise in the net capital share”, *Brookings Papers on Economic Activity*, BPEA Conference Draft, March 19-20, 2015, Figure 9.

He resolves the problem by altering his methods and, specifically, by dispensing with the challenge of estimating the capital of the corporate, or even business, sector. Instead, he relies on more aggregated estimates of national wealth that come from a variety of sources and are calculated using diverse methods. For 1900 and 1912, for example, Piketty uses estimates generated by Raymond Goldsmith based on the perpetual inventory method rather than market valuations. For 1850, 1860 and 1880, in contrast, he employs estimates of household wealth from the decennial wealth censuses. These data were intended to approximate market valuations but, as I noted, they suffer from all kinds of problems and were deemed especially deficient for estimating the value of physical capital used by the business sector. In acknowledgement of these difficulties, Piketty increases the estimates of household wealth he finds there by a flat rate although he does not explain the rationale for setting that rate at 20 per cent nor why, given changes in the census methodology, it should be applied as a flat rate to all years.³²

2. Conceptualising Capital’s Role and Rewards

Having understood something about the way that Piketty defines and measures capital, there are several grounds on which we might take issue with the image of capital that he presents for the United States. Undoubtedly, the easiest target is the way he handles historical data to measure capital. Certainly there seem to be grounds for questioning what he

³² Piketty and Zucman, 2013, 57, 62-3.

does given the debatable choices he makes in selecting proxies for market valuations of capital, his willingness to combine sources that use disparate methodologies and his manipulation of the data to smooth their differences.³³

More fundamentally, it might seem tempting to challenge Piketty on the legitimacy of his concept of capital given the extent to which it departs from standard usage of the term in economics today. However, the mere fact that Piketty is unconventional in conceptualising capital does not make him wrong. After all, as we have seen, he is not the only scholar in the history of economic thought to challenge the notion that capital can be understood as the physical stuff used in production.³⁴ Whether Piketty's concept of capital is legitimate or otherwise depends on how he uses it or, more precisely, on how it fits into his theory of capital's economic role and rewards.

That observation is, of course, just as true for mainstream economists but they have shown a marked lack of interest in critical discussion of the conceptual foundations that underpin their own definition and measurement of capital. Raymond Goldsmith, a towering figure in the empirical analysis of capital, was unabashed in proclaiming that “[m]y appetite for discussion of concepts is limited, and I feel they have for quite a while produced nothing that is new in this field”.³⁵ So too, Robert Solow dismissed the importance of economic debates on capital theory by suggesting they had endured for such a long time only because the central question they addressed was “badly posed”.³⁶

These economists' disdain for conceptual discussion of capital reflects their commitment to one particular way of understanding its economic role and rewards and their limited imagination in conceiving of viable alternatives to it. The mainstream view is embedded in what is described as the “neoclassical” approach to growth and distribution that can be summarised in three 'parables' about capital's role and rewards. First, capital is a physical quantity that serves as a “factor of production” with a productive contribution that can be identified and measured independently of the contributions of other factors. Second, there are diminishing marginal returns to individual inputs, including capital, so that a greater quantity of capital leads to a lower marginal product of additional capital. Third, the return on

³³ For a trenchant critique of similar practices with respect to historical sources and data on US inequality, see Richard Sutch, “The One-Percent across Two Centuries: A Replication of Thomas Piketty's Data on the Distribution of Wealth for the United States”, working paper, December 12, 2015.

³⁴ Hodgson, 1081.

³⁵ Raymond Goldsmith, “Comment” on Robert Gallman, “The United States Capital Stock in the Nineteenth Century” in Stanley Engerman and Robert Gallman, eds., *Long-Term Factors in American Economic Growth*, (Chicago and London, 1986), 207.

³⁶ Robert Solow, *Capital Theory and the Rate of Return* (Amsterdam, 1963), 10.

capital is determined by the marginal productivity of aggregate capital as well as the relative scarcity of capital.³⁷

These claims remain widely accepted in economics today but they are just claims and, as such, far from self-evident.³⁸ Indeed, it is precisely for this reason that there has been scope in the history of economic thought for alternative interpretations of capital's role and rewards.³⁹ The question this observation begs is whether Piketty thinks of capital differently from the neoclassical approach? In a book that seeks to challenge the conventional wisdom on the relationships that link economic growth, the capital intensity of the economy, and the return to capital, we might expect to find an extensive conceptual discussion that offers new ways of thinking about them. Yet, when we go looking for a theoretical discussion of capital in Piketty's book, the pickings are surprisingly slim.

Insofar as the economic role of capital is concerned, Piketty is adamant that we cannot understand it if we conceptualise it merely as a factor of production:

Some definitions of 'capital' hold that the term should apply only to those components of wealth directly employed in the production process. For instance, gold might be counted as part of wealth but not of capital, because gold is said to be useful only as a store of value. Once again, this limitation strikes me as neither desirable nor practical (because gold can be a factor of production, not only in the manufacture of jewelry but also in electronics and nanotechnology). Capital in all its forms has always played a dual role, as both a store of value and a factor of production. I therefore decided that it was simpler not to impose a rigid distinction between wealth and capital.

Piketty clearly suggests, therefore, the need for an alternative theory of capital that goes beyond the neoclassical theory of production to take account of capital's "dual role". Yet, he offers no guidance on how we might understand how capital functions in its financial role as a store of value and, specifically, on how it might interact with capital's productive role in the process of economic development. Moreover, even allowing for his claim that capital's productive role should not be everything in a theory of capital, it seems unreasonable to say nothing further on the matter. Yet, in an entire chapter devoted to "Growth: Illusions and Realities", Piketty speaks of technology, innovation and knowledge diffusion when he

³⁷ Paul Samuelson, "Parable and Realism in Capital Theory: The Surrogate Production Function." *Review of Economic Studies*, vol. 29 (1962) 193-206.

³⁸ As Schumpeter said with respect to the diminishing marginal productivity of capital: "we are asserting a fact and this imposes upon us the duty of factual verification" and 'we have no logical right to reply that the challenged proposition is 'obvious'; and we are committing a definite error, if we call it 'evident'." (Schumpeter, 1954, 1037).

³⁹ See, for example, Avi Cohen and Geoff Harcourt, "Retrospectives: Whatever Happened to the Cambridge Capital Theory Controversies?" *Journal of Economic Perspectives*, vol. 17 (2003), 207-210.

discusses the dynamics that foster economic growth and makes no mention at all of capital. Thus, although *Capital* clearly suggests the importance of an alternative theory of capital's economic role, it does not offer one.

Worse still, when we turn to Piketty's analysis of the rewards to capital, where he has more to say, his analysis hijacks a model from mainstream economics that is based on precisely the limited understanding of capital "directly employed in the productive process" that he criticises. He evokes alternatives to the "simple economic models" that suggest that "the rate of return on capital should be exactly equal to the 'marginal productivity' of capital".⁴⁰ And he alludes to a different, more "complex" and "realistic" approach in which "the rate of return on capital also depends on the relative bargaining power of the various parties involved". But then he disappoints in opting for an analysis of capital's rewards that is remarkably close to a neoclassical line. Thus, he asserts that "the rate of return on capital is determined by the following two forces: technology (what is capital used for?), and second, the abundance of the capital stock (too much capital kills the return on capital)". Once he explains that "technology" means that "it is natural to expect that the marginal productivity of capital decreases as the stock of capital increases", the similarity with the neoclassical theory of capital's rewards becomes clear.⁴¹

These observations beg the question of how Piketty's analysis of the rewards to capital could present a challenge to the conventional wisdom if it is constructed on similar conceptual foundations. In fact, the controversy his book has stimulated stems from his empirical analysis and, specifically, the trends he identifies in capital's share of income, rather than from any theoretical innovation. Consistent with his expansive definition of capital, Piketty measures its income in broad terms to include "the various amounts of income from capital included in national accounts, regardless of legal classification (rent, profits, dividends, interest, royalties, etc., excluding interest on public debt and before taxes)".⁴² On this basis he observes that capital's net share of income has risen in the last several decades in developed economies, even as their capital-income ratio has increased.⁴³

Piketty explains this empirical regularity not by challenging the neoclassical principle of a diminishing marginal productivity of capital but by suggesting that, in practice, it may diminish more slowly than most neoclassical economists believe: "The interesting question is therefore not whether the marginal productivity of capital decreases when the stock of capital

⁴⁰ Piketty, 212.

⁴¹ Piketty, 215.

⁴² Piketty, 202-203.

⁴³ Piketty, 222; Piketty and Zucman, 2014.

increases (this is obvious) but rather how fast it decreases”.⁴⁴ To answer that question, he suggests, we need to look to the character of the “production function” – “a mathematical formula reflecting the technological possibilities that exist in a given society” and, specifically, the elasticity of substitution that it specifies between capital and labour.⁴⁵ In this regard, Piketty takes issue with economists’ reliance on the Cobb-Douglas production function, which assumes the elasticity of substitution to be exactly equal to one, due to its “inadequacy” for “studying evolutions over the very long run”. Piketty suggests that “[o]ver a very long period of time, the elasticity of substitution between capital and labor seems to have been greater than one”.⁴⁶

In making this claim, Piketty has stirred up an empirical debate on the elasticity of substitution between capital and labour. However, that should not distract from the fact that his analysis of capital’s rewards is based on a theory of distribution that is indistinguishable from the mainstream one. This suggests a major problem of conceptual incoherence at the heart of Piketty’s analysis. He defines capital differently, much more broadly, than neoclassical economists do, yet still uses the same theory of distribution, based on a much narrower understanding of capital, that they employ. Put differently, he extends the neoclassical parables of capital theory from their relatively narrow application to the physical assets used in production to the whole panoply of assets that he deems to constitute capital.

Not surprisingly, some neoclassical economists have expressed discomfort with his doing so. They have expressed particular concern about his inclusion of housing on the grounds that it produces returns in a way that is quite distinctive from capital used in the production of other goods and services. Thus, Matthew Rognlie argues that the recent rise in capital income from housing cannot be explained by the inherent productivity of the underlying physical assets but is driven “in large part by artificial scarcity through land use regulation” and, one might add, an expanded global mortgage market.⁴⁷

Much the same concern can be raised about Piketty’s reliance on stock prices to estimate the market valuations of corporate assets. Doing so, he acknowledges, implies a rather different concept of corporate capital than the physical assets on which mainstream economists focus:

...the stock market value of a company often depends on its reputation and trademarks, its information systems and modes of organization, its investments, whether material or immaterial,

⁴⁴ Piketty, 216.

⁴⁵ Piketty, 216.

⁴⁶ Piketty, 220-1.

⁴⁷ Matthew Rognlie, “A note on Piketty and diminishing returns to capital”, working paper, June 15, 2014, 16-18.

for the purpose of making its products and services more visible and attractive, and so on. All of this is reflected in the price of common stock and other corporate financial assets and therefore in national wealth.⁴⁸

Even if Piketty were right that stock market capitalisations incorporate different components of corporate capital in such rational and systematic fashion, he does not explain why the same parables that economists apply to thinking about physical capital might be expected to apply to “reputation” and “modes of organization”.⁴⁹

Yet, whatever the conceptual inconsistencies of Piketty’s analysis, they do not suggest that we return to the mainstream vision of capital since it confronts significant problems of its own. The conventional view may be clear on the importance of capital in its productive role but it suffers from weaknesses in incorporating it in a theory of growth. It does so, as we have seen, based on a series of postulates about the way in which capital operates as a factor of production. They were derived, in the first instance, by classical economists from their observations about land and were extended much later, without further empirical scrutiny, to the machines and structures that neoclassical economists define as capital.⁵⁰

Tellingly, when neoclassical economists at the forefront of this logical extension sought real-life examples to motivate their claims, they typically appealed to fables of orchards and the fruits of a bounteous nature rather than empirical evidence of capital’s role in production. Little wonder then that Irving Fisher found himself accused of designing a theory in which “income streams, like mountain brooks, gush spontaneously from nature’s hillsides”.⁵¹ He fought back in emphasising that “the technique of production” was a central element in his analysis.⁵² Still, he did not believe that a theory of capital’s rewards needed “to launch itself upon a lengthy discussion of the productive process, division of labour, utilization of land, capital, and scientific management”.⁵³

Neoclassical economists have maintained much the same stance ever since, insisting their claims about capital are “natural” or “evident” without offering much evidence for them. As we have seen, Piketty adopts these unfortunate habits too although he occasionally hints at the lack of empirical support for the neoclassical theory of capital. He notes, for example, that

⁴⁸ Piketty, 49.

⁴⁹ Indeed, much of new growth theory was based on claims of increasing, rather than constant, returns to scale in such domains.

⁵⁰ Luigi Pasinetti, “Critique of the neoclassical theory of growth and distribution”, *BNL Quarterly Review*, vol. 215 (2000) 383-431.

⁵¹ H. Seager, “The Impatience Theory of Interest”, *American Economic Review*, vol. 2 (1912) 835.

⁵² Irving Fisher, “The Impatience Theory of Interest”, *American Economic Review*, vol. 3 (1913) 610.

⁵³ Irving Fisher, *The Theory of Interest* (New York, 1930), 473.

it is hard to know whether the rate of return on capital is higher or lower than the marginal productivity of capital "since this quantity is not always precisely measurable".⁵⁴

Still, even more problematic than concerns about the empirical basis for claims of a diminishing marginal productivity of capital is the fact that they depend for their plausibility on technology being stable. Clearly there are no grounds for applying that assumption, or a theory of distribution that depends on it, to a long-run analysis. Yet, in the absence of a more suitable alternative, that is precisely what neoclassical economists do. As Robert Solow explained in a survey article on 'The neoclassical theory of growth and distribution':

Very little has been said in this survey about income distribution (in other words, about the determination of factor prices). That is because there is no special connection between the neoclassical model of growth and the determination of factor prices. The usual practice is to appeal to the same view of factor pricing that characterizes static neoclassical equilibrium theory.⁵⁵

The illegitimacy of applying a static theory of distribution to a dynamic setting is obvious but it is all the more flagrant given what neoclassical economists believe they have discovered over the last 50 years about the contributions of different factors of production to economic growth. Empirical research on growth is dominated by an approach that "decomposes" aggregate output into the contributions of different factors based on the Solow-Swan model of economic growth. In accounting for the rising labour productivity that has characterised the US and other advanced economies over the last two centuries, studies of growth accounting have shown that capital, as neoclassical economists define and measure it, does not take us far. The implication is that "something else" accounts for rising labour productivity, an unexplained residual that is usually labelled "total factor productivity" (TFP).

The importance of this unexplained residual can be seen in the historical data shown in Table 1 for the United States. It has been significant, relative to the measured contribution of capital, since the beginning of the 19th century. Moreover, its importance increased from the mid-19th century and, although capital's measured contribution did too, TFP surpassed it in importance from the late 19th century. Indeed, it did so rather dramatically until the last quarter of the 20th century when TFP's significance diminished. Even so, it continued to rival the estimated contribution of capital in accounting for growth.

⁵⁴ Piketty, 212.

⁵⁵ Robert Solow, "A neoclassical theory of growth and distribution", BNL Quarterly Review, vol. 215 (2000) 349.

Table 1 Accounting for labour productivity growth, U.S. private domestic economy, 1800-1989 (% per year)

	Output per man hour	Capital stock per man hour	Total factor productivity
1800-1855	0.39	0.19	0.20
1855-1890	1.06	0.69	0.37
1890-1927	2.01	0.62	1.39
1890-1927	2.00	0.51	1.49
1929-1966	2.52	0.43	2.09
1966-1989	1.23	0.57	0.66

Source: Moses Abramovitz and Paul David, “American Macroeconomic Growth in the Era of Knowledge-Based Progress: The Long-Run Perspective” in Stanley Engerman and Robert Gallman, eds., *The Cambridge Economic History of the United States*, vol. 3: *The Twentieth Century* (Cambridge and New York, 2000) 1-92.

However, even to speak of total factor productivity in these terms, although descriptively efficient, is problematic given its lack of conceptual meaning. All it represents, as the term ‘residual’ suggests, is what is left over after accounting for growth in terms of measured inputs whose productive contribution economists think they do understand. Although TFP is often interpreted as “technology”, it is more properly seen, as Moses Abramovitz candidly admitted, as a measure of economists’ ignorance about the sources of economic growth.⁵⁶

The importance and persistence of this unexplained residual has led some economists to devise empirical strategies to eliminate it, many of which involve “improvements” in the measurement of capital.⁵⁷ Estimates of TFP are so sensitive to the way capital is measured, and the assumptions behind that measurement are so debatable, that there are limitless opportunities for these efforts.⁵⁸ Yet, the shadow that the residual casts over growth accounting suggests another interpretation, arguably more obvious but certainly more

⁵⁶ Moses Abramovitz, ‘The Search for the Sources of Growth : Areas of Ignorance, Old and New’, *Journal of Economic History* (53, 1993), 217-243.

⁵⁷ It has found expression largely in a debate about whether technological change is “embodied” in capital so that its benefits can be reaped through the investment of capital rather than being “disembodied” and showing up as total factor productivity.

⁵⁸ Michael Burda and Battista Severgnini, “Solow Residuals without Capital Stocks”, 2009.

devastating: that the neoclassical theory of growth is not a terribly useful basis for understanding the productive role of capital in the economy.

Even some adepts of growth accounting have admitted as much with Abramovitz proving especially critical in this regard. His initial concern with the residual, expressed more than a half century ago, was that “the Residual in its early primitive form was a cover for many sources of growth besides technological advance” so that “the Residual was really a grab-bag” for which growth theorists had no explanation. Decades later his concerns had gone much deeper, right to the core of growth theory’s conceptualisation of economic growth and, specifically, to “the notion that the several proximate sources of growth that it identifies operate independently of one another”.⁵⁹ What that perspective ignores, Abramovitz argues, is the importance for economic growth of “the interdependence of what we have come to call the ‘proximate sources’ of growth”.⁶⁰ And its continued influence means that : “We know all too little about the interactions among our infamous ‘proximate causes’. They constitute an area of ignorance even larger than the old primitive Residual”.⁶¹

If the disappointments of growth accounting point to the limits of neoclassical growth theory for understanding capital’s economic role, they also suggest serious concerns about a neoclassical theory of distribution applied to the long run. After all, if we cannot account for economic growth in terms of the productive contributions of capital and labour, we ought not to assume that the rewards of economic progress should be absorbed by payments to them. Yet, that is what neoclassical economists instinctively do when they analyse the distribution of economic rewards and, indeed, what Piketty does as well. At least to the extent that the “unexplained residual” reflects the deliberate efforts of some specific type or group of economic actors, we risk distributing the fruits of economic progress in ways that do not compensate those responsible for generating them. Indeed, as I argue below, that is exactly what has happened in the U.S. corporate sector in recent decades.

3. Confronting the History of U.S. Capital

The substantial shortcomings of the way in which both Piketty and neoclassical economists conceptualise the economics of capital can be seen as an invitation to develop an alternative vision of capital’s role and rewards. The history of economic thought is an important source of inspiration for such alternatives but economists’ debates on capital theory

⁵⁹ Abramovitz, 220.

⁶⁰ Abramovitz, 236.

⁶¹ Abramovitz, 237. The development of ‘new growth’ theory can be seen as an acknowledgement of the theoretical limitations of ‘old growth’ theory even it has achieved only limited success in overcoming them (Paul Krugman, ‘The New Growth Fizzle’, *New York Times*, August 18, 2013).

can take us only so far given their limited contact with the empirical characteristics of capitalist economies.⁶² That problem can only be overcome to the extent that new thinking about capital's role and rewards is systematically grounded in what we know about capital from economic, business and financial history.

In this regard, the history of capital in the United States offers inspiration for new ways of thinking about the role and rewards of capital. Even a limited review of several important features of the history of US capitalism, although it makes no claims to completeness, suggests a number of insights that are ignored or misunderstood in existing approaches to capital. Taken together, they underline the importance of an analysis of capital's role and rewards in the historical context of the evolving social organisation of US capitalism.

3.1 The Productive Organisation of US Capital

The conventional approach to thinking about the role of capital in economics, as we have seen, is to emphasise its importance for the production of goods and services. From a neoclassical perspective, once the level of investment and, therefore, the capital intensity of an economy is established, its economic implications are determined by structural relationships that obtain between the aggregate amount of capital invested in the economy and its productivity. Thus, capitalists may differ in their propensity to invest but they are bound by similar structural constraints insofar as the economic outcomes of their investments are concerned.

However, the history of US capitalism shows that the productive role of capital is determined not only by the amount of capital invested but also by how that capital is used. Moreover, since the utilisation of capital is shaped by the organisation of the process through which goods and services are produced, an analysis of the productivity of capital requires an understanding of the characteristics of that organisation. And, because organisational characteristics vary across economic units as well as over time, we observe significant heterogeneity in the productivity with which they employed capital. Thus, the challenge of understanding the productive role of capital goes well beyond measuring the aggregate quantity of capital employed in a specific economy, sector or industry to include an analysis of how capital is used in different organisational contexts.

In the decades after the American Revolution, the importance of organisation to the productivity of US capitalism was not immediately apparent given the structure of the new

⁶² Cohen and Harcourt, 209.

republic's economy. Agriculture remained overwhelmingly dominant at the time, employing three quarters of the nation's workforce in 1800, with the trade sector representing a much less important, but still significant, sector.⁶³ Traditional economic units characterised the US economy at the time, with family farms dominating the organisation of agricultural production and sole proprietorships and partnerships elsewhere. These units expanded their output largely by employing more inputs, essentially labour since capital requirements were modest in agricultural and mercantile activities in the early 19th century.⁶⁴

The larger slave plantations in the South represented the main exception to these patterns given the relatively large scale of their workforce and invested capital. As Stanley Engerman noted, these plantations "had many of the characteristics of modern industrial firms, being described as 'a factory in the field' ". Crucial to their profitability was the ability to use their capital productively; since a larger proportion of that capital was represented by slaves themselves, and the prices of slaves were determined by expectations of the output they could produce, merely investing in capital was no guarantee of generating profits from it.⁶⁵ Doing so meant that slave masters had to devise methods of making their slaves as productive as possible. In part, they accomplished this feat, as several recent books remind us, by devising unusually cruel forms of physical and psychological exploitation.⁶⁶ Yet, planters and their overseers also focussed attention on the division and coordination of slaves' work to make their coercion as productive as possible.⁶⁷

Until the mid-19th century, besides slave plantations, the only other economic units of any significant scale were to be found in the country's rapidly developing industrial sector. Although industry was of negligible importance in the early decades of the American republic, an indigenous process of industrialisation got underway in the United States from the 1810s. By 1860 the US industrial sector had grown to a substantial size, led by the expansion of textiles and footwear. However, until the Civil War, it was dominated by small-

⁶³ Robert Margo, "The Labor Force in the Nineteenth Century", in Stanley Engerman and Robert Gallman, eds., *The Cambridge Economic History of the United States*, vol. 2: *The Long Nineteenth Century* (Cambridge and New York, 2000) 207-243..

⁶⁴ Rapid population growth in the US of more than 3 per cent per annum between 1800 and 1855 facilitated an increase in the overall size of the workforce and we also observe an annual increase of 0.48 per cent in manhours per capita over the same period (Abramovitz and David, p. 8, p. 14).

⁶⁵ Stanley Engerman, "Slavery and its Consequences for the South in the Nineteenth Century", in Stanley Engerman and Robert Gallman, eds., *The Cambridge Economic History of the United States*, vol. 2: *The Long Nineteenth Century* (Cambridge and New York, 2000) 329-366.

⁶⁶ See, for example, Walter Johnson, *River of Dark Dreams: Slavery and Empire in the Cotton Kingdom* (Cambridge, Mass., 2013) ; Edward Baptist, *The Half has Never Been Told : Slavery and the Making of American Capitalism* (New York, 2014).

⁶⁷ Engerman, 342; Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., 1977) 65.

scale enterprises, characterised by limited workforces and capital requirements, with only a few exceptions in the textile industry.⁶⁸

Productivity growth in early US industry was much less impressive than what was to come but it was significant relative to historical alternatives. And that begs the question of how it was achieved, especially since capital requirements were not that high at the time. In this regard, Kenneth Sokoloff's microeconomic studies of productivity growth during early US industrialisation offer some provocative results. Using data at the industry level, he claims that investment in fixed capital cannot account for most of the productivity gains recorded during this period; more important, he suggests, was the capital invested in circulating or working capital rather than equipment and structures. Yet, even allowing for working as well as fixed capital, most of the advance in labour productivity recorded in US manufacturing between 1820 and 1860 cannot be attributed to capital formation and ends up being classified as total factor productivity. Having considered several possible explanations of this residual, Sokoloff suggests that it is explained by the changes in the organisation and intensification of work that are emphasised in enterprise and industry studies of early industrialisation.⁶⁹

It is precisely that logic that is at the heart of Alfred D. Chandler's account of the organisational "revolution" that occurred in the US economy with the rise of big business. Although Chandler acknowledges that the organisational challenges that confronted plantations and early industrial companies seemed significant in the first half of the 19th century, he emphasises just how limited they were compared to those associated with the "modern business enterprises" that emerged in the US economy from the 1850s.⁷⁰ These enterprises made their initial appearance not in the industrial sector but in transportation and communication and, especially, in the railroad sector. They emerged there, as Chandler explains, as a consequence of the unprecedented scale of railroads' capital requirements and the complexity of their production process.

In the presence of large capital commitments, railroad enterprises faced high fixed costs and needed to generate a large volume of traffic to turn a profit but handling that volume created major challenges given the growing complexity of the tasks involved and the

⁶⁸ Naomi Lamoreaux, "Entrepreneurship, Business Organization, and Economic Concentration" in Stanley Engerman and Robert Gallman, eds., *The Cambridge Economic History of the United States*, vol. 2: *The Long Nineteenth Century* (Cambridge and New York, 2000) 403-434.

⁶⁹ Kenneth Sokoloff, "Productivity Growth in Manufacturing during Early Industrialization: Evidence from the American Northeast, 1820-1860" in Stanley Engerman and Robert Gallman, eds., *Long-Term Factors in American Economic Growth*, (Chicago and London, 1986) 679-729; for a summary and further development of the evidence to which Sokoloff refers, see William Lazonick, *Competitive Advantage on the Shop Floor*, (Cambridge, 1990).

⁷⁰ Chandler, 64.

importance of coordinating them. The solution, as Chandler explains it, was the emergence of “managerial organisations” to divide and integrate the work of planning and coordinating the railroad business. The administrative tasks involved were so numerous, varied, and complex that they were increasingly handled by men with special skills who were hired and trained by the railroad. Moreover, the growing challenges of coordinating trains and the flow of rail traffic encouraged growing attention to lines of responsibility, communication and authority within railroad companies. Thus, it was railroad enterprises that pioneered in the emergence of what Chandler describes as “modern management” in the United States.⁷¹

Railroad managers focussed growing attention on the organisation of work within railroad enterprises but they increasingly faced the problem of dealing with industrial organisation too. The characteristics of railroads’ investment meant that they all faced a similar imperative of increasing volume. Increasingly these incentives led to price wars among carriers as they struggled to generate the business they needed to cover their fixed costs. Initially, U.S. railroad enterprises attempted to limit the problem of ruinous competition through price agreements with their competitors but they proved of only limited efficacy and rate wars continued to weigh heavily on railroads’ profitability. A new solution to the challenge of controlling competition emerged with massive consolidation or ‘system-building’, which extended throughout the railroad industry from the mid-1880s.⁷² Soon the most aggressive system builders had grown to a gargantuan scale to dominate the US railroad industry.⁷³

In other sectors of the US economy, the pressures for the emergence of managerial organisation depended on the extent of capital investments required. Thus, it was in the rapidly evolving US industrial sector in the decades after the Civil War that big business became prominent. That was true since the transition to mass production involved growing capital requirements and due to growing vertical integration in the most rapidly-developing industries of the time. It was there that managerial organisation developed giving rise to “modern industrial enterprises” that, like railroad enterprises, were concerned with utilising the capital at their disposal as effectively as possible through a complex division and organisation of work.

In emphasising the significance of Chandler’s insights into the organisational revolution in US capitalism, economic historian, Alexander Field, characterises the modern

⁷¹ Chandler, 81-121.

⁷² Chandler, chapter 5, 145ff.

⁷³ By 1893 ‘the thirty-three railroad corporations with a capitalization of \$100 million or more operated 69 percent of the railroad mileage in the United States’ (Chandler, 167).

business enterprise as a “capital-saving” innovation. As he explains: “the introduction and diffusion of what Alfred Chandler called modern business enterprise had a profound capital-saving impact on the American economy . . . principally via increased speed of production and inventory turnover, which spread costs of holding capital over a larger volume of output”.⁷⁴ Thus, far from taking capital intensity as a technological “given”, enterprises could manage the relationship between capital and output to the extent that they could build organisations that were capable of planning and using capital more effectively.

US entrepreneurs and managers in capital-intensive activities understood this logic very well as Andrew Carnegie’s legendary “hard-driving” polices suggest. The results were evident in the blast furnaces, which year after year dramatically increased their efficiency and productivity”.⁷⁵ Hard-driving took its toll on the Carnegie Company’s workforce but it also succeeded in wringing the maximum output from its capital.

Still, making profits in the US steel industry depended not just on driving machines as hard as possible to produce more output but also on producing products that could be sold at favourable prices. As in the railroad sector, ruinous competition became a problem as increasing capital investments induced steel enterprises to engage in price wars to generate enough volume to cover their fixed costs. The Carnegie Company proved effective at breaking out of this spiral by diversifying out of steel rails, where price competition was particularly intense, through product and process innovation that allowed it to move into structural steel. It was not, however, until the giant consolidation of the US steel industry that gave rise to United States Steel that price competition was brought under effective control in the US steel industry.⁷⁶

We see a similar “capital-saving” logic at work in other US capital-intensive industries in which modern business enterprise emerged in the way that Chandler describes.⁷⁷ Indeed, the importance that large US industrial enterprises attached to using their capital intensively, rather than to capital intensity as such, was made very explicit at Du Pont in the early teens. There F. Donaldson Brown developed a simple formula that isolated the determinants of a business’s return on capital and became the basis of a management tool that diffused throughout the US business sector. The “Du Pont formula” – Return on Investment =

⁷⁴ Alexander Field, 1987. “Modern Business Enterprise as a Capital Saving Innovation.” *Journal of Economic History* vol. 47 (1987) 473–485.

⁷⁵ David Nasaw, *Andrew Carnegie*, (New York, 2006) 400.

⁷⁶ Naomi Lamoreaux, *The Great Merger Movement in American Business, 1895-1904*, (1988).

⁷⁷ For the US electrical equipment industry and the challenge of using working, as much as fixed, capital intensively, see Mary O’Sullivan, “Living with the U.S. Financial System: the Experiences of GE and Westinghouse in the Last Century”, *Business History Review*, 80: 4, Winter 2006, 621-655.

Profit/Sales x Sales/Assets -- made clear that a company's return on investment (ROI) is driven by the efficiency with which a company uses its assets just as much as the profitability of its sales. The ratio used to measure a firm's efficiency in using its assets, usually described as "asset turnover", is an inversion of the capital-output ratio that economists use to measure capital intensity.

The managerial implications of the inversion were clear: the goal of capitalist enterprise was not just to invest in capital but to squeeze every possible dollar of profit out of it. Achieving this objective was far from straightforward, however, since it depended on building and running an organisation that was capable of delivering it. Thus, when we measure asset turnover in industries such as electrical equipment and automobiles, we observe important and persistent differences across companies in how effective they were in using their capital.⁷⁸

The historical examples that I have offered are meant to be suggestive of the importance of organisation in determining the productive role of capital. The fact that I have taken some of the most provocative ones from the industrial sector should not imply that the logic they illustrate is confined to it. To the contrary, it has just as much resonance for the trade, wholesale and retail industry that has become an exemplar of the post-industrial economy in the US and elsewhere. Indeed, what distinguishes Wal-Mart, the industry giant in the United States, is its overwhelming commitment to "hard-driving" its capital compared with its competitors. As a result, as Table 2 shows, it significantly outperforms its closest US competitor, Target, in the utilisation of both its fixed and working capital. If there is some "technological" logic that determines the relationship between the capital invested in the retail industry and the returns it ought to deliver, then Wal-Mart spends an inordinate amount of time in studiously neglecting it.

Certainly there is room for debate about the precise characteristics of the division and coordination of work that are important in determining the productivity of capital. Empirical analyses of slave plantations and early industrial companies focus on the organisation of work on the factory floor given the limited depth of their managerial hierarchies. In contrast, Chandler's work says nothing at all about the US factory floor or its Fordist principles although other scholars have offered a corrective to his exclusive focus on managerial organisation. Questions have been asked too about the continued relevance of the managerial organisation that Chandler celebrated given the dramatic changes in the way US corporations divide and coordinate work internally and with respect to sub-contractors both in the United

⁷⁸ O'Sullivan, 2006.

States and internationally. Still, my focus here is not on the particular characteristics of business organisation that might prove more or less effective at any moment of time but rather the general importance of organisation in determining the efficiency with which capital is used.

Table 2 “Hard Driving” Capital in the US Retail Industry

In billions of \$s unless specified, 2010	Wal-Mart	Target
Sales	405.0	67.4
Total Asset Turnover	2.38	1.54
Fixed Asset Turnover		
Square footage of stores (millions)	603	234
\$ of sales per square foot	672	288
Inventory Turnover	12.2	8.9

Source: Wal-Mart and Target, *Annual Reports* (2010).

There has been a temptation to claim that the importance of complex business organisation in the United States has receded in recent years with the diminution of former corporate giants. Even sober-minded scholars have heralded the demise of the corporation and the resurgence of the market in the US business sector.⁷⁹ However, recognition of the continued concentration of crucial economic variables, not least capital formation itself, shows just how misleading such claims can be. As a recent paper puts it: “This high concentration at the top of the distribution of capital spenders presents a challenge to the existing literature on corporate investment”.⁸⁰ In fact, its observation that “the investment behaviour of the very largest corporations is distinct and important” represents a much broader challenge than the paper allows since it confronts most economic analyses of the productive role of capital for their failure to grapple with complex organisations.

To do so, economists must acknowledge that enterprises are not necessarily bound by

⁷⁹ Richard Langlois, “The Vanishing Hand: The Changing Dynamics of Industrial Capitalism”, *Industrial and Corporate Change*, vol. 12 (2003) 351-385.

⁸⁰ Gustavo Grullon, John Hund and James Weston, 2014, “Investment Concentration and the Importance of Cash Flow”, working paper, ; for similar data on the concentration of R&D spending, see Mark Hirschey, Hilla Skiba and M. Babajide Wintoki, « The size, concentration and evolution of corporate R&D spending in U.S. firms from 1976 to 2010 : Evidence and implications », *Journal of Corporate Finance*, vol. 18 (2012) 496-518.

homogeneous structural constraints insofar as the outcomes of their investments are concerned. As a result, it is not sufficient to look at the amount of investment they make to understand the productivity with which they employ it. Relatedly, the economic implications of variations in capital intensity over time, as measured by the standard K/Y ratio, cannot be fully understood from a macroeconomic level. A decline in measured capital intensity might signal a diminished role for capital in the production of goods and services but it could just as easily occur because capital is being used more intensively. Indeed, that is precisely what we observe in certain key phases of the expansion of important industries in US such as the growth of the automobile industry during the 1920s.

3.2 The Fallacy of Productive Factors & their Rewards

There are a great number of empirical questions that remain to be answered about the historical role of capital in the production of goods and services. Yet, even the limited observations I have made based on the history of capital in US capitalism suggest significant problems with the standard way that many economists understand it. For them, the economic analysis of capital is limited to the determinants of its investment; what happens thereafter, as one textbook put it, is not an economic question but “a purely technological question about the production function”. What I have suggested instead is that the question is very much about economics and, specifically, about the way economic units organise themselves to generate a return on the investments they make. The economics of capital, therefore, must be studied in organisational or relational terms as much as in technical ones.⁸¹

The claim that the productive role of capital can be understood only in the context of the organisations that use it differs from the dominant view of capital as a "factor of production" since it implies that machines and structures cannot be thought of as being inherently productive or unproductive. The Carnegie Company's blast furnaces were more productive than other steel company's blast furnaces because the Carnegie Company had the organisational capacity to use them more intensively than its competitors. Replicating that capacity was much more difficult for a competitor than buying a similar machine.

A vision of economic progress based on factors of production may have made sense in an economy in which the distinct contributions of individual actors – landowners, workers and capitalists – seemed paramount. However, the emergence of large and complex organisations as central players in the most dynamic sectors of the economy gave some economists pause about its continued relevance. Certainly Alfred Marshall recognised the

⁸¹ Amit Bhadhuri, “On the Significance of Recent Controversies on Capital Theory: A Marxian View”, *Economic Journal*, vol. 79 (1969) 532-539.

problem and even tried to deal with it by proposing a new factor of production called "organisation". However, in doing so, he sought to bolster the conventional vision of the economic process by maintaining the illusion that capital's productive contribution could be separated from that of organisation. The more recent emphasis on the "interdependence" of factors of production by Moses Abramovitz and other economists might seem to suggest an improvement in this regard. However, they tend to characterise such interdependence in a highly schematic way that abstracts from the fact that it is undertaken, to a large extent, by organisations established and operated precisely for the purpose of bringing capital together with other "factors of production" to make them work interdependently.

Fortunately, there have been economists interested in studying the implications of the rising importance of organisation in capitalism. When Schumpeter launched his original attack on neoclassical economics for its neglect of innovation, he characterised the process that he deemed to be the "central fact of economic life" as dependent on the individual initiative and effort of the entrepreneur. However, his increasing attention to the dynamics of business and economic history led him to acknowledge that:

the entrepreneurial function need not be embodied in a physical person and in particular in a single physical person... the entrepreneurial function may be and often is filled co-operatively. With the development of the largest-scale corporations this has evidently become of major importance: aptitudes that no single individual combines can thus be built into a corporate personality.⁸²

Thus, "the large-scale establishment or unit of control" played a central role in bringing about "economic progress" and he castigated neoclassical economists for casting it as an aberration in a well-functioning market economy. To the contrary, he argued: "it had come to be the most powerful engine of that progress and in particular of the long-run expansion of total output"⁸³ Capital, from his point of view, was "a necessary complement of entrepreneurial action" but fundamentally dependent for its productivity on the organisations that employed it.

Notwithstanding the originality of Schumpeter's insights, there is much research that remains to be done to understand how capital's role in the production of goods and services depends on the characteristics of the organisations that invest and use it.⁸⁴ Nevertheless, it is

⁸² Joseph Schumpeter, "Economic Theory and Entrepreneurial History", in Research Center in Entrepreneurial History, Harvard University, ed., *Change and the Entrepreneur* (Cambridge, Mass., 1949) 71.

⁸³ Joseph Schumpeter, *Capitalism, Socialism and Democracy* (New York, 1975) 106.

⁸⁴ Especially since economists who recognise the importance of economic organisation in theories of the firm, even those operating in a Schumpeterian tradition, tend to downplay the role of capital (Mary

already clear that such a conceptualisation of capital's role has crucial implications for understanding the economic origins of profit. Given the time and uncertainty involved in building such organisations, there is no reason to expect that profits will come quickly or easily. But, once they do, they may endure for some time given the challenges for competitors of replicating organisational capabilities. What that means for successful enterprises is that it is impossible to make a clear distinction between profits that accrue from their productive use of resources and those that stem from their market power since they are so inextricably bound up together.⁸⁵ And it also implies that enterprises that have created highly productive organisations in the past may continue to enjoy profits even as their organisational capacities diminish.

Such a world is a far cry from the neoclassical ideal in which corporate organisations make only transitory profits. However, it seems much closer to the historical experience of an advanced economy like the United States in which large and persistent corporate profits have long been a reality. Neoclassical economists have a hard time explaining how that came to be the case and Piketty too lacks a theory of capital that could account for high and sustained profits in the corporate sector. He implicitly acknowledges that limitation towards the end of his book when he says that he knows “virtually nothing” about exactly how Bill Gates became rich. He appeals to the standard economic explanation in suggesting that Bill Gates “profited from a virtual monopoly on operating systems (as have many other high-tech entrepreneurs in industries ranging from telecommunications to Facebook)” although that is like saying that Einstein owed his success to his monopoly of the theory of relativity. However, Piketty also hints at something more analytically ambitious when he says: “I believe that Gates’s contributions depended on the work of thousands of engineers and scientists doing basic research in electronics and computer science, without whom none of his innovations would have been possible”. Had that statement come at the beginning of his book, it might have provided the basis for a rethinking of the productive role of capital but on page 445 it is little more than a throwaway comment.

That corporations integrate capital in complex organisational processes to produce goods and services has implications not only for an economic analysis of the source of profits but also for their distribution. The neoclassical theory of distribution implies that actors receive economic rewards commensurate with their productive contributions. The

O’Sullivan, ‘Finance and Innovation’ in Jan Fagerberg, David Mowery and Richard Nelson, eds., *The Oxford Handbook of Innovation* (Oxford, 2005) 240-265; Anthony M. Endres and David A. Harper, “The kinetics of capital formation and economic organisation”, *Cambridge Journal of Economics* (2012, 36) 963-980).

⁸⁵ Schumpeter, 1975, chapter 8, 87-106.

mechanisms for establishing such a clear link between contribution and reward depend on strict technological conditions that cannot be expected to hold in an economy in which complex organisations predominate. And the even more fundamental assumption on which the neoclassical theory of distribution relies -- that we can isolate capital's contribution to the production of goods and services -- seems quite implausible. If capital depends for its productivity on the organisation that uses it, then its productive contribution is inextricably bound up with it.

In their empirical analyses of distribution, many economists are perfectly willing to admit the problem of distinguishing between different types of productive contributions in the case of sole proprietorships and partnerships. Piketty follows their lead in this regard in acknowledging that the men and women who run these businesses are often both "owner" and "operator" so that the payments they receive conflate rewards to labour and capital. However, he draws a sharp contrast, as many economists do, with "most private economic activity [which] today is organized around corporations or, more generally joint-stock companies". On the books of these companies, Piketty suggests, "there is a clear distinction between remuneration of labor (wages, salaries, bonuses, and other payments to employees, including managers, who contribute labor to the company's activities) and remuneration of capital (dividends, interest, profits reinvested to increase the value of the firm's capital, etc.)."⁸⁶ In fact, whatever the accounting clarity associated with these streams, nothing could be further from the truth insofar as their economic character is concerned. Even at the level of a particular corporate enterprise it is impossible to make any such "clear distinction" and it is fantastical to imagine it can be done at the level of the corporate economy. Indeed, that is precisely the gist of Piketty's musing about Gates' dependence on his "thousands of engineers and scientists" but it does not penetrate his analysis of capital's rewards in large complex organisations.

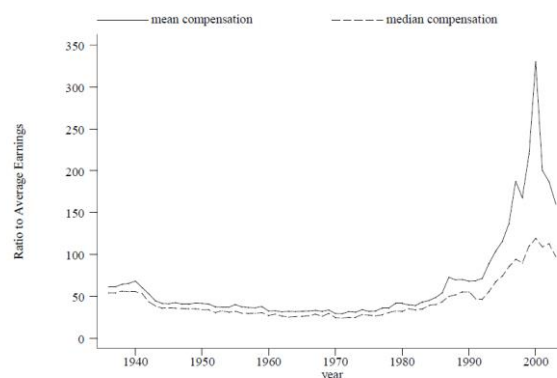
Precisely because of the complex economic relationship between effort and reward in such organisations, there is room for considerable bargaining about who gets what. That bargaining can take place at the level of the economy, the sector or industry as well as the enterprise itself. As we know from research on "varieties of capitalism" it rests on institutional foundations that may differ across country and change over time. Certainly, in the history of the US corporate economy bargaining over the fruits of corporate success have worked themselves out in drastically different ways over time.

⁸⁶ Piketty, 203. In fact, he uses the purportedly clear capital-labour split for the corporate economy as the basis for estimating one for sole proprietorships and partnerships.

One way in which the organisational foundations of corporate success were acknowledged in leading US corporations in the past was through the retention and reinvestment of their profits. In this way, the average employee, just as much as executives and shareholders, could derive future benefits from corporate success. However, that mechanism has broken down in recent decades as US corporations have paid out more and more of their profits through dividend payouts and stock repurchases.⁸⁷

That pattern developed through an unholy alliance of corporate executives and financial interests. Until the 1980s, the rewards that US corporate executives received for their efforts were tied closely to the fortunes of the organisations they managed and the other people who worked for them. In recent years, however, these links have been broken as suggested by the dramatic increase in top managers' rewards, relative to those of production workers, in the US corporate economy (Figure 4). Top managers of US corporations have reaped extravagant rewards in the form of bonuses and stock-based compensation largely for their cooperation in diverting the fruits of organisational success to shareholders.⁸⁸

Figure 4 Compensation of top corporate executives relative to average earnings



Note: Total compensation is composed of salary, bonuses, long-term bonus payments, and stock option grants. Average compensation in each year is expressed relative to total wage and salary accruals per full-time equivalent employee from table 6.6 of the National Income and Product Accounts. Based on the three highest-paid officers in the largest 50 firms in 1940, 1960 and 1990.

Source: Carola Frydman and Raven Saks, “Executive Compensation: A New View from a Long-Term Perspective, 1936–2005, *Review of Financial Studies*, (23, 2010).

⁸⁷ Mary O’Sullivan, *Contests for Corporate Control: Corporate Governance and Economic Performance in the United States and Germany* (Oxford, 2000); William Lazonick and Mary O’Sullivan, “Maximizing Shareholder Value: a New Ideology for Corporate Governance”, *Economy & Society*, vol. 29 (2000) 13-35.

⁸⁸ O’Sullivan, 2000; Lazonick and O’Sullivan, 2000.

Interestingly, Piketty places a great deal of emphasis on the rise of the “supermanager” in his analysis of growing inequality in the United States in the late 20th century. Moreover, in a section called “The Illusion of Marginal Productivity” he rails against economists who justify their outsized pay packages in terms of the standard neoclassical theory of distribution. Noting that “the vast majority of top earners are senior managers of large firms” he emphasises that the notion of individual marginal productivity is impossible to define in such settings and “becomes something close to a pure ideological construct” to justify higher compensation. Despite his concerns about the illusion of marginal productivity as applied to labour, Piketty never challenges its relevance for thinking about capital’s role and rewards. And, oddly enough, he makes no attempt to link “the takeoff of the supermanagers” to the dynamics of capital in US capitalism.⁸⁹

3.3 The Financial Organisation of Capital

To understand how these changes came about, an understanding of capital’s financial dynamics seems essential, notably an analysis of the historical distinctiveness and significance of recent trends towards “financialisation” in the U.S. economy. In analytical terms, that means we need to grapple with a historical reality in which capital is financial as well as productive. As we have seen, Piketty emphasises that capital has such a dual identity but, unfortunately, he does not propose an analysis of the financial, any more than the productive, aspect of capital.⁹⁰

There are other scholars who have underlined the importance of capital’s dual role including Rudolf Hilferding and Hyman Minsky from an economic perspective and Fernand Braudel and Giovanni Arrighi from a historical one. All these scholars conceive of the interaction between capital’s financial and productive dynamics in distinct ways but the general lesson we learn from their work is that the character of their interaction varies a great deal over time. Finance capital may facilitate the formation and utilisation of productive capital, it may develop and profit from it, and it may feed upon it and even undermine it. What that implies is a need to study capital’s financial dynamics in their own right and not just as ancillary to capital’s productive role in the economy.

The financial dynamics of capital in the US economy go far beyond their relationship to the US corporate sector but, given the limited scope of this article, I will focus my remarks on the financialisation of US corporations. The corporate form, by its very nature, creates the potential for financial and productive capital to develop greater autonomy than other legal

⁸⁹ Piketty, 330-333.

⁹⁰ Tribe, 262-3.

forms such as the sole proprietorship or the partnership. However, whether that potential is realised depends on the dynamics of the corporate, as well as the financial, sector.

In the history of the United States, financial and productive capital began to develop some independence of each other through the separation of shareholding from control within the corporate sector and the evolution of liquid markets for corporate stocks and bonds in the financial sector. These developments did not occur spontaneously in response to the emergence of the corporate form in the United States. Instead, they followed the rise of big business, manifesting themselves initially for the railroad sector before spreading to the industrial sector, and even then taking decades to unfold. By the end of the 19th century, we can begin to speak of a separation of ownership and control in the US railroad corporation, although it was far from complete, as well as the existence of liquid markets for their securities. For industrial corporations, in contrast, it was not until the decade after World War 1 that we observe the development of broad and deep markets for their stocks and bonds. So too the separation of ownership and control in these companies took more time than for railroads, attracting a great deal of attention from the 1920s although, once again, it was far from definitive even then.⁹¹

As these developments occurred, we can increasingly distinguish between the dynamics of financial and productive capital in the US corporate sector. From the perspective of finance capital, at least from World War 1 on, what that largely created was greater scope for financial speculation. Indeed, the trading of corporate stocks and bonds became, along with real estate speculation, the vibrant hub of a "financialised" economy in the 1920s. Yet, even as speculation in corporate securities exploded, it had little impact on the operation of the underlying corporations themselves. To the contrary, the dynamics of productive capital in the US corporate sector enjoyed increasing independence of finance capital as the 1920s unfolded.

Eventually the bubble on the stream of enterprise burst and productive capital in the US corporate sector gained even greater autonomy as the 1929 crash, and the onset of the Great Depression, generated significant regulatory restrictions on finance capital that lasted for several decades. It was during this period that we observe growing discomfort with the characterisation of corporate managers as servants of financial capital. In 1932, Berle and Means emphasised how the corporate revolution had created centres of economic power on an

⁹¹ On the separation of ownership and control, see Brian Cheffins and Steven Bank, "Is Berle and Means Really a Myth?", *Business History Review*, vol. 83 (2009) 443-474; on the development of securities markets, see Mary O'Sullivan, *Dividends of Development: Fits and Starts in the History of U.S. Securities Markets, 1865-1919*, (Oxford, 2016).

unprecedented scale and, at the same, had led to an explosion of "the atom" of private property. Thus, they argued, economic power was increasingly concentrated in the hands of managers who were not owners and property in the corporation was becoming a passive institution. From their perspective, private property no longer offered an adequate justification for the exercise of corporate control or the distribution of corporate profits.⁹²

Instead, they claimed, there was a need to go beyond traditional economic and legal theory to develop concepts that were more appropriate to the new reality of the US corporate economy. In this regard, Berle and Means proposed that corporations be made responsible not just for dividends but for a much broader set of "claims of the community", including "fair wages" and "security to employees". To achieve these results, they deemed it necessary that corporate management develop into a "purely neutral technocracy". And in the decades that followed, we do observe the development of a powerful "managerialist" ideology for the US corporation. As the editors of *Fortune* put it in 1951: "[t]he manager is becoming a professional in the sense that like all professional men he has a responsibility to society as a whole".⁹³

Yet, for all of the influence that US corporate managers exercised at this time, and the autonomy they enjoyed from financial interests, the acquiescence of corporate law to managerial control remained implicit. As Erber put it: "[T]he managers have not succeeded, either through legislation or adjudication, to resolve their ambivalent, contradictory status of power without property". That left the legitimacy of managerial control vulnerable to challenge and, ultimately, to a concerted attack from scholars and other pundits who were intent on reviving the philosophy that corporations should be run for the benefit of shareholders.⁹⁴

The opening for that attack came as US corporations confronted major productive challenges beginning in the 1970s in the face of an intensification of international competition in a wide range of industries. These competitive challenges demanded a response, but as US enterprises struggled with what was going on in the productive sphere, they discovered that the financial ground had shifted under their feet. Specifically, a transformation in how US households saved, as well as a concerted move towards financial deregulation, led to a major intensification of the pressures on US corporations to deliver higher and higher returns on their corporate stocks.

⁹² O'Sullivan, 2000

⁹³ For a somewhat different interpretation of the same phenomenon, see James Burnham, *The Managerial Revolution: What is Happening in the World*. (New York, 1941).

⁹⁴ The following discussion is based on O'Sullivan, 2000 and Lazonick and O'Sullivan, 2000.

These pressures manifested themselves in a variety of ways from battles for corporate control to institutional investor activism. Initially, many US corporate managers resisted the logic of "shareholder value" which they perceived as a challenge to their longstanding discretion in the corporate sphere. However, their resistance to shareholder value as the benchmark for corporate performance abated as executive pay packages became more and more dependent on stock compensation. Taken together, these pressures have dramatically remade the relationship between financial and productive capital in the US corporate sector.

The implications of this transformation remain to be fully understood but the most important lines of inquiry focus on the implications of the "financialisation" of the US corporation for the relationship between corporate profits and investments or what is sometimes described as the profit-investment nexus.⁹⁵ Some scholars argue that financialisation means that high US corporate profits can no longer be expected to translate into buoyant corporate investment while others focus on its impact on the types of investments that US corporations make rather than their magnitude.⁹⁶ There has been interest too in financialisation as a spur to profit-making schemes by US corporations that require little productive investment at all. In this regard, the growing role of financial activities as a source of profits, even for industrial corporations, has drawn scholarly attention. So too the growing intensity of U.S. corporations' efforts to evade taxes, reflected in their increased use of international tax havens in recent decades, is surely related to the pressures they face for ever-increasing financial returns.⁹⁷ Although there is much more to learn, it is already clear that to ignore the dynamics of finance capital is to overlook perhaps the most important trend in the role of capital in US capitalism over the last 25 years.

4. Conclusion

Thomas Piketty's book, *Capital in the Twenty-First Century*, reopens fundamental questions about the role and rewards of capital that economists have never resolved. It does so by exploring the history of capital in capitalism and derives much of its credibility from the

⁹⁵ United Nations Conference on Trade and Development, *Trade and Development Report*, (Geneva and New York, 1997).

⁹⁶ Lazonick and O'Sullivan, 2000; Julie Froud, Colin Haslam, Sukhdev Johal and Karel Williams, "Cars after Financialisation: A Case Study in Financial Underperformance, Constraints and Consequences", *Competition and Change*, vol. 6 (2002) 13-41; Engelbert Stockhammer, "Shareholder Value Orientation and the Investment-Profit Puzzle", *Journal of Post-Keynesian Economics*, 28 (2006) 193-215; Will Milberg, "Shifting resources and uses of profits: sustaining US financialization with global value chains", *Economy and Society*, vol. 37 (2008) 420-451; Will Milberg and Deborah Winkler, *Outsourcing Economics: Global Value Chains in Capitalist Development* (New York, 2013); William Lazonick, "The Financialization of the U.S. Corporation: What Has Been Lost, and How It Can Be Regained," *Seattle University Law Review*, vol. 36 (2013) 857-909.

⁹⁷ Gabriel Zucman, "Taxing Across Borders: Tracking Personal Wealth & Corporate Profits", *Journal of Economic Perspectives*, vol. 28 (2014) 121-148.

historical evidence it marshals in defence of its claims. In this chapter, I have sought to evaluate the basis for Piketty's arguments by considering them in light of the history of US capitalism.

I have argued that it is extremely difficult to make economic sense of Piketty's historical analysis of capital in the US in the 19th and 20th centuries. That is true, only in part, due to the distinctive choices he makes, compared to mainstream economists, in defining and measuring capital. Much more problematic, in fact, are theoretical commitments he shares with them that preclude an understanding of capital's historical role and rewards in the US economy. Based on a discussion of several important features of US economic history, I have argued that such an understanding demands an historical analysis of capital, both productive and financial capital, in relation to the evolving social organisation of capitalism in the US.