The Falling Rate of Profit and the Great Recession

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I declare that the material contained in this thesis is entirely my own work, except where due and accurate acknowledgment of another source has been made.

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Abstract

This thesis develops a new, temporalist interpretation of Marx's value theory. It applies this to US national accounting statistics, in order to test Marx's Law of the Tendential Fall in the Rate of Profit (LTFRP) and whether it can explain the causes of the Great Recession of 2007 – 2009 in the US.

It finds that movements in the rate of profit in the US conform to Marx's law and that the Great Recession can be explained by a prior decline in the US rate of profit. It also gives empirical confirmation of Marx's account of the tendencies and counter-tendencies which determine movements in the average rate of profit.

The interpretation builds on the important breakthroughs of the temporal single system interpretation (TSSI) of Marx's value theory, which refutes two allegations of internal inconsistency against Marx's system: the transformation problem and the Okishio Theorem. This includes showing how a temporalist approach can be extended to account for the devaluation of capital due to crises and obsolescence, overcoming problems associated with historical cost accounting while still making it possible for cost-reducing technological change to lead to a falling rate of profit with a constant real wage.

The thesis also gives a method for measuring the turnover time of variable capital. This makes it possible to measure the value composition of capital and the organic composition of capital as the ratios of one stock to another stock, and to quantify the influences on the rate of profit of changes in the organic composition of capital, changes in the turnover time of variable capital, the cheapening of new capital, the devaluation of existing capital and changes in the rate of surplus value.

The thesis also quantifies the relationships between the total stock of surplus value, unproductive expenditures of surplus value, profits from production, profits from secondary exploitation and fictitious profits. This forms the basis for two new types of measure of the rate of profit with which to test Marx's law.

This value accounting framework is then extended to explain how the creation of fictitious capital can create fictitious profits, and how this can be used to explain average rates of return on financial assets and the interest rate.

The results show there has been a long-term decline in the US rate of profit, and declines in the US rate of profit in the lead up to all major crises. Since 1945, the organic composition of capital has increased more or less continuously, and its effect on the rate of profit was counteracted to a limited extent by the other factors Marx identifies, including a rising rate of surplus value. Marx's observations concerning the relationship between the interest rate and the business cycle are also supported by the evidence over the long-term. This is strong evidence in favour of the predictive power of Marx's value theory in *Capital.*

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Chapter 1: Marx's Value Theory and the Law of the Tendential Fall in the Rate of Profit

The Great Recession has again confirmed Marx's prediction that economic crises are inevitable under capitalism. Yet Marx's most developed explanation for *why* this is the case – his law of the tendential fall in the rate of profit (LTFRP) – is not widely accepted, even among Marxists.

Marx's broader value theory suffers an arguably worse fate. Its fundamental premises are endlessly debated and reinterpreted, but, with important exceptions, this often delivers few concrete analytical insights. Perhaps as a result, *Capital* is often consulted for its famous quotations, its literary merits, its method, its philosophy, and even sometimes its conclusions; but the quantitative value theory on which these conclusions are based is almost as widely neglected or rejected as the LTFRP.

This thesis builds on the work of a small but growing number of Marxists whose temporal single system interpretation (TSSI) of Marx's value theory aims to recover this aspect of Marx's thought. The TSSI refutes two influential allegations of internal inconsistency against Marx's system: the transformation problem and the Okishio Theorem. Both have done major damage to the credibility of Marxist ideas.

The Okishio Theorem claims that profit-increasing technological change cannot lead to a falling rate of profit in the way Marx describes.[1] If it were true, then logically it would entail rejecting not only Marx's LTFRP, but also the crisis theory he develops on that basis, an important aspect of Marx's historical materialism, and one part of the case for revolutionary socialist politics.

[1] Okishio, "Technical Changes and the Rate of Profit."

The transformation problem has been even more damaging, since it appears to show that Marx's *entire* value theory is internally inconsistent. If this were true, it would invalidate Marx's explanation of how the working class is exploited under capitalism, and most of the rest of his analysis in *Capital*.

Understandably, much energy has been expended debating the significance of these problems or trying to solve them (though not always usefully). There is also a mutually reinforcing relationship between the lack of confidence these critiques have created and what Alan Freeman has called 'Marxism without Marx': the attempt to divorce Marx's conclusions from his economic analysis.[2]

Yet refutations of these critiques have existed since the 1980s. They have demonstrated that the transformation problem and the Okishio Theorem depend on a misrepresentation of Marx's theory that is still prevalent: that he was trying, or should have been trying, to construct an equilibrium model of the capitalist economy. If we drop this assumption, the TSSI demonstrates that Marx's procedure for transforming values into prices is not guilty of the inconsistency his critics allege, and the Okishio Theorem does not refute Marx's LTFRP.[3]

The TSSI therefore clears the way for significant progress to be made towards understanding Marx's political economy on its own terms, extending it, and using it for empirical analysis. In particular, it makes the quantification of Marx's value theory a much more viable endeavour; since, if Marx's value theory can be quantified on an internally consistent basis, it is much more

[2] Freeman, 'Marxism without Marx: A Note towards a Critique', 85–86. See also Kliman, 'The Whiggish Foundations of Marxian and Sraffian Economics', 652.

[3] Kliman, "The Profit Rate Under Continuous Technological Change"; Freeman and Carchedi, *Marx and Non-Equilibrium Economics*; Kliman, *Reclaiming Marx's Capital*; Carchedi, "From Okishio to Marx through Dialectics"; Kliman and Freeman, "The Truthiness of Veneziani's Critique of Marx and the TSSI"; Kliman and McGlone, "The Transformation Non-Problem and the Non-Transformation Problem"; Carchedi, "The Logic of Prices as Values"; Giussani, "The Determination of Prices of Production." Kliman, *Reclaiming Marx's Capital* is the best starting point and summarises the debates.

likely to be a useful framework through which to analyse economic statistics. So far, however, most work on the TSSI has remained at the level of high value theory.

This thesis takes these breakthroughs as its starting point for an analysis of the dynamics of the rate of profit. Specifically, it uses Marx's value theory to develop a new method of measuring the rate of profit, the cause of its hypothesised tendency to fall, the factors counteracting this and their effect on the rate of profit, and the connection between the rate of profit and financial rates of return. It applies this to data for the US economy, with a focus on testing whether Marx's LTFRP can explain the causes of the Great Recession.

Parts of the thesis are unavoidably technical. It uses some mathematics, but this does not go beyond high school level algebra (e.g., there are no matrices or vectors). The more difficult aspects describe how the US national accounts are used to construct the measures mentioned above, but it should be possible to understand the general argument without following every detail of the accounting.

The thesis is structured as follows. This chapter discusses the most relevant parts of the vast literature devoted to Marx's value theory and the rate of profit, both as background and to take positions on the most important points of controversy over how to interpret and test Marx's law. The first section starts with overviews of explanations of the falling rate of profit before Marx, and the significance of the LTFRP for Marx and for socialist strategy. Then it considers how to interpret the LTFRP: over what time period Marx supposes it applies and whether it predicts future movements in the rate of profit. The second section discusses the three most important *theoretical* objections to the LTFRP – the transformation problem, the Okishio Theorem, and the charge that it is indeterminate – and the persuasive arguments that have been made against them.

The next three chapters set out a new method for measuring the rate of profit and explaining its movements. Chapter 2 raises a problem with existing temporalist approaches to measuring the rate of profit: that their historical cost measures of fixed capital cannot allow for the devaluation of existing capital, even though this rightly plays a crucial role in their interpretations of the LTFRP. It argues that valuing capital advanced at pre-production prices (i.e., the prices prevailing immediately before production commences) addresses this issue, and is consistent with a TSSI. This includes a numerical example which shows that the pre-production rate of profit does not re-introduce the problem of the Okishio Theorem. It also gives a method for quantifying the effect of the cheapening of constant capital on the rate of profit, and how this relates to measuring surplus value, plus a hypothesis concerning the relationship between the pre-production price rate of profit, the rate of accumulation and the rate of growth of output.

Chapter 3 goes further into measuring the effects of the counteracting factors to the falling rate of profit and it gives a method for measuring the effect of the rising organic composition of capital (OCC). It argues the OCC is not the ratio of the stock of constant capital to the annual wages bill (a flow), as is usually thought, but the ratio of the stock of constant capital to the *stock* of variable capital. This means it can only be measured after calculating the turnover time of variable capital. It also gives a method for doing this. This forms the basis for decomposing changes in the ROP in terms of changes in the OCC, the cheapening of new capital, the devaluation of pre-existing capital, changes in the turnover time of variable capital, and changes in the rate of surplus value.

Chapter 4 raises problems with existing definitions of the numerator of the rate of profit. It repeats Gillman's argument that rather than defining the ROP as $s / (c + v)$, it should be defined as $(s – u) / (c + v)$, where 'u' is certain unproductive expenditures of surplus value. It then shows why the common view that ($s - u$) is equal to after-tax profits from production is not correct. It argues the difference between the two has a deeper theoretical significance: it shows that a value theory approach implies the need to account for the difference between 'non-fictitious' profits and the profits actually recorded by businesses and investors. The chapter then gives a method for measuring non-fictitious profits using the US national accounts.

This raises the question of what *fictitious* profit is, and how it can be produced. Chapter 6 argues it is the result of the expansion of fictitious *capital* in excess of the expansion of actual capital. But to give the necessary background for this argument, Chapter 5 discusses Marx's views on finance and the rate of profit. Chapter 6 then builds a framework for quantifying the relationship between the average non-fictitious rate of profit and the average rate of return on fictitious capital. It also explains how this relates to movements in interest rates and share markets, and the way in which 'excessive' fictitious profits can create the conditions for property and stock market bubbles and crashes.

Finally Chapter 7 presents the results from applying these techniques to US data, with a particular focus on how they can help us to explain the causes of the Great Recession and the relevance of Marx's LTFRP, and Chapter 8 draws some conclusions concerning the predictive power of Marx's analysis in *Capital.*

The Development of the LTFRP and its Significance

The Falling Rate of Profit Before Marx

Among the classical political economists it was widely believed that the rate of profit had a long term tendency to fall. This conjecture was consistent with the limited evidence they had. Though Adam Smith acknowledges it "must be altogether impossible" to calculate "average profits of stock" using the statistics available to him, he argues "the progress of interest… may lead us to form some notion of the progress of profit". He finds that interest rates in England had been declining since at least the reign of Henry VIII. He also observes that the more developed European countries (England and Holland) tended to have lower interest rates than the less developed (France and Scotland), which in turn had lower interest rates than the colonies. He draws the conclusion that the average rate of profit in a country is mainly a function of its level of development.[4]

Smith seems to argue this is a result of intensifying competition leading to rising wages:

> The increase of [capital] stock, which raises wages, tends to lower profit. When the stocks of many rich merchants are turned into the same trade, their mutual competition naturally tends to lower its profit; and when there is a like increase of stock in all the different trades carried on in the same society, the same competition must produce the same effect in them all.[5]

On the other hand, Smith also thinks that the end result of this process would be a combination of *low* wages and low profits:

> In a country which had acquired that full complement of riches which the nature of its soil and climate, and its situation with respect to other countries allowed it to acquire; which could, therefore, advance no further, and which was not going backwards, both the wages of labour and the profits of stock would probably be very low.[6]

Here he instead seems to explain falling profits in terms of a limit to the level of a country's development imposed by a combination of its natural conditions and its competitive position.

Ricardo takes up these same themes but combines them into a more coherent explanation (if still an implausible one). He argues the rate of profit tends to fall because of declining marginal productivity in agriculture: a higher population requires more food, which requires agriculture

[4] Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, vol. 1, bk. I, chap. IX.
[5] Ibid.
[6] Ibid.

to expand to cover less fertile land. This pushes up the labour time required to produce the food and clothing needed by workers, which pushes up wages, pushing down the rate of profit. While, for him, this downward “gravitation” of the profit rate is checked by technological improvements in agriculture and manufacturing, the overall tendency is nevertheless downwards.[7]

He expresses the same concern as Smith over where this process will lead:

> The farmer and the manufacturer can no more live without profit than the labourer without wages. Their motive for accumulation will diminish with every diminution of profit, and will cease altogether when their profits are so low as not to afford them an adequate compensation for their trouble.[8]

Ricardo calls this the ‘stationary state’. For him, invoking its spectre has a political purpose: to argue that the English state cannot afford its system of poor relief.[9]

For JS Mill, the invocation of the stationary state has a slightly different political purpose. He argues an end to accumulation will naturally eliminate some of the nastier aspects of capitalism: it promises an end to the “trampling, crushing, elbowing, and treading on each other's heels” associated with striving for wealth. Whereas “[h]itherto it is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being”, a combination of laws limiting inheritance rights, policies restricting population growth and an end to the accumulation of capital promises a world in which “industrial improvements would produce their legitimate effect, that of abridging labour”.[10]

[7] Ricardo, *The Principles of Political Economy and Taxation*, chap. VI.
[8] Ibid.
[9] Ibid., chap. V.
[10] Mill, *Principles of Political Economy*, bk. IV, chap. VI.

Marx's Contribution and his Crisis Theory

Marx does not conduct his own empirical investigation into movements in the rate of profit, and it seems unlikely he would have had access to much better data than Smith if he had tried.[11] His critique of the classicals concerns *why* the rate of profit falls, and what this implies about the stability of capitalist social relations.

The most counter-intuitive aspect of Marx's LTFRP is that increasing productivity tends to *lower* the rate of profit. This seems particularly strange if we assume no change in real wages, as both Ricardo and Marx did. Surely increases in productivity should make it cheaper to produce the commodities that make up the real wage, tending to increase the rate of profit? As mentioned, Ricardo acknowledges that this is true in manufacturing, but retreats to the implausible position that not only does productivity in agriculture decline over time, but that the effect this has on the labour time required to produce each workers' means of consumption is larger than the effect of increasing productivity in manufacturing.

Marx, on the other hand, argues that the development of industry *does* tend to reduce the labour time required to reproduce labour power, *and* to increase the ratio of surplus value to productive workers' wages. He calls this 'the production of relative surplus value'.[12] But he points out, against Ricardo, that the ratio of profits to wages is not the only determinant of the rate of profit.[13] The rate of profit is the ratio of profits to the *whole* of the capital advanced by the capitalist, including the cost of raw materials, machinery, structures and equipment ('constant capital'), and not just outlays on wages ('variable capital').

[11] Though he does investigate movements in the interest rate further, e.g. Marx, *Capital III*, 1981, 684.
[12] Marx, *Capital I*, 429–491.
[13] Marx, *Grundrisse*, bk. VII, p. 753.

As capital accumulates, Marx famously argues there is a tendency for the stock of constant capital to grow faster than variable capital. Because the only source of profit is surplus value, and because surplus value is only produced by workers (who are employed in numbers proportional to capitalists' spending on wages) there is a tendency for the rate of profit to fall over time.[14] In this way, Marx takes a premise which he shares with classical political economy – that labour is the only source of new value – and shows how it leads to a better explanation for falling profit rates; replacing what he calls Ricardo's retreat into 'organic chemistry' with an analysis of how capital accumulation unintentionally changes social relations. Marx attaches great significance to this explanation. In the Grundrisse, he calls it "the most important law of modern political economy, and the most essential for understanding the most difficult relations" because it can explain why economic crises must necessarily recur under capitalism.[15]

The classical political economists did not identify the link between the falling rate of profit and economic crises. Like the neoclassicals today, they subscribed to versions of the dogma that the market is inherently self-correcting and harmonious. The most well-known of these has become known as "Say's Law": the idea that "supply creates its own demand", as Keynes summarised it.[16] Ricardo holds a soft version of this doctrine, which leads him to rule out the possibility of any prolonged general inability to sell output.[17] In its hardest version, "Say's Law" can be taken to mean that because every purchase is also a sale, total purchases must always be equal to total sales – and therefore even momentary crises are impossible.

Marx's critique of Say's Law is the starting point for his analysis of crises. He points out that although it is true that every purchase for one person is a sale for another, every transaction is

[14] Marx, *Capital III*, 1981, 317–338.
[15] Marx, *Grundrisse*, bk. VII, p. 749.
[16] Keynes, *General Theory of Employment, Interest and Money*, 18–19.
[17] Ricardo, *The Principles of Political Economy and Taxation*, chap. 21.

an exchange of a commodity *for money* (excluding barter). During a crisis, the immediate problem is that there are many who want to exchange their commodities for money ('sellers'), but relatively few who want to exchange their money for commodities ('buyers'). That is, people hold onto their money, and unsold commodities pile up. As Marx stresses, this is only a *description* of what a crisis is: it only shows that "the possibility of crises" is inherent in the form of the commodity. It does not say *why* they occur.[18]

At the next level of concreteness, Marx argues

> the ultimate reason for all real crises always remains the poverty and restricted consumption of the masses, in the face of the drive of capitalist production to develop the productive forces as if only the absolute consumption capacity of society set a limit to them.[19]

This looks like evidence that Marx is an 'underconsumptionist': i.e., that he thinks the cause of crises is low wages. But as Marx understood, "the poverty and restricted consumption of the masses" is a *permanent* feature of capitalism, and does not explain why reproduction sometimes proceeds more or less 'smoothly', and at other times collapses into crisis.

Like the critique of Say's Law, the masses' restricted consumption explains one of the conditions that makes crises *possible* under capitalism. During a crisis, there are too many sellers and not enough buyers, so commodities pile up unsold, and factories go idle. At such moments, production and consumption fall well short of the 'absolute consumption capacity of society'. If *that* set the only limit to the development of the productive forces, there would be no crisis. Here Marx is polemicising against the view that such crises are due to an *absolute* excess of

[18] Marx, *Capital I*, 208–209.
[19] Marx, *Capital III*, 1981, 615.

productive capital (i.e., an excess relative to need), rather than an excess in relation to the *capacity* and (for the wealthier) *willingness* to buy output.

In *Capital* II, where Marx examines the reproduction process in most detail, he forcefully repudiates underconsumptionism:

> It is a pure tautology to say that crises are provoked by a lack of effective demand or effective consumption. The capitalist system does not recognise any forms of consumer other than those who can pay, if we exclude the consumption of paupers and swindlers. The fact that commodities are unsaleable means no more than that no effective buyers have been found for them, i.e. no consumers (no matter whether the commodities are ultimately sold to meet the needs of productive or individual consumption). If the attempt is made to give this tautology the semblance of greater profundity, by the statement that the working class receives too small a portion of its own product, and that the evil would be remedied if it received a bigger share, i.e. if its wages rose, we need only note that crises are always prepared by a period in which wages generally rise, and the working class actually does receive a greater share of the part of the annual product destined for consumption. From the standpoint of these advocates of sound and 'simple' (!) common sense, such periods should rather avert the crisis. It thus appears that capitalist production involves certain conditions independent of people's good or bad intentions, which permit the relative prosperity of the working class only temporarily, and moreover always as a harbinger of crisis.[20]

Marx's *own* crisis theory is the LTFRP. Whereas bourgeois political economy tended to see the declining rate of profit as a gradual slide into stasis, Marx argues it is an unstable process that brings about its own negation. To show why, he considers an extreme, hypothetical case of an "absolute overproduction of capital"; a situation in which "no further additional capital could be employed for the purpose of capitalist production", i.e., to produce additional surplus value. At this point any new capital must compete for a share of a fixed or even declining mass of profits.

[20] Marx, *Capital II*, 1978, 486–487.

This would happen when the working population could not supply any more labour time (full employment) and the rate of surplus value could not be increased in the short-term (as Marx points out, these two conditions go together: if there is full employment then it is difficult for capitalists to push down wages). Again, note that Marx is considering an extreme case for illustrative purposes: in reality, absolute full employment never happens under capitalism.[21]

The full employment assumption implies that the new capital can only begin to operate by employing existing workers, meaning that "one portion of the capital would lie completely or partially idle". For the old capital, this would mean a decline in the mass of surplus value appropriated, since some of the fixed mass of surplus value is now appropriated by the new capital. That is, "[t]he valorization of the old capital would have experienced an absolute decline". Marx argues "this kind of actual devaluation of the old capital would not take place without a struggle" over which portion of the existing capital is to lie idle. The resolution of the crisis, and the return to a "'healthy' movement of capitalist production" then depends on the *devaluation* of capital restoring the rate of profit (a process which is the focus of Chapter 2). Marx also discusses how the stagnation in production associated with the crisis leads to unemployment, declining wages and hence a rising rate of surplus value. This "prepares the ground for a later expansion of production – within the capitalist limits."[22]

Farjoun and Machover provide an alternative but complementary account of the link between the falling rate of profit and economic crises. They point out that because the tendency for the rate of profit to equalise across industries and enterprises is never realised completely in practice, there will always be variation in the rates of profit made by different firms. This means that when the average rate of profit falls, some firms' rates of profit may become negative, or

[21] Marx, *Capital III*, 1981, 360.
[22] Ibid., 360–364.

at least fall low enough that they cannot meet payments on their debt. This creates the possibility of a credit crisis, a slump in investment, and / or a recession.[23]

The Significance of the LTFRP

This link between the falling rate of profit and economic crises is a crucial aspect of Marx's historical materialism, and one that has been under-appreciated by Marxists. In the *Grundrisse*, Marx argues this explanation of crisis makes the LTFRP "the most important law from the *historical* standpoint" because it explains how capitalism becomes a fetter on the further development of the forces of production:

> The growing incompatibility between the productive development of society and its hitherto existing relations of production expresses itself in bitter contradictions, crises, spasms. The violent destruction of capital not by relations external to it, but rather as a condition of its self-preservation, is the most striking form in which advice is given it to be gone and to give room to a higher state of social production.[24]

In his *Law of the Accumulation and Breakdown*, Henryk Grossman explains how the falling rate of profit expresses this contradiction quite directly. Under any mode of production, the development of human productivity can be expressed by the quantity of means of production, M, set in motion by the expenditure of each unit of human labour power, L. Under capitalism, this growth takes the specific form of a growth in the value composition of capital (the ratio of c to v). According to Marx's law, it is precisely growth in this ratio which pushes down the rate of profit and necessitates a crisis: i.e., it is precisely capitalism's success at developing human productivity which brings its continued reproduction into crisis.[25]

The LTFRP is also the basis for an argument in favour of socialism. Without it, we can still observe from experience that economic crises have been a recurrent feature of capitalism, as Marx and

[23] Farjoun and Machover, *Laws of Chaos: A Probabilistic Approach to Political Economy*, 163–166.
[24] Marx, *Grundrisse*, bk. VII, pp. 749–750. Emphasis added.
[25] Grossman, *Law of the Accumulation and Breakdown*, introduction.

Engels do in the Manifesto.[26] But this does not explain whether they will occur in the future, or how this might be prevented. If, for example, the real cause of a particular crisis is not the falling rate of profit, but low wages, this suggests that the crisis could be overcome on terms favourable to the working class if it fought for higher wages alone. Similarly, if the underlying cause is financial speculation, the solution to the crisis is to reform the financial system. In both cases, the fight for socialism becomes a kind of 'added extra': a fight which may be worth pursuing for moral reasons, but which is not necessary in order to avert future crises and allow for the unfettered development of the productive forces. As Grossman puts it, "we abandon the materialist basis of a scientific argument for the necessity of socialism, the deduction of this necessity from the economic movement".[27]

Moreover, the LTFRP is part of the argument for a *revolutionary* socialist strategy. First, it is necessary to say that the argument for revolution does not depend on whether there is a tendency of the rate of profit to fall. Regardless of the level of the profit rate, the smashing of the capitalist state apparatus is a necessary condition for a socialist transformation of society, in order to eliminate the most important coercive mechanism standing behind the reproduction of capitalist social relations.[28] However, the most important 'non-coercive' mechanism through which capitalist social relations are reproduced today is the pressure to make a profit. If profit rates are high, this can suggest a certain 'breathing space' exists for reforms to be won within the system. For example, it suggests that there is plenty of surplus value available for a left wing government to appropriate and spend on improving workers' living standards and nationalising the means of production. It also suggests that state- or worker-controlled industries could co-exist with other capitalist firms without coming under strong pressure to increase productivity

[26] Marx and Engels, *Manifesto of the Communist Party*, sec. 1.
[27] Grossman, *Law of the Accumulation and Breakdown*, chap. I.
[28] Marx, *The Civil War in France*, sec. "The Paris Commune"; Lenin, *The State and Revolution*.

and keep wages low, because their margins would be large enough to accommodate this. But if the average profit rate is low, this suggests that such changes either would be impossible, or, if they were implemented, that they would throw the capitalist economy into crisis. In other words, it suggests that major reforms won by the workers' movement would not last long while capitalism continues to exist.

Sadly, the workers' movement is currently a long way from facing such strategic dilemmas, so their relevance can seem limited. It can also be tempting to think that the political and moral arguments for revolution will suffice, without the need for their economic counterpart. The Bolsheviks, for example, led a workers' revolution without a clear understanding of the tendency of the rate of profit to fall or value theory. But after they took power this was a significant liability. For example, with the isolation of the revolution there was an extensive debate over how long they would need to 'hold out' before the next crisis hit the advanced economies, which would have benefitted from a better understanding of the LTFRP. [29]

Crisis theory is also intimately related to Marxist theories of imperialism. In the early 20th century, arguments over political economy often took the form of a contest between underconsumptionist theories (e.g. Kautsky, Luxembourg, Varga and Stalin) and theories that began from the unevenness and disproportionality of capitalist development (e.g. Hilferding and Trotsky); and the various theories of imperialism constructed at this time were formed on variations of either of these foundations.[30] A better understanding of *Marx's* crisis theory and movements in the rate of profit may prove a more fruitful starting point for a contemporary Marxist theory of imperialism.

[29] Day, *The Crisis and the Crash*.
[30] Ibid., 1–39.

If used properly, an analysis of movements in profit rates is also perennially important for understanding the *current* state of the capitalist economy and how it is likely to change: that is, for developing *perspectives*. Even for small groups of socialists, political activity that is informed by accurate perspectives is much more likely to be well-directed and successful.

Interpreting Marx's Law

There is debate over what Marx means by a 'tendency' for the rate of profit to fall. This debate is important, because in order to test *Marx's* law, we must first accurately interpret it.

Essentially there are three positions. The most widely held is the simplest: that Marx's law predicts that, over the long term, the average rate of profit will tend to fall. Most versions of this interpretation allow for some variation in the rate of profit over the short-term.

In one of the first attempts to test the law using statistical data, Gillman adopts this position. He argues that Marx distinguishes between cyclical movements in the rate of profit, which can be caused by a range of factors, and a long term 'secular decline', to which the law refers. According to Gillman, this is how, for Marx, the law is supposed to explain why economic crises not only occur and recur, but tend to intensity over time.[31]

Anwar Shaikh adopts a similar interpretation. He proposes a tendency for what he calls the 'basic' rate of profit to decline over the history of capitalism. His 'basic' rate of profit is what the rate of profit would be if fixed assets were used at full capacity. He argues that this basic rate will fall even during boom years.[32] This is a potentially interesting hypothesis, but Shaikh does

[31] Gillman, *The Falling Rate of Profit*, 5–6.
[32] Shaikh, "The Falling Rate of Profit as the Cause of Long Waves: Theory and Empirical Evidence," 176–179.

not demonstrate that it is an implication of *Marx's* LTFRP; which, as we will see below, incorporates the claim that the rate of profit recovers after crises.[33]

Sweezy also adopts the secular decline interpretation of the law, but argues that Marx fails to show that this would occur in practice. In particular, he argues that Marx never manages to show why a rising rate of surplus value could not prevent the rate of profit from falling over the long term. Another way of putting his point is that Marx failed to show that increases in the rate of surplus value are a mere counteracting factor and not the over-riding *tendency*.[34]

Heinrich has recently revived a version of this argument, but goes one step further. He argues that, for Marx, "the increase in the rate of surplus-value as a result of an increase in productivity is not one of the 'counteracting factors', but is rather one of the conditions under which the law as such is supposed to be derived." So, according to Heinrich, even if we grant Marx the assumption that the counteracting tendencies have no effect, Marx still failed to show that "in the long term… the rate of profit must fall". We will address this criticism below.[35]

In their polemic against Heinrich, Kliman et. al argue that this objection is based on a misinterpretation of Marx's law. They argue that Marx's law "is not a *prediction* of what must inevitably happen, but an *explanation* of what does happen".[36] Specifically, they argue Marx's law says that

> *the capitalist mode of development of the forces of production – accumulation of capital accompanied by labour-saving technical change that increases productivity – is the dominant cause, in the long run, of the fall in the rate of profit*. The rate of profit falls only under particular circumstances, and it can fall for other reasons, such as rising wage

[33] Mage also subscribes to the secular decline interpretation: Mage, "The 'Law of the Falling Tendency of the Rate of Profit': Its Place in the Marxian Theoretical System and Relevance to the US Economy," 111.
[34] Sweezy, *The Theory of Capitalist Development*, 101–105.
[35] Heinrich, "Crisis Theory, the Law of the Tendency of the Profit Rate to Fall, and Marx's Studies in the 1870s."
[36] Kliman et al., "The Unmaking of Marx's Capital," 4.

> rates, but if and when it does exhibit a long-term decline, the capitalist mode of development of the forces of production is the dominant cause of that decline.[37]

This turns the secular decline interpretation on its head. According to this interpretation, rather than predicting that the rate of profit will fall in the future, Marx's law *as such* explains why the rate of profit falls *in the case that* it falls. It follows that if the rate of profit rises this does not count as evidence against this version of 'Marx's law'. Periods of a rising rate of profit would simply be outside the domain of explanation of the law as such. If we wanted to find evidence to try to refute this version of 'Marx's law', we would have to find cases in which the rate of profit exhibits a 'long-term decline', but establish that it fell for some reason other than the accumulation of capital accompanied by labour saving technical change.

Thus on Kliman et al.'s interpretation, Marx's LTFRP is a much less ambitious hypothesis than it is usually understood to be. As Carchedi and Roberts point out, it says precisely nothing about whether economic crises are likely to continue to occur under capitalism (let alone worsen), because it says nothing about whether the rate of profit is likely to fall in future.[38] Based on other work they have published, Kliman and Freeman clearly also do believe that recurrent crises *are* likely under capitalism, and that the rate of profit *is* likely to fall, but according to their interpretation these are not predictions of Marx's 'law as such'.[39]

In response to this interpretation, it is first necessary to point out that whether or not Marx's law *itself* incorporates a prediction, Marx *does* say, more than once, that the rate of profit *actually tends to fall*. For example, after presenting a numerical example in which the rate of profit falls as the ratio of constant to variable capital rises, Marx says "[t]he hypothetical series

[37] Ibid., 5, their emphasis.
[38] Carchedi and Roberts, "A Critique of Heinrich's, 'Crisis Theory, the Law of the Tendency of the Profit Rate to Fall, and Marx's Studies in the 1870s'."
[39] Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession*; Freeman, "The Profit Rate in the Presence of Financial Markets: A Necessary Correction," 2012.

we constructed at the opening of this chapter therefore expresses the actual tendency of capitalist production”.[40] He also says: “[a]s the capitalist mode of production develops, so the rate of profit falls, while the mass of profit rises together with the increasing mass of capital applied”.[41] Moreover, Marx *must be* committed to the proposition that the rate of profit tends to fall over at least some time period if it is to be a useful basis for a theory of crises. So, whether or not we consider this proposition part of what they call the ‘law as such’, it needs to be true for their ‘law as such’ to have any relevance. It is therefore difficult to understand why Kliman et al. attach so much importance to this particular interpretative issue.

Moreover, if Marx *had* wanted to insist that the claim that the rate of profit actually tends to fall is not a part of his law of the tendential fall in the rate of profit, then surely he would have explained this quite specific use of language very carefully and transparently, even when writing a draft manuscript. The fact that he does not do so strongly favours the interpretation that the law itself incorporates the prediction that the rate of profit actually tends to fall.

However, there is also the question of the length of time over which the law applies. Reuten and Thomas argue Marx does not advance a single, coherent position on this question. In the *Grundrisse*, they argue Marx holds the position that the rate of profit falls over the long term, which they see as a ‘naturalistic’ inheritance from classical political economy. Later, especially in the manuscripts that become *Capital* III, they argue Marx adopts a cyclical interpretation: that the rate of profit falls in the lead up to crises, and rises afterwards. They even suggest Marx could have replaced the name he himself chooses for his law in Volume 3 (‘the law of the tendential fall in the rate of profit’) with the ‘theory of the rate of profit cycle’.[42]

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[40] Marx, *Capital III*, 1981, 318.
[41] Ibid., 356.
[42] Reuten and Thomas, “From the ‘Fall of the Rate of Profit’ in the Grundrisse to the Cyclical Development of the Profit Rate in Capital.”

As we have seen, there is nothing 'naturalistic' about Marx's position in the *Grundrisse*; it is precisely in the *Grundrisse* that Marx develops an explanation for the falling rate of profit in terms of social relations and pours scorn on Ricardo's retreat to 'organic chemistry'.

Reuten and Thomas' claim that Marx 'reformulates' his law is similarly thin. In fact, in both the *Grundrisse* and *Capital* III, it is clear that Marx thinks there is both a tendency for the rate of profit to fall as capitalism develops, *and* that there is a cyclical movement. As Reuten and Thomas acknowledge, the idea that crises allow the rate of profit to recover by devaluing capital is already present in the *Grundrisse*, alongside the idea that the rate of profit nevertheless tends to fall in the long term:

> These contradictions, of course, lead to explosions, crises, in which momentary suspension of all labour and annihilation of a great part of the capital violently lead it back to the point where it is enabled [to go on] fully employing its productive powers without committing suicide. Yet, these regularly recurring catastrophes lead to their repetition on a higher scale, and finally to its violent overthrow.[43]

In *Capital* III Marx repeats both positions. In the sections discussing the law itself, it is true that he focuses on the cyclical movement:

> The devaluation of the elements of constant capital, moreover, itself involves a rise in the profit rate. The mass of constant capital applied grows as against the variable, but the value of this mass may have fallen. The stagnation in production that has intervened prepares the ground for a later expansion of production – within the capitalist limits.
>
> And so we go round the whole circle once again.[44]

But elsewhere in the Volume 3 manuscripts he maintains the position that the rate of profit tends to fall with the development of the productive forces. Note also that Marx refers to the rate of profit in a single country:

[43] Marx, *Grundrisse*, bk. VII.
[44] Marx, *Capital III*, 1981, 363–364.

> Since we have seen that *the level of the profit rate stands in inverse proportion to the development of capitalist production*, it follows that the higher or lower rate of interest in a country stands in the same inverse proportion to the level of industrial development, particularly in so far as the variation in the rate of interest expresses an actual variation in the profit rate.[45]

Are these two positions consistent? First note that the passage immediately above is not exactly equivalent to a 'declining trend' position. The development of capitalist production does not necessarily proceed in a linear fashion in a single country over time. Even on a world scale, the development of the forces of production can stagnate due to economic slumps or could even, in theory, be sent backwards for a time. But as long as the development of the productive forces *does* recover the rate of profit should have a tendency to fall over the long term, according to Marx's formulation.

A possible problem with this position is that, as Kliman argues, a severe crisis could in theory devalue so much capital that afterwards the rate of profit rises to a new high.[46] If this did not coincide with the physical destruction of the forces of production (or, at least, if it did not coincide with very much destruction), then both the rate of profit and the level of capitalist development might reach all-time highs after the crisis. Then, even if the profit rate recommenced its 'ordinary' rate of decline, this may not lead to a falling trend over the long term. Another crisis might then be triggered that allowed the rate of profit to recover to a level up to or exceeding the previous high. Under such a scenario, the rate of profit rate might indeed

[45] Ibid., 481, emphasis added. This passage was not added into *Capital* III by Engels, it comes directly from the original manuscript:
"Da man gesehn, daß die Höhe der Profitrate in umgekehrtem Verhältniß zur Entwicklung der capitalistischen Production steht, folgt daher, daß höhrer oder niedrer Zinsfuß in einem Lande dasselbe umgekehrte Verhältniß zum Stand der industriellen Entwicklung hat – so weit die Verschiedenheit des Zinses wirklich Verschiedenheit der Profitrate ausdrückt." Marx and Engels, *Karl Marx Friedrich Engels Gesamtausgabe II (MEGA II)*, II, 4.2:432–433.
[46] Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession*, 25–26.

move in a cycle with no secular trend, or even have an upward trend. We will deal with this objection in the next chapter.

In any case, there is no *inconsistency* between Marx's positions that the rate of profit tends to fall as capitalism develops and that devaluation causes it to move cyclically. Together, they imply a 'downward spiral' interpretation of Marx's law. This is the version of the law this thesis will test.

Though both are testable propositions, the cyclical movement is easier to investigate, because it does not require data stretching across the whole history of capitalism. Note that Marx's theory does not predict just *any* cyclical movement in the rate of profit; it predicts that the rate of profit will fall in the lead up to crises, and recover with the destruction or devaluation of capital.[47] Arguably this is the most important aspect of Marx's law, because it forms the most immediate basis for his explanation of crises. So the main focus of the thesis will be on testing this proposition. However, Chapter 7 also uses less reliable data to investigate whether there is a long-term downward trend in the rate of profit, and whether this is also reflected in a long-term tendency for the rate of interest to decline.

In both cases we will look at US data only. This is mainly to keep the scope of the thesis manageable. But it also raises the question of whether Marx's law applies to the rate of profit in a single country. Some argue that, in theory, Marx's law applies to the average rate of profit across the world as a whole.[48] Estimates of the average rate of profit in a single country would therefore only express the effects of Marx's law imperfectly.

[47] As is discussed in Chapter 5, this must also be distinguished from Marx's theory of the business cycle, which covers a shorter time period.
[48] Roberts, "A World Rate of Profit."

However, in his list of counteracting factors, Marx includes 'foreign trade'.[49] We also saw above that Marx himself refers to the relationship between the rate of profit and the level of development in a single country. This raises some difficult questions which Marx does not address: to what extent do rates of profit equalise across borders? How do we account for international transfers of surplus value? Chapter 4 discusses these a little further, but they cannot be addressed properly in the context of a study of the average rate of profit in the US alone.

Criticisms of the Law

Indeterminacy

As mentioned, Sweezy and Heinrich object that Marx does not conclusively demonstrate that the effect of the rising organic composition of capital will tend to outweigh the effect of the rising rate of surplus value. At various stages in his argument it is true that Marx assumes away the effect of the rising rate of surplus value, in order to focus on other aspects of movements in the profit rate.[50] But elsewhere in *Capital*, especially in Volume 1, Marx argues there is a tendency for the rate of surplus value to rise.[51] Moreover, it is important for Marx to at least show that it is *probable* that the effect of the rising organic composition of capital will outweigh the effect of a rising rate of surplus value, otherwise there is no basis for his prediction that the rate of profit tends to fall.

Although it is not developed at length, Marx sets out the essentials of this argument. Whereas, in previous examples, Marx has assumed that the rate of surplus value is constant, in the section of Volume 3, Chapter 15 ('Development of the Law's Internal Contradictions') headed 'The Conflict Between the Extension of Production and Valorization', he points out that "the

[49] Marx, *Capital III*, 1981, 344–347.
[50] Ibid., 318.
[51] Marx, *Capital I*, 429–636.

development of productivity… takes a double form – firstly, there is an increase in surplus labour, i.e. a shortening of necessary labour-time, the time required for the reproduction of labour-power; secondly, there is a decline in the total amount of labour-power (number of workers) applied to set a given capital in motion."[52] The first is what Marx calls the production of relative surplus value, the second is an expression of the rising value composition of capital. He argues their combined effect on the rate of profit will be the following:

> In so far as the development of productivity reduces the paid portion of the labour applied, it increases surplus-value by lifting its rate; but in so far as it reduces the total quantity of labour applied by a given capital, it reduces the number by which the rate of surplus-value has to be multiplied in order to arrive at its mass. Two workers working for 12 hours a day could not supply the same surplus-value as 24 workers each working 2 hours, even if they were able to live on air and hence scarcely needed to work at all for themselves. In this connection, therefore, the compensation of the reduced number of workers provided by a rise in the level of exploitation of labour has certain limits that cannot be overstepped; this can certainly check the fall in the profit rate, but it cannot cancel it out.[53]

To understand this argument, we first need to explain what Marx means by 'a given capital'. When explaining movements in the average rate of profit, Marx often considers what they would mean for a single, representative capital of value 100 with an average value composition of capital, average rate of surplus value and average rate of profit. Above, Marx considers what happens when the number of workers employed by this average, given capital falls from 24 to 2: i.e., if the ratio of capital advanced to workers grows 12 times larger. In this case, Marx points out that even if we assume each worker initially produces only two hours of surplus value each day, implying a very low initial rate of surplus value, this still gives a total of 48 hours surplus labour. Unless they did not need to eat or sleep, there is no way that two workers could ever

[52] Marx, *Capital III*, 1981, 355.
[53] Ibid., 355–356.

supply that much surplus labour. Even if they worked 12 hours a day and 'lived on air' (i.e., earned zero wages, implying an 'infinite' rate of surplus value), they would still only supply 24 hours of surplus labour, and the rate of profit would fall by half.

The underlying reason for this is, as Marx says, that the ratio of capital advanced to hours worked can rise indefinitely, whereas the surplus value that a given worker can supply in a day has absolute limits. Shaikh shows that this means "[f]or *any* combination of rates of rise of *s/v* and *C/l* [where *'l'* is employment], one can easily show that the basic rate of profit [i.e., the ROP assuming full capacity utilisation] will inevitably fall".[54]

This does not *guarantee* that the rate of profit will fall over any given time period. If we assumed a sufficiently slow rate of increase in the ratio of capital advanced to workers, then a rising rate of surplus value could make possible a rising rate of profit over 100 years, 500 years, or any time period we choose, with the inevitable fall coming afterwards. But Marx clearly comes to the reasonable conclusion that such cases are unlikely to occur in practice: i.e., that the rate of profit will tend to fall over time periods that are relevant.[55]

Similarly, there is no *guarantee* that the ratio of capital advanced to workers will increase over time. Marx conjectures that it will, but he acknowledges 'counteracting factors'. In particular, as will be discussed in Chapter 3, the effects of the cheapening constant capital due to technical progress and the shortening turnover time of variable capital tend to push up the rate of profit; and again, in the abstract, we could construct examples in which this outweighs the effect of a rising OCC.

[54] Shaikh, "The Falling Rate of Profit as the Cause of Long Waves: Theory and Empirical Evidence," 177–178.
[55] Marx, *Capital III*, 1981, 341–342.

But again, the fact that Marx never *proves* that the effect of the rising OCC must generally outweigh these counteracting factors does not imply that movements in the rate of profit are 'indeterminate'. It is impossible to prove, *a priori*, that the rate of profit *must* fall over any given period. All Marx could establish was that it was *likely* that the tendency of the rate of profit to fall explained crises in the past, based on the combination of the limited evidence available to him and his own attempt to understand the most important tendencies of capitalist development; and that it was *likely* that this would lead to future crises.

Indeed, this is all we can reasonably expect from practically *any* proposition in the social sciences. If it were possible to predict the future with certainty there would be no point in doing so. Ultimately, then, the validity of the law can only be decided with reference to statistical evidence. However, this evidence must be arranged and interpreted in a fashion as consistent as possible with Marx's system. The next criticism we will consider concerns that system as a whole.

The Transformation Problem

As mentioned above, the transformation problem has done considerable damage to the credibility of Marx's value theory, on which the LTFRP is based. It has also spawned an enormous literature. Here we will confine ourselves to outlining the problem itself, and discussing how the allegations of internal inconsistency made against Marx's solution to it have been shown to be false.

A version of the transformation problem is implicit in Ricardo, and Marx examines it in *Theories of Surplus Value*.[56] The general problem is how to reconcile the idea that labour is the source of value with the equalisation of profit rates across firms and industries.

[56] Marx, *Theories of Surplus Value*, 249–250.

For *Marx's* value theory, the problem takes the following specific form. The value of a commodity is the socially necessary labour time (SNLT) necessary to produce it. Capitalists are able to make profits because one particular kind of commodity – human labour power – can produce more value than it costs to reproduce and purchase. Workers also need material to work with. This is the product of past human exertion (what Marx calls 'dead labour') combined with natural resources. Marx argues that these materials only pass on the value of the SNLT that they embody – they do not create new value. So the only source of surplus value is 'living labour': i.e., the new productive labour performed over a given period.

If labour values directly determined prices, as Marx mostly assumes in *Capital* I, and the surplus value produced by workers in each branch of industry therefore directly determined profits in that branch, then branches with a below average ratio of constant to variable capital would make above average rates of profit. However, if this were true in practice, the situation would not last long. Seeing the above average rates of profit on offer, capitalists would focus their new investments on branches with relatively low compositions of capital, and output in these branches would therefore grow relatively fast. At prices equal to values this would lead to an oversupply of the commodities produced by these branches, and these capitalists would be forced to lower their selling prices, while the reverse would be true in branches with relatively high value compositions. This means there is a tendency for prices to move towards levels at which they equalise rates of profit across branch. Marx calls these 'prices of production'.[57]

Marx illustrates the problem using a numerical example. He assumes five different branches of production, each with different compositions of capital, but with the same rate of surplus value. His first two tables show that, if commodities sell at prices equal to their values, then the

[57] Marx, *Capital III*, 1981, 241–253.

branches with higher compositions of capital will earn lower rates of profit than branches with lower compositions.[58]

Then he shows how this situation would be altered if the total surplus value were instead distributed among branches such that their rates of profit were equal. In this case, the commodities produced by the capitals of higher than average composition would sell for prices higher than their values, and the commodities produced by the capitals of lower than average composition would sell for prices lower than their values; that is, these prices would effect a transfer of value from the lower composition capitals to the capitals with higher compositions. If actual prices are equal to these prices of production, then "[t]he various different capitals here are in the position of shareholders in a joint-stock company" – i.e., each capitalist appropriates profits in proportion to the capital they advance, and not profits equal to the surplus value produced by the workers they employ.[59]

In his numerical example, Marx takes the values of the capital advanced by each branch of production to be known data. Specifically, he assumes that inputs are purchased at their *values*, but outputs are sold at their prices of production. This solution to the transformation problem has been a constant source of controversy since it was published.[60] Here we will outline the strongest and most influential objection to it, that of Landislaus von Bortkiewicz, and how TSSI Marxists have refuted it.

Bortkiewicz's critique tries to show that Marx's transformation procedure suffers from 'internal contradictions', because it is incompatible with simple reproduction.[61] To do this, Bortkiewicz

[58] Ibid., 255.
[59] Ibid., 256–258.
[60] For histories of this controversy see Kliman, *Reclaiming Marx's Capital*, 41–54 and Freeman, "Trends in Value Theory since 1881."
[61] Bortkiewicz, "Value and Price in the Marxian System," 9.

relies on two false premises. The first is that Marx's example assumes simple reproduction. In fact Marx never says this, so technically Bortkiewicz's attempt to demonstrate internal contradictions falls at the first hurdle. Nevertheless, for Marx's transformation procedure to be valid generally, it should be possible to use it to construct examples that *are* compatible with simple reproduction, so we cannot dismiss the issue this easily.

Bortkiewicz's second false premise is the real source of the difficulties Marxists have had with the transformation problem. Under the influence of the emerging school of equilibrium economics, *Bortkiewicz* imposes the condition on *Marx's* procedure that input prices are equal to output prices. That is, he makes it a condition that prices do not change over time.

Taken together, these premises are equivalent to demanding that Marx's transformation procedure conform to the standards of an equilibrium model of prices. Bortkiewicz recognises that this is foreign to Marx's approach, which he sees himself as 'correcting':

> Marx always proceeds *arithmetically*: he assumes certain quantities to be known and deduces from them, by a series of successive operations, the unknowns which interest him…
>
> [T]he Marxian method rest[s] on an unfounded view of the character of economic relations. Alfred Marshall once said of Ricardo "He does not state clearly… how, in the problem of normal value, the various elements govern one another *mutually*, and not *successively* in a long chain of causation." This description applies even more to Marx…
>
> Modern economics is beginning to free itself gradually from the successivist prejudice, the chief merit being due to the mathematical school led by Léon Walras.[62]

However, there is no reason to consider Marx's successivist procedure a 'prejudice' in need of 'correction'. It simply amounts to the idea that one thing causes another in a temporal sequence:

[62] Ibid., 23–24.

that prices paid for inputs today will affect the prices and values of the output they are used to produce in the future.

It is in fact Bortkiewicz's alternative starting point that rests on an unfounded view of the character of economic relations. In reality, prices change over time. Imposing an equilibrium model of price and value determination onto this reality effectively implies that the prices and values of inputs today are *retroactively determined* by the prices and values of outputs produced and sold in the future. Bortkiewicz and other equilibrium theorists are entitled to construct models on this basis if they want to: after all, it is impossible to construct any theory without making some simplifying assumptions. However, they are *not* entitled to require that *Marx's* theory share their unrealistic abstraction, and declare it inconsistent for failing to do so. This is setting up and knocking down a straw man. As we will see, the (probably unintentional) genius of Bortkiewicz's article is that he not only makes his straw man look so convincing that even Marxists have confused it for the real thing, after knocking it down he kindly offers us a 'corrected' version which some Marxists decided to adopt.

This 'correction' is deeply flawed. By imposing the conditions that input prices are equal to output prices, and that input values are equal to output values, Bortkiewicz creates two separate systems of simultaneous equations: a value system and a price system. This makes the value of a commodity proportional to both the labour time spent producing it *and its constant capital inputs*, stretching back to inputs that are "wholly the result of direct labour".[63] It follows that the value of one commodity relative to another is in no way determined by the price system. From this starting point, it is only possible to maintain one of Marx's two aggregate equalities: that

[63] Ibid., 18.

the total price of output is equal to its total value, or that total profit is equal to total surplus value. Imposing both creates an internal inconsistency.

Bortkiewicz and many Marxists after him think this is a problem with Marx’s theory. In fact it only demonstrates that Marx’s theory is inconsistent with Bortkiewicz’s equilibrium approach. In other words, Bortkiewicz’s attempt to show that Marx’s *non*-equilibrium approach is *internally* inconsistent fails because it smuggles in Bortkiewicz’s own equilibrium assumption. There is also something quite arbitrary about the way in which Bortkiewicz relates his value system to his price system. Values do not do any real explanatory work: some aggregate of values is just deemed to be equal to some aggregate of prices. As Kliman observes, many 'solutions' to the transformation problem take just this form, often accompanied with textual evidence for why Marx thought that their favoured aggregate equality was more important than the others.[64]

When he republished Bortkiewicz's critique in English translation, Sweezy presented it as a vindication of Marx's theory. He argued that Bortkiewicz's purpose was to eliminate “relatively superficial errors … to show that the core of [Marx's] system was sound”.[65] The form of his ‘solution’ then became the basis for the simultaneous, dual-system interpretation that dominated Marxist economics for most of the 20th century, and still remains influential today.

For example, Anwar Shaikh and Ahmet Tonak base their detailed procedure for converting national accounts into Marxist categories on this type of interpretation. For Shaikh and Tonak, every commodity has a value and a price. Value is the number of average socially necessary labour hours that would be necessary to replace the commodity, and price is the amount of money paid for the commodity. Fixed constant capital passes on value based on its depreciation

[64] Kliman, *Reclaiming Marx’s Capital*, 160–161.
[65] Sweezy, “Editor’s Introduction,” xxviii–xxix.

rate multiplied by the number of labour hours it would take to replace it under current technology. For them, unlike Marx, value is always measured in labour hours (or weeks, years etc.), and price in currency.[66]

Under this interpretation, the transformation problem is presented as an empirical question: to what extent is there variation in prices that is not explained by variation in values? There is no other way to present the problem, since their system of values is not even scaled such that some aggregate of values is equal to some aggregate of prices: the two systems are measured in different units, and are completely separate. Thus they cite studies that find that price and value magnitudes have small absolute average deviations (12% or less) and high correlations, and argue that this demonstrates that the transformation problem is not empirically significant.[67]

But this bears little relationship to Marx’s theory. First, as discussed above, the starting point of Marx's transformation procedure is that individual prices do diverge from values, and profits diverge from surplus value for individual capitals, because there is a tendency for rates of profit to equalise across capitals with unequal value compositions. For Marx, this was a real feature of capitalism worth investigating, not just a minor technical question. Shaikh acknowledges that he differs from Marx in this respect.[68]

Second, correlation is a measure of the extent to which two variables move together. Values and prices share a large quantitative component in common: cost price (or cost price and cost value for dual-system interpretations). In the controversies over the transformation of values into prices this is generally not disputed. So when we calculate the correlation between values and prices, we should *expect* it to be high, since a large part of the test is picking up on whether

[66] Shaikh and Tonak, *Measuring the Wealth of Nations*, 78–87.
[67] Ibid., 141–144.
[68] Ibid., 64.

both values and prices do in fact share this element. Effectively, this measure of correlation allows dual-system proponents to marshal the fact that cost price is a shared element as evidence for their theory, when in fact it is a proposition shared by almost every economic theory. Using two different methods to correct for this, Kliman finds no support for the hypothesis that value per dollar of cost explains variation in price – and, in one model, finds that including this variable (along with costs) actually reduces the predictive power of the model.[69]

This dual-system interpretation came under attack in the 1980s. The so-called 'New Interpretation' was one challenger. Under the 'old' dual-system interpretation, the price of labour power is the wage, while the value of labour power is the sum of the values of commodities bought by workers to reproduce their labour power. Foley, Duménil and others argue that in fact the wage is equivalent to *both* the value and the price of labour power.[70] This means that the total value of labour power purchased over a year (V) is equal to the wages bill. By then imposing the condition that the sum of surplus value (S) is equal to the sum of profit, the New Interpretation also gets the result that new value added (S + V) is equal to the total price of the net product. However, this is not the same as *Marx's* stipulation that the sum of the prices of *gross* output be equal to the sum of their values.

Single system interpretations take this same idea but apply it to *all* inputs, not just labour power. That is, they assume constant capital also passes on value to output based on its price and not its original value. The equality of the total value and total price of gross output then follows, along with the equality of total surplus value and total profit.

[69] Kliman, *Reclaiming Marx's Capital*, 200–201.
[70] Foley, "The Value of Money the Value of Labor Power and the Marxian Transformation Problem"; Duménil, "Beyond the Transformation Riddle."

For each individual commodity, however, its price can differ from its value. To understand why, we need to introduce the concept of the Monetary Expression of Labour Time (MELT).[71] This is usually calculated as the ratio of the total price of the net product to total employment or hours worked (though the next chapter discusses how this is modified under a temporalist interpretation). It therefore gives a measure of the value added by an 'average' hour of labour time.[72] The value of a commodity can then be defined as the cost of the inputs used up to produce it plus the product of the MELT and average *direct* labour time required to produce the commodity. In general this will be different from the commodity's price.

Single system interpretations have been produced in both temporalist and simultaneist variants, and both can be consistent with Marx's two aggregate equalities.[73] This shows that a single system interpretation of Marx's system can in fact deal with the special case in which inputs prices are equal to output prices: i.e., a single system interpretation does not rule out the possibility of equilibrium prices *a priori*. The distinctive feature of a *temporal* single system interpretation is that it does not impose this condition as an assumption. According to a temporalist approach, the value transferred by inputs is based on their price at the time production commences, whether or not this turns out to be equal to prices when outputs are produced.

One strong reason to prefer a temporalist approach is that, if we want a value theory that can explain crises, it does not seem very sensible to *assume* equilibrium. Another crucial advantage of the temporalist interpretation is that it is the only approach that is consistent with Marx's

[71] Ramos, "Labour, Money, Labour-Saving Innovation and the Falling Rate of Profit."
[72] Ideally this would be a measure of the value added by an hour of *socially necessary* labour time at the average skill level.
[73] For simultaneist versions, see Wolff, Roberts, and Callari, "Marx's (not Ricardo's) 'Transformation Problem'"; Lee, "Marx's Labour Theory of Value Revisited"; Moseley, "Marx's Logical Method and the 'Transformation Problem.'"

LTFRP, as will be discussed below. But there is also direct textual evidence for a TSSI. Shortly after presenting his transformation procedure, Marx anticipates Bortkiewicz's objection that he 'fails' to transform the value of inputs into prices of production:

> It was originally assumed that the cost price of a commodity equalled the value of the commodities consumed in its production. But for the buyer of a commodity, it is the price of production that constitutes its cost price and can thus enter into forming the price of another commodity. As the price of production of a commodity can diverge from its value, so the cost price of a commodity, in which the price of production of other commodities is involved, can also stand above or below the portion of its total value that is formed by the value of the means of production going into it. It is necessary to bear in mind this modified significance of the cost price, and therefore to bear in mind too that if the cost price of a commodity is equated the value of the means of production used up in producing it, it is always possible to go wrong. Our present investigation does not require us to go into further detail on this point. It still remains correct that the cost price of commodities is always smaller than their value. For even if a commodity's cost price may diverge from the value of the means of production consumed in it, this error in the past is a matter of indifference to the capitalist. The cost price of the commodity is a given precondition, independent of his, the capitalist's, production, while the result of his production is a commodity that contains surplus-value, and therefore an excess value over and above its cost price.[74]

This passage is usually seen as evidence of sloppiness on Marx's part: that he should have explored the implications of relaxing the assumption that the cost price is equal to the value of inputs used up to produce the commodity, but wrongly thought that this was not a significant issue. In retrospect we can say that if Marx *had* given a numerical example of this sort it would have saved Marxists a great deal of confusion. But in fact Marx does tell us enough to deal with the more general case. He tells us that the result of the capitalist's production "is a commodity that contains surplus-value, and therefore an excess value over and above its *cost price*". That is:

[74] Marx, *Capital III*, 1981, 264–265.

Value of the commodity = surplus value it contains + cost price.

This conception of surplus value is only consistent with a single system interpretation. According to a dual system interpretation, he *should* have said that the surplus value of a commodity is an excess over and above the *value of the commodities used to produce it*, i.e.:

> Value of the commodity = surplus value it contains + value of inputs (including labour power) used to produce it.

The passage above also supports the view that Marx was a temporalist. Marx tells us "[t]he cost price of the commodity is a given precondition, independent of his, the capitalist's, production". But if he were a simultaneist, then he should have said that the cost price of the capitalist's inputs is mutually determined with the price of outputs, and not a given precondition.[75]

Productivity Improvements and the Rate of Profit

This section surveys two related criticisms of Marx's explanation of the relationship between productivity improvements and the rate of profit. The first is a common intuitive objection to the LTFRP: if productivity improvements tend to lower the average rate of profit, then why would capitalists choose to introduce them? Marx addresses this issue. His answer is that even though, as a class, capitalists suffer a lower average rate of profit, the individual businesses that are first to introduce a cost-reducing technique benefit from what is now called a 'first mover advantage'. This is because, when the new technique is introduced, the price of output in that branch does not generally fall immediately to the price of production associated with the new technique. For a time, the first movers compete side-by-side with businesses using older, less productive techniques; meaning that, generally, the price of output will remain somewhere between the price of production determined by the older techniques and the price of production

[75] For more textual evidence in favour of a TSSI, see Kliman, *Reclaiming Marx's Capital*, 89–111.

determined by the new one.[76] This means the first movers can sell their output above (and potentially well above) their prices of production; so, for a time, they appropriate 'super profits'. These super profits are paid out of surplus value transferred from other businesses.

Note that Marx's explanation here fits easily with a successivist, dynamic approach: the incentive to introduce a new technique depends on there being a period in which profit rates are not equal and prices are not in equilibrium.[77] Moreover, if technological change is more or less continuous, it is likely that the 'second movers' will in fact be the 'first movers' to introduce another, still more productive technique when they come to replace their equipment. This would mean that, rather than equalising, each company's profit rate would trace something like the path of a competitor in a downhill leapfrog race: a downward trend punctuated by upward spikes.[78]

The second criticism will we consider is the Okishio Theorem. It claims to show that, assuming no change in the real wage, any technological change that lowers costs per unit cannot lead to a fall in the rate of profit. It will either lead it to increase or to stay the same.[79]

The problem with the Okishio Theorem is its definition of the rate of profit. It is defined such that input prices are equal to output prices: that is, in 'simultaneist' terms. But for any real economy, input prices are never simply equal to output prices. Changing prices are a feature of capitalism; and, crucially, of increases in productivity. It turns out that calculating the rate of profit as though input prices really *are* equal to output prices is equivalent to making an

[76] See Carchedi, *Frontiers of Political Economy*, 55–57 for a useful discussion of Marx's theory of price determination.
[77] Marx, *Capital III*, 1981, 373–374.
[78] Carchedi, *Frontiers of Political Economy*, 68–90. See Wells, 'The Rate of Profit as a Random Variable' for a comprehensive empirical study of the distribution of rates of profits.
[79] Okishio, "Technical Changes and the Rate of Profit."

accounting mistake that assumes away the very dynamic of a falling rate of profit followed by devaluation which Marx's law sets out to explain.

For example, suppose a cost-reducing productivity improvement is implemented across the machine-producing sector, and this brings the cost of machines down from $100 at the start of the year to $50 at the end. For owners of existing machines, in a sense this is both good news and bad news. The good news is that when their machines need replacing, this will cost half as much. The bad news is that their existing machines have just halved in value.

A prudent accountant will recognise this as an asset write-down, and charge the change in the value of the machines against both the balance sheet and profits. A less prudent account might hold these machines at their historical cost, ignoring the effect of the change in current prices on both the balance sheet and profits. Only a transparently fraudulent set of accounts would write-down the value of the machines on the balance sheet but fail to charge this loss against profits.

Yet calculating the rate of profit as though input and output prices are equal is equivalent to this third alternative. According to the simultaneist definition of the rate of profit, the stock of capital should be valued at output prices – in this example, $50 – and no charge made against profit for the devaluation of the machines beyond accounting for their ordinary rate of depreciation. The Okishio Theorem is able to 'prove' the profit rate cannot fall because this $50 loss per machine is subtracted from the denominator of the rate of profit but not from the numerator.

As will be discussed in the next chapter, Marx *did* think that one effect of productivity improvements was to cheapen the elements of existing and newly produced capital advanced. But he conceived of this as a process in time, where capital must first be advanced at the prices prevailing at the start of the production period, and is only devalued when those prices actually change. This difference is crucial, because in reality technological development is a continuous process. In the example above, if there were to be no change in productivity in the second year, then the rate of profit defined in pre-production price terms *would* rise to the same level as the simultaneist 'rate of profit' for the first year (since pre-production prices for the second year are just the output prices of the first year). But for the rate of profit to fall, the law presupposes continual development of the productive forces: i.e., it presupposes continual increases in productivity. When this stops happening, during a slump or a crisis, the law predicts the rate of profit will *rise.*

Using temporalist measures of the rate of profit, many numerical and algebraic examples have been given that refute the proposition that cost-reducing technological change can never cause the rate of profit to fall.[80] However, as will be discussed in the next chapter, a problem with these measures of the rate of profit is that they measure fixed assets at *historical cost*. This rescues the idea that productivity improvements can cause the rate of profit to fall at the expense of eliminating the possibility for the devaluation of existing capital to cause it to rise. In the next chapter, we will show that if inputs are instead valued exclusively at pre-production prices, we can allow for the possibilities of both the devaluation of existing capital and a falling rate of profit due to productivity increases.

Summary

This chapter has argued that it matters for Marx's historical materialism and socialist strategy whether the rate of profit has a tendency to fall, and that TSSI Marxists have shown that attempts to demonstrate internal inconsistency of Marx's LTFRP have failed. But as the next

[80] Kliman, *Reclaiming Marx's Capital*, 127–132; Ernst, "Simultaneous Valuation Extirpated: A Contribution to the Critique of the Neo-Ricardian Concept of Value"; Kliman, "The Profit Rate Under Continuous Technological Change"; Freeman and Kliman, "Two Concepts of Value, Two Rates of Profit, Two Laws of Motion"; Kliman and McGlone, "A Temporal Single-System Interpretation of Marx's Value Theory."

three chapters will argue, although temporalism must be the starting point for any coherent quantitative interpretation of Marx's value theory, there are problems with the existing interpretations that we need to rectify.

Chapter 2: Devaluation

There is a connection between correctly measuring the rate of profit and understanding its dynamics. One key question is how to conceptualise 'devaluation' – that is, the loss of value due to movements in prices.

This chapter will argue there is a problem with the way the two leading TSSI proponents deal with this issue. Neither Kliman nor Freeman's approach allows for the kind of general devaluation that Marx identifies as the main way economic crises tend to be overcome. First we will show this to be the case for the most general formalisation of a TSSI, Freeman's *Price, Value and Profit*, and second we will show that Kliman's historical cost measure of the rate of profit creates similar problems. Third, the chapter argues that this problem is not an unavoidable outcome of adopting a TSSI, by setting out a TSSI which does allow for general devaluation, and quantifying its effect on the rate of profit. This is made possible by adopting a particular version of the assumption that total profit is equal to total surplus value: that it excludes profit created or destroyed by movements in the prices of commodities. Fourth, the chapter argues that the best way to approximate this approach using national accounts data is to use the start of year stock of fixed assets at the previous year's prices in the denominator of the rate of profit, as a proxy for 'pre-production' prices. Finally, it argues that this measure of capital advanced is also the most relevant for testing the hypothesis that trends in the rate of profit tend to be similar to trends in the rate of accumulation and rate of growth of output when capacity utilisation is at or above 'normal' levels.

Existing Temporalist Approaches

Formalisms and Models

Alan Freeman's 'Price, Value and Profit' is the most comprehensive attempt to formalise a TSSI approach. Before discussing the approach itself, there is an important aspect of Freeman's method to explore and endorse. Freeman's article differs from many attempts to specify Marx's system in mathematical language in that it does not construct a *model* of the capitalist economy.[81] Broadly speaking, a model is a system of equations which takes data inputs and turns them into predictions. The test of a good model is how well its predictions fit with observations. But before we can construct models, we need a method for collecting and interpreting the data on which they will depend: an accounting framework, or *formalism*. Unlike a model, a formalism itself does not imply testable hypotheses or make predictions.

For example, Shaikh and Tonak's *Measuring the Wealth of Nations* includes both a Marx-inspired model and a Marx-inspired formalism. Their formalism gives a method for, among other things, calculating the SNLT embodied in different types of output according to a simultaniest definition, which they call the *value* of the commodity.[82] This is not a prediction which can be tested, just a method for transforming the national accounts into a set of observations. They then investigate how closely these observations fit with a particular *model*: specifically, that prices tend to be proportional to their measures of values.[83] This model is often thought to constitute Marx's theory of value (though in fact Marx's discussion of the transformation of values into prices of production specifically repudiates this).

[81] Freeman, "Price, Value and Profit - A Continuous, General, Treatment," 225–226.
[82] Shaikh and Tonak, *Measuring the Wealth of Nations*, 78–89.
[83] Ibid., 141–144.

Veneziani criticises the TSSI for *assuming* that Marx's aggregate equalities are true, rather than constructing a model which yields these equalities as predictions.[84] But this is a category error. Since a TSSI is a formalism, and not a model, it is not supposed to make predictions. It is instead a framework for arranging economic data in a way which aims to be both consistent with Marx's value theory and helps us to understand the real connections between the phenomena we are seeking to explain. The 'test' of whether this is a *good* formalism is whether, once we assume its framework, we can give successful explanations and make successful predictions, which may include models. Thus a formalism can usefully be thought of as part of what Lakatos calls the 'hard core' of propositions which are not usually tested directly, but are instead evaluated according to their potential to act as a framework for successful research.[85]

Nevertheless, it *is* possible to specify some desirable features of a formalism *a priori*. First, an internally consistent and coherent formalism is to be preferred over one that is inconsistent or incoherent, because this is an important aspect of what it means for explanation to make sense. This extends to the question of the realism of assumptions. Milton Friedman's infamous justification for the unrealistic assumptions of mainstream economics is that the realism of assumptions does not matter, because in some cases unrealistic assumptions can be the basis for constructing models with as much (or possibly more) predictive power as models that use more realistic assumptions.[86] In other words, reality can be 'as if' the unrealistic model were true. But such cases beg the question *why* the unrealistic model can produce accurate results. If the model builder concedes that their model is 'unrealistic', this concedes that their model is an incomplete explanation of the phenomena they seek to explain. The model builder can only

[84] Veneziani, "The Temporal Single-System Interpretation of Marx's Economics."
[85] Lakatos, "Criticism and the Methodology of Scientific Research Programmes," 168–170.
[86] Friedman, "The Methodology of Positive Economics."

explain why their unrealistic model ‘works’ with reference to propositions to which they *are* committed, and therefore *do* consider ‘realistic’.

In the case of a strict formalism, the question of the realism of its assumptions is posed differently from that of a model. For example, if we want to construct a strict formalism, and we build into it the assumption that input prices are equal to output prices, then the relevant question is not whether this is true ‘most of the time’ or ‘when it matters’ or ‘under ideal conditions’ (as it might be for constructing a model), but whether, *a priori*, they *must* always be exactly equal in reality. Simultaneist formalisms fail this test. Because it has been constructed so that it can be applied to national accounts data, the accounting framework in this thesis will not always pass this test either, because sometimes we will have to make approximations so that we can work with the available data. But, in general, our aim is to do this as little as possible, so that the formalism can be as effective as possible as a framework within which to test other hypotheses.

Second, since we are also interested in interpreting Marx’s value theory, a good formalism should be as consistent as possible with Marx’s work. This does not necessarily mean constructing a formalism that is consistent with everything Marx ever wrote, because, being a human being, Marx was not immune from making errors or contradicting himself. But it does mean trying to construct an interpretation that is as consistent as possible with Marx’s most important arguments and conclusions.

Freeman’s Formalism

How successful is Freeman’s formalism at achieving these goals? Freeman begins building his formalism by considering the exchange of commodities separately from their production and consumption. He imposes the condition that the exchange of commodities, and the price movements that these exchanges create, cannot alter the total value of the stock of commodities that exists across the economy at a point in time. This is one aspect of his definition of value.[87]

Freeman illustrates this with the example reproduced in tables 1 and 2 below. Table 1 says that, initially, Capital I owns 25 units of commodity 1, which have a total value of £200, and hence a value per unit (or 'unit value') of £8. Capital I also owns £300 worth of money, which Freeman represents as £300[300£], to indicate that this is both pound notes that add up to 300 (300£) and currency that has a *value*, at initial price levels, of £300. Capital II owns 20 units of commodity 2, initially worth £80 at £4 per unit, and also owns £300 of money.

Table 1[88]

Stocks	Commodity 1	Commodity 2	Money	Total Wealth
Capital I	£200[25]		£300[300£]	£500
Capital II		£80[20]	£300[300£]	£380

Table 2 represents the result of the two capitals selling their holdings of commodities to one another at prices equal to unit values.

Table 2[89]

Stocks	Commodity 1	Commodity 2	Money	Total Wealth
Capital I		£80[20]	£420[420£]	£500
Capital II	£200[25]		£180[180£]	£380

Since this exchange was made at prices equal to initial prices (and to values), the total wealth of each capital remains the same after the transaction; but Capital I now owns £80 more of

[87] Freeman, "Price, Value and Profit - A Continuous, General, Treatment," 235–240.
[88] Ibid., 235.
[89] This table is not exactly the same as Freeman's, because Freeman's table shows Capital I and Capital II each owning the same stock of money as previously (£300). This must be an error, because it is not consistent with the fact that the total wealth of I and II is unchanged in his table, nor is it consistent with the fact that Capital II has increased its holdings of commodities by £120 (and Capital I's have fallen by the same amount) with no change in prices. Ibid.

commodity 2, £200 less of commodity 1, and £120 more money. Capital II owns £80 less of commodity 2, £200 more of commodity 1, and £120 less money.

Freeman now supposes instead that commodity 1 sold at £4 per unit, commodity 2 sold at £9 per unit, but there was no change in the value of money. In that case, we would have the result given in Table 3.

Table 3[90]

Stocks	Commodity 1	Commodity 2	Money	Total Wealth
Capital I		£180[20]	£220[220£]	£400
Capital II	£100[25]		£380[380£]	£480

Here, the price change has altered the total wealth of each capital, without altering their combined total wealth. Because commodity 1 sells at a price lower than its initial value, Capital I suffers a loss of £100. Conversely, because commodity 2 sells at a price higher than its initial value, Capital II gains a profit of £100. In this example, this profit and loss cancel each other out. Freeman says that these price changes have transferred £100 of *value* from Capital I to Capital II. He also points out that this transfer of value occurs regardless of the quantity of each commodity that is traded. If, instead, each capital had only sold and bought one unit of each commodity at these prices, then their total wealth would still be £400 and £480 respectively. Capital I would still have suffered what the national accounts call a 'holding loss' of £100, and Capital II would still have made a 'holding gain' of £100.

But now consider an example where profits and losses do not balance. Freeman supposes that commodity 1 trades at £16, and commodity 2 trades at £8 (i.e., at prices twice their unit values). This gives the result in Table 4.

[90] Ibid., 236.

Table 4[91]

Stocks	Commodity 1	Commodity 2	Money	Total Wealth
Capital I		£160[20]	[300£-160£+400£=540£]	£700
Capital II	£400[25]		[300£-400£+160£=60£]	£460

Here, the combined wealth of both capitals has increased by £280 in nominal terms, even though no one has produced or consumed anything, and there has not even been an increase in the money supply.[92] How do we deal with this case? Has there been any increase in total wealth in real terms?

Freeman's answer is that there cannot have been any such increase. For this reason, we should define the *value of money* such that these price changes make no difference to the combined wealth of the two capitals, after adjusting for inflation. Thus he re-writes Table 4 as Table 5 below.

Table 5[93]

Stocks	Commodity 1	Commodity 2	Money	Total Wealth
Capital I		£old 121.38=£160[20]	£old 409.65[540£]	£old 531.03
Capital II	£old 303.45=£400[25]		£old 45.52=[60£]	£old 348.97

This answer has an intuitive appeal, because it seems clear that since there has been no production or consumption, total wealth is unchanged and hence total value must also remain unchanged in real terms. Freeman uses this example as the starting point for his formalism. He

[91] Ibid., 238.
[92] Freeman incorrectly says that the increase is £260. Ibid., 269.
[93] Ibid., 240.

makes it an axiom that price movements can transfer value between commodity owners, but cannot create or destroy it across all owners of commodities.[94]

But Marx himself argues that price movements can in fact devalue already existing capital. Indeed, for Marx, this is characteristic of the accumulation process and the crises it entails, and one he discusses in several place and at some length:

> Also related to what has been said [about the cheapening of constant capital] is the devaluation of existing capital (i.e. of its material elements) that goes hand in hand with the development of industry. This too is a factor that steadily operates to stay the fall in the rate of profit, even though in certain circumstances it may reduce the mass of profit by detracting from the mass of capital that produces profit.[95]
>
> …
>
> Simultaneously with the fall in the profit rate, the mass of capital grows, and this is associated with a devaluation of the existing capital, which puts a stop to this fall and gives an accelerating impulse to the accumulation of capital value.[96]
>
> …
>
> The periodical devaluation of the existing capital, which is a means, immanent to the capitalist mode of production, for delaying the fall in the profit rate and accelerating the accumulation of capital value by the formation of new capital, disturbs the given conditions in which the circulation and reproduction process of capital takes place, and is therefore accompanied by sudden stoppages and crises in the production process.[97]
>
> …
>
> The chief disruption, and the one possessing the sharpest character, would occur in connection with capital in so far as it possesses the property of value, i.e. in connection with capital *values*. The portion of capital value that exists simply in the form of future claims on surplus-value and profit, in other words promissory notes on production in

[94] Ibid.
[95] Marx, *Capital III*, 1981, 3:343.
[96] Ibid., 3:357.
[97] Ibid., 3:358.

> their various forms, is devalued simultaneously with the fall in the revenues on which it is reckoned. A portion of ready gold and silver lies idle and does not function as capital. Part of the commodities on the market can complete their process of circulation and reproduction only by an immense reduction in their prices, i.e. by a devaluation in the capital they represent. The elements of fixed capital are more or less devalued in the same way.[98]

But under Freeman's formalism, it is an axiom that the total value of all commodities cannot change as a result of price movements. It is therefore hard to see how his approach can allow for the devaluation of existing capital that Marx describes. The closest Freeman's formalism comes to representing this is that allows for some of the value of commodities owned by capitalists to be *transferred* to non-capitalists, if the prices of commodities owned by businesses falls relative to the value of money. This would indeed devalue the existing stock of capital. But this is not what happens in reality when capital is devalued due to a crisis; non-capitalists do not get richer while capitalists get poorer. Nor is this an effect that Marx describes. Marx describes a process whereby practically all commodities are devalued due to the crisis: above he lists future claims on surplus value (fictitious capital), gold and silver, unsold commodities and fixed capital.

Freeman's formalism also allows for the possibility that capital advanced in *nominal terms* can decline as a result of falling prices for constant capital. But Marx uses the term *value* in the quotation above, which he emphasises. He clearly does not mean a purely nominal decline.

Kliman's Approach

The same criticism applies to using fixed assets at historical cost to measure capital advanced, as Kliman does. Kliman himself devotes two sections in a chapter of *The Failure of Capitalist Production* to discussing the importance of devaluation due to crisis for Marx's LTFRP. He writes:

[98] Ibid., 3:362–363. Emphasis in original.

> The LTFRP implies that there is an ever-present tendency in capitalism for labor-saving technical innovation to lower the rate of profit. Yet Marx also argued that this tendency is interrupted and counteracted from time to time by "the destruction of capital through crises".
>
> Part of what he was referring to is the destruction of physical capital assets… But insofar as the theory of crisis is concerned, what matters is the destruction of capital in terms of *value* – the decline in value of physical capital assets as well as the decline in the (fictitious) value of financial assets. Of course, when physical assets are destroyed, their value is destroyed as well, but the predominant factor that causes capital value to be destroyed is falling prices.[99]

But a historical cost measure cannot account for the effect of falling prices on the existing stock of fixed assets. A historical cost measure values each asset at the price for which it was originally purchased (after depreciation). Using a pure historical cost measure (i.e., one which does not adjust for general price inflation), falling prices only influence the nominal value of capital advanced insofar as they affect the prices of *newly produced* assets. The prices at which existing assets are valued must, by definition, remain constant (after allowing for depreciation). The only way the existing stock of fixed assets could be *devalued* using a pure historical cost measure would be in *relative* or *inflation-adjusted* terms – i.e., relative to the prices of other commodities, or the MELT. But this would require an *increase* in the prices of newly produced commodities, not a decrease. If we use an inflation-adjusted historical cost measure, the effect Marx describes is similarly not possible. The whole point of such a measure would be to leave the inflation-adjusted prices of pre-existing fixed assets unchanged after depreciation, and therefore unaffected by devaluation.

[99] Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession*, 22.

Indeed, Kliman acknowledges that his historical cost measure does not account for devaluation, effectively conceding that the historical cost rate of profit is not the measure of the rate of profit to which Marx's law refers:

> It is true that capital does eventually become revalued according to the cost of reproducing it, and that capital devaluation therefore tends to raise the profit rate. The "resolution" of the discrepancy between original production costs and current reproduction costs, however, takes place through the many mechanisms of crisis, through the *forcible* adjustment of old values to the new…. The discussion below is confined to the underlying tendency of the profit rate and the unit price, independently of periodic disruptions.[100]

That is, Kliman acknowledges that his historical cost measure of the rate of profit does not take into account the effect of the 'forcible adjustment of old values to the new' that occurs during crises. It is also important to point out that it is not true that devaluation *only* occurs through periodic disruptions and crises. Above we saw that Marx mentions "the devaluation of existing capital that goes hand in hand with the development of industry" as a factor that "*steadily* operates to stay the fall in the rate of profit", which a historical cost measure of the rate of profit similarly fails to account for.

Pre-Production Prices

If the theoretical results of the TSSI depended on historical cost valuation, this criticism would be a major problem, since it would leave the TSSI unable to reproduce Marx's conclusion that crises allow the rate of profit to recover by devaluing capital. But this section will argue that the refutation of the Okishio Theorem and the resolution of the transformation problem do not depend on historical cost valuation, and can be obtained by valuing constant capital at pre-production prices.

[100] Kliman, "The Profit Rate Under Continuous Technological Change," 286.

This is not an original idea. For the purposes of measuring the value *transferred* from constant capital to output, both Kliman and Freeman argue pre-production prices should be used, based on their interpretations of Marx. As Kliman explains:

> Precisely how much value is transferred from the means of production has been the subject of considerable controversy… I and other proponents of the temporal single-system interpretation (TSSI) interpret Marx as having held that the amount of value transferred is the amount of value that is needed to acquire the means of production (rather than their own value). The word "needed" serves to indicate that the amount of value transferred depends upon (a) the current cost, rather than the **historical cost**, or original cost, of the means of production, and (b) the socially average expenditure on the means of production.[101]

When it comes to measuring the value *transferred* by constant capital, the difference between the TSSI and a simultaneist interpretation is that, for the TSSI, the relevant 'current cost' is the replacement cost of inputs immediately *before* the production period for the output starts, whereas the relevant current cost for a simultaneist interpretation is the price of the inputs at the *end* of the production period. For the purposes of calculating the value transferred, neither temporalists nor simultaneists value fixed capital inputs at their price when the *inputs themselves* were produced or sold. In the case of circulating constant capital, if we take a period-by-period approach (as Marx did), then if the stock turns over completely there is no difference between the price of these inputs when they are produced, and the price of these inputs before they are used in production, since the end of one production period is the beginning of the next.

Like Kliman, Freeman argues:

> it is a complete misnomer to treat the distinction between the above [Freeman's TSSI] and equilibrium valuations as a distinction between 'historical' and 'current' cost. The value transferred to the product is not given by the magnitude of capital when purchased; it is given by the magnitude of this capital when it is used. This is its 'current'

[101] Kliman, *Reclaiming Marx's Capital*, 22. Kliman's emphasis.

> cost. The equilibrium determination substitutes a completely different notion, redefining the word 'current' to mean 'future'; it says that the value transferred by the cotton is given by what the cotton will cost when it has been produced using a technology that does not exist at the time it is used. It redefines also the word 'necessary' to usurp Marx's meaning… 'Necessary' for Marx means that which can be achieved under existing social conditions, that is, using the machinery which is now in place. Necessary for the equilibrium approach means that which can be achieved under ideal social conditions, that is, using the most advanced machinery in existence whether or not it is in place.[102]

One could, if one wanted to, devise a historical cost temporalist approach, which assumed that the value transferred by each input is determined by the price for which the inputs were originally purchased, or their price at the time they were produced. I am not aware of anyone who has done this. Such an approach would be inconsistent with statements such as this from Marx:

> The value of any commodity – and thus also of the commodities which capital consists of – is determined not by the necessary labour-time that it itself contains, but the *socially* necessary labour time required for its reproduction. This reproduction may differ from the conditions of its original production by taking place under easier or more difficult circumstances. If the changed circumstances mean that twice as much time, or alternatively only half as much, is required for the same physical capital to be reproduced, then given an unchanged value of money, this capital, if it was previously worth £100, would now be worth £200, or alternatively £50.[103]

It is not entirely clear why Kliman and Freeman account for this revaluation when calculating the value transferred from constant capital, but use historical cost to calculate the denominator of the rate of profit. It may be related to Kliman's explanation of why, in his empirical work, he does not try to construct what he calls a 'Marxian' rate of profit. As part of his justification for using a historical cost measure of the rate of profit, he writes:

[102] Freeman, "The Limits of Ricardian Value," 14.
[103] Marx, *Capital III*, 1981, 3:238. Emphasis in original.

> the task of theory is to account for *observed* phenomena. Thus the purpose of a study of profitability should be to account for movements in what businesses and investors mean when they talk about the rate of profit or rate of return, rather than to account for movements in a theoretical construct. The latter is of interest only insofar as it helps to explain the former.[104]

However, since a historical cost measure of the rate of profit is not affected by devaluation, it is not possible to use Marx's law to explain its movements in the way that Kliman tries to. For example, Kliman argues that during the crises of the 1970s and early 1980s, not enough capital was devalued or destroyed to allow for a major new boom like the one that occurred after WWII.[105] This is why, he argues, the rate of profit remained persistently low. But since the rate of profit which Kliman measures is not affected by the destruction of capital values in the way Marx describes, Kliman cannot appeal to Marx's law to explain the persistently low rate of profit. If existing capital values *had been* destroyed by falling asset prices in the way that Marx describes, *this would not affect Kliman's chosen measure of the rate of profit*.

The second and less fundamental problem is that the historical cost rates of profit which Kliman measures are not "what businesses and investors mean when they talk about the rate of profit or rate of return". The numerators of Kliman's measures of the rate of profit are not intended to extend beyond *profits from production*: i.e., profits from selling newly produced commodities.[106] But businesses can also make losses from devaluation: i.e., from variations in prices of the already produced commodities that they own, and from variations in the current prices of their financial assets, liabilities, land, natural resources, intangible assets and goodwill. Capital gains or losses even affect 'cash profits' if the assets in question are sold.[107] Businesses

[104] Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession*, 96.
[105] Ibid., 24.
[106] However, as will be argued in Chapter 4, in fact the numerators of Kliman's measures of the rate of profit are not exactly the same as profits from selling newly produced commodities.
[107] Horngren, *Accounting*, 456–483.

and investors generally take this into account when assessing the profitability of a company, and do not restrict themselves to examining profits from production. Similarly, when calculating a measure such as 'return on assets', accountants include all assets and liabilities in the denominator, and not only produced assets or fixed assets.[108]

It *is* possible that, in practice, current cost is inferior to historical cost as an *approximation* of the 'book value' of fixed assets: i.e., the value at which company accounts carry fixed assets. This is not because there is a hard accounting rule that assets must be carried at historical cost. Rather, it is because historical cost is often the default option. In practice, companies use a mixture of historical cost and current cost (or 'fair value') accounting.[109]

More importantly, *any* measure of the average rate of profit across companies is, to some extent, a theoretical construct. Business people and investors generally do not look at measures of the average rate of profit across the economy as a whole at all.

This does not mean there is no reason to measure the average rate of profit. Rather, it makes it clear that, for any measure of the average rate of profit we use, we need to be clear about its explanatory purpose. One reason for measuring the rate of profit is to explain *other* phenomena, "to reduce the visible and merely apparent movement to the actual inner movement".[110] For example, in Chapter 4 we will set out a measure of the rate of profit that is useful for explaining the rate of accumulation and the average rate of return on financial assets, but which capitalists themselves do not measure or respond to. This measure of the rate of profit aims to both *explain* these phenomena in which we are interested, and *be explained* by Marx's law. Chapter 4 will also set out a measure of the rate of profit which *is* intended to approximate an average of rates

[108] Ibid., 633.
[109] Ibid., 13–14.
[110] Marx, *Capital III*, 1981, 3:428.

of return which capitalists themselves observe and respond to, *and* for which we can explain its movements using Marx's law.

A Temporalist Approach that Allows for Devaluation

Why a Pre-Production Cost Estimate is Compatible with Temporalism

The previous section has argued that one desirable property of our measure of the rate of profit is that it can be affected by the devaluation of existing capital. The challenge now is to show how that devaluation can be accounted for in value theory terms, in a way that is consistent with temporalism and with Marx's aggregate equalities.

Our first task is to clarify more precisely what we mean by depreciation, and how it is different from devaluation and revaluation. Depreciation is often thought of in purely physicalist terms, as the wear and tear that a machine undergoes over the course of its useful life. But there is also depreciation due to obsolescence; what Marx calls 'moral' depreciation. As Marx identifies, this takes two forms: depreciation due to the invention of new, more productive material elements of capital (e.g. faster computers, machines capable of producing more output per worker) and depreciation due to the cheapening of the cost of reproducing the existing material elements of capital (e.g. when a computer or machine becomes cheaper to produce, or if inputs such as iron or steel become cheaper).[111]

One issue of controversy is whether Marx thought that moral depreciation transfers value to output. Kliman argues that Marx's position is that it does not.[112] This is important because the depreciation models used in the US national accounts incorporate a portion of moral

[111] Ibid., 3:208.
[112] Kliman, *The Persistent Fall in Profitability Underlying the Current Crisis: New Temporalist Evidence*, 73.

depreciation, and if Kliman is right, then, ideally, we would exclude moral depreciation from our calculations.

However, Marx in fact does allow that moral depreciation can transfer value to output. In *Capital* II, Marx argues that fixed capital "gives up value to the product in proportion to the exchange-value that it loses together with its use-value."[113] Elsewhere, he indicates that moral depreciation fits this description, when he refers to "[t]he constant improvements which rob existing machinery, factories, etc., of a part of their use-value, and therefore also their exchange-value".[114] Moral depreciation robs existing machines of part their use value because their use value, for capitalists, is the extent to which they can valorize capital, which is in part determined by the productivity and cost of machines used by other capitalists.

Marx also states *explicitly* that fixed capital transfers value to the product as a result of moral depreciation:

> This process is particularly significant at times when new machinery is first introduced, before it has reached a certain degree of maturity, and where it thus constantly becomes outmoded before it has had time to reproduce its value. This is one of the reasons for the unlimited extension of working hours that is usual in periods of this kind, work based on alternating day and night shifts, so that the value of the machines is reproduced without too great costs having to be borne for wear and tear. If the short working life of the machines (their short life-expectancy *vis-a-vis* prospective improvements) were not counter-balanced in this way, they would transfer too great a portion of their value to the product in the way of moral depreciation and would not even be able to compete with handicraft production.[115]

Does this mean that *all* moral depreciation transfers value to output? It is possible that this is what Marx had in mind. But if this is the case, it raises the problem of measuring it. If the price

[113] Marx, *Capital II*, 1978, 237.
[114] Marx, *Capital III*, 1981, 208.
[115] Marx, *Capital III*, 1981, 3:208–209.

of an asset falls, how can we know whether this is due to moral depreciation, devaluation, or ordinary wear and tear? As Freeman points out, we cannot answer this question by examining the physical properties of the asset itself.[116]

Note, however, that the above passage refers to the short life-*expectancy* of machines in a period of rapid technological development. This suggests that the crucial issue is how much the capitalists should *expect* depreciation to affect the value of their fixed capital, whatever the cause.[117]

Compare this with the way depreciation is measured in the US national accounts. The BEA's depreciation models try to base their assumptions on information about the prices actually paid for fixed assets when they are bought second hand.[118] For example, the depreciation schedule for cars is informed by comparing the prices, at a single point in time, for similar types of car made 1 year ago, 3 years ago, 10 years ago etc.[119] So effectively this is a measure of the rate at which the price of an asset is expected to decline over time (including due to expected moral depreciation), excluding inflation.

This is basically in keeping with Marx's conception of depreciation, if we adopt the expectations-based interpretation proposed above. One difference is that, in his numerical examples, Marx uses straight line models of depreciation, while the US national accounts mostly use geometric models (i.e., they assume the value of fixed assets declines at a constant rate).[120] But Marx does not seem to be wedded to using straight line models:

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[116] Freeman, "Price, Value and Profit - A Continuous, General, Treatment," 254.
[117] Note this is different from saying that capitalists' *actual* expectations determine the rate at which moral depreciation transfers value to output.
[118] "BEA Depreciation Estimates."
[119] Note that this is different from tracking the prices paid *over time* for a particular car, which would also be subject to general price inflation.
[120] US Bureau of Economic Analysis, *Concepts and Methods of the U.S. National Income and Product Accounts*, M–5.

> The portion of the price which must replace the wear-and-tear of the machinery enters the account more in an ideal sense, as long as the machinery is still at all serviceable; it does not very much matter whether it is paid for and converted into money today or tomorrow, or at any particular point in the capital's turnover time.[121]

Marx distinguishes this depreciation from devaluation and revaluation, which he describes in the following way:

> Revaluation and devaluation, for their part, are self-explanatory. We simply mean that the capital present increases or decreases in value as the result of certain general economic conditions (since what is involved here is not the particular fate of one single private capital), i.e. that the value of the capital advanced to production rises or falls independently of its valorization by the surplus labour it employs.[122]

In the national accounts, revaluation and devaluation are treated in much the same way. If, for example, the price of buying a new car of a particular type increases by 5%, then the stock of cars of this type will have its current value inflated by 5% after subtracting depreciation. This is also called a 'holding gain'.

Marx does not devote much discussion to devaluation and revaluation in *Capital*, because these phenomena "assume for their full development the credit system and competition on the world market".[123] But he acknowledges their importance for the rate of profit, because:

> they make it appear as if it is not only the rate of profit but also its mass (which is in fact identical with the mass of surplus-value) that can increase and decrease independently of movements of surplus-value, whether of its mass or its rate.[124]

The problem he seems to be raising is that revaluation and devaluation appear to exert an influence on the mass of profits:

[121] Marx, *Capital III*, 1981, 3:213.
[122] Ibid., 3:205.
[123] Ibid.
[124] Ibid.

> Since the rate of profit is equal to the proportionate excess in the value of the product over the value of the total capital advanced, an increase in the rate of profit that arose from a devaluation of the capital advanced would involve a loss in capital value, while a decline in the profit rate that arose from a rise in value of the capital advanced could well involve a gain.[125]

If, for example, a company's assets increase in value due to revaluation, this is a form of profit; conversely, devaluation is a loss. But neither revaluation nor devaluation affect the mass of surplus value produced. Kliman draws the reasonable conclusion that Marx's aggregate equality refers to an equality between the sum of surplus value and the sum of profits *from production*, i.e., excluding revaluation and devaluation.[126] (However, as will be argued in Chapter 4, once we introduce unproductive expenditures of surplus value, taxation and credit this equality needs to be further modified.)

This argument that revaluation and devaluation can change capital values might also seem to contradict Marx's argument that "the sum of the values in circulation can clearly not be augmented by any change in their distribution".[127] But revaluation is not a part of circulation. As Marx argues, "[t]he value of a commodity is expressed in its price *before it enters into circulation*, and it is therefore a pre-condition of circulation, not its result".[128] Prices are offered *prior* to exchange; exchange is what happens when a buyer takes up a seller's offer, and the commodity and money change hands. So there is no inconsistency if we say that: 1) the act of *exchange* cannot alter the sum of values in circulation and 2) movements in prices *can* alter the total value that is embodied in already produced commodities (for example, when capital is devalued due to moral depreciation or crises).

[125] Ibid., 3:208.
[126] Kliman, *The Persistent Fall in Profitability Underlying the Current Crisis: New Temporalist Evidence*, 74.
[127] Marx, *Capital III*, 1981, 3:265.
[128] Ibid., 3:260. Emphasis added.

In the national accounts, holding gains and losses are excluded from all measures of profit. But this is not the case for company accounts. In particular, companies are *not* entitled to write down the value of their assets without charging this against profits.[129] So we must recognise that there is the possibility for a divergence between some measures of total profit and total surplus value. We will return to this issue further below and in the next chapter.

The MELT and Revaluation

In order to measure the effects of revaluation and devaluation in value terms, we need a method of adjusting for inflation. That is, we need a way to measure the Monetary Expression of Labour Time (MELT). The most common approach is based on the New Interpretation, which is to define the MELT as the 'net product' (output less constant capital inputs consumed) divided by a measure of the labour time performed to produce it. We will represent this using the following notation:

$$n(NI)_{t,t+1} \equiv \frac{\$_{t,t+1}y - \$_{t,t+1}d_{t,t+1}}{L_{t,t+1}} \ .$$

Here some explanation of the notation we are using is required. Above, *n* is the MELT, *y* is output gross of depreciation, *d* is depreciation, and *L* is employment. The subscripts specify the period to which the variable refers. For example, $n_{t,t+1}$ is the MELT during the period between point in time *t* and point in time *t* + 1. Magnitudes measured in units of currency, such as output, are preceded by a \$ sign, which also includes a subscript indicating the prices at which output is measured. So '$\$_{t,t+1}y_{t,t+1}$' means 'output over the period between *t* and *t + 1* measured at the average prices prevailing between *t* and *t* + 1'. Magnitudes measured in units of labour time have no '\$' sign before them. So *L*, for example, could be measured in hours or years of labour

[129] The treatment of gains due to revaluation is different: if they reverse previous losses due to devaluation, they are counted towards profit, but if they do not, then are accounted for separately as a 'revaluation surplus'. Horngren, *Accounting*, 477.

time, but not in units of currency. Elsewhere we will also use the convention that magnitudes preceded by 'Q' measure a quantity of use values. This notation is mostly borrowed from Freeman.[130]

Note that all the magnitudes in the expression above are flow magnitudes for a single period. The New Interpretation definition of the MELT therefore treats each period as a self-contained entity, unaffected by results from the previous period, as well as applying only to the monetary expression of the net product. In contrast, a temporalist measure of the MELT should measure the monetary expression of both the direct and indirect SNLT that gross output embodies, with inputs valued at the prices prevailing when production commences. This raises the problem of how to deal with the fact that production periods across different industries and businesses are different lengths and commence at different points in time (and in many cases production of a new unit of output commences more or less continuously). We will start by assuming this complexity away, by assuming production periods of uniform length 1 commencing at point in time *t*. In this case, the ideal measure of the MELT would be the following:

$$n(ideal)_{t+1} \equiv \frac{\$_{t+1} y_{t,t+1}}{L_{t,t+1} + (\$_t d_{t,t+1} + \$_t inv_{t,t+1})/n(ideal)_t}$$

Here *inv* is all circulating constant capital ('inventories') consumed to produce this period's output.

Our assumption of a uniform production period means that all this output is finished at point in time *t* + 1. We take the monetary expression of this output to be its total price at the moment it is produced, i.e., at *t* + 1. This may be different from the price at which it is actually sold. This is

[130] Freeman, "Price, Value and Profit - A Continuous, General, Treatment."

consistent with Marx's argument that values (and hence total value, and total price) are determined as a result of production, but prior to exchange.[131]

The denominator includes direct labour (L) plus the value transferred to output by constant capital. Consistent with temporalist valuation, we take the inputs expressed at pre-production prices (prices at time t) divided by the MELT prevailing at that time. This means calculating each period's MELT depends on knowing the MELT for the previous period. In practice, we must start our analysis at a particular point in time, when we will not know the previous period's MELT; so we need a method for estimating the initial MELT. We will use the New Interpretation definition to do this. The small error this creates in our estimates will rapidly diminish in percentage terms as the (imperfectly estimated) value transferred by inputs in the first year quickly becomes a very small fraction of the total value of output.[132]

The more serious problem is that, in practice, production periods are not uniform, and generally we will not know how long they last.[133] Moreover, since we need to work with national accounting statistics, we are restricted to working with annual or quarterly data. Finally, it is much easier to work with data collected on a 'value added' rather than a 'gross output' basis. For these reasons, we will use the following expression to estimate the MELT each year:

$$n_{t,t+1} = \frac{\$_{t,t+1} y_{t,t+1}}{L_{t,t+1} + \$_{t-1,t} d_{t,t+1} / n_{t-1,t}}$$

For fixed capital, this preserves the idea that inputs transfer value based on pre-production prices by taking current depreciation valued at *last year's* prices and dividing this by last year's

[131] Marx, *Capital*, 1976, 260; See also Kliman, "Marx's Concept of Intrinsic Value."
[132] Freeman makes a similar argument for his measure of the MELT, which is based on stocks. Freeman, "Time, The Value of Money and the Quantification of Value," 15.
[133] Akinci and Karahanogullari, "Convergence of Monetary Equivalent of Labour Times (MELTs) in Two Marxian Interpretations."

MELT. Note here that the MELT is now estimated over the course of a period, rather than at a specific point in time. Nevertheless, we maintain the idea that the equality of total price and total value applies after production, and not exchange, since *y* is the new output *produced* during the year, not the output *sold* during the year.

Now that we can adjust for inflation in MELT terms, we can calculate the effect of revaluation or devaluation. Revaluation of fixed capital, *RF*, is the growth in the value of fixed assets after subtracting net investment in fixed assets, i.e.:

$$RF_{t,t+1} \equiv F_{t+1} - F_t - i_{t,t+1} + d_{t,t+1}$$

(where *i* is gross fixed asset investment and *d* is depreciation). The above magnitudes are measured in SNLT. In order to calculate them, we need to work with the current cost figures for the stock of fixed assets that are used in the NIPA. These value the stock of fixed assets at the end of the period at the average prices prevailing over the preceding and following quarters (or the average prices for the preceding and following years for data published before 1948). So we first need to convert these to 'pre-production' prices: i.e., the average prices prevailing over the preceding year. Then we can obtain estimates measured in SNLT by dividing by the average MELT for that year. That is,

> F_t ≡ Current cost non-residential business structures and equipment $_t$ (FA 4.1 lines 2 & 3 less lines 66, 67, 70, 71, 74 and 75) × Price index for non-residential fixed investment $_{t-1,t}$ (NIPA 1.1.4 line 9, preceding year) / [0.5 × Price index for non-residential fixed investment (preceding quarter) + 0.5 × Price index for non-residential fixed investment (following quarter)] / $n_{t-1,t}$;

and hence

$\$_{t-1,t} F_t$ ≡ Current cost non-residential business structures and equipment $_t$ (FA 4.1 lines 2 & 3 less lines 66, 67, 70, 71, 74 and 75) × Price index for non-residential fixed investment $_{t-1,t}$ (NIPA 1.1.4 line 9, preceding year) / [0.5 × Price index for non-residential fixed investment (preceding quarter) + 0.5 × Price index for non-residential fixed investment (following quarter)].

So, if we multiply both sides of the expression for *RF* by the current MELT,

$$\$_{t,t+1}RF_{t,t+1} = \$_{t,t+1}F_{t+1} - \$_{t-1,t}F_t \times \frac{n_{t,t+1}}{n_{t-1,t}} - \$_{t,t+1}i_{t,t+1} + \frac{n_{t,t+1}}{n_{t-1,t}} \times \$_{t-1,t}d_{t,t+1}.$$

In Chapter 4, we will incorporate this into a general method of quantifying the influences on the rate of profit.

This approach sets no limits on how far revaluation or devaluation could go. In principle, a crisis could devalue the elements of constant capital all the way down to near zero if prices fell far enough. But this does not mean that the dynamics of devaluation and revaluation are inexplicable.

For example, suppose there is a crisis that causes a massive devaluation of capital. Once production recommences, prices of fixed assets are likely to remain low until capacity utilisation reaches more normal levels; since, during this time, newly produced fixed assets will have to compete with idle assets that have already been produced. However, as this slack is taken up and full capacity utilisation approaches (which could be many years later), prices for fixed assets are also likely to move to near their prices of production. If they do not, then capitalists producing fixed assets will continue to make below average rates of profit, and investment in increasing output in this sector will be very low. If prices for fixed assets *do* return to near prices of production, or above, the prices of existing fixed assets will also rise to near or above these prices of production (after accounting for moral and ordinary depreciation), hence pushing the value of capital advanced back up to more 'normal' levels.

This explains why devaluation does not mean that the rate of profit is unlikely to decline over the long term, as the forces of production develop. If devaluation due to crises tended to be permanent, then Marx's law would predict only a tendency for the rate of profit to fall between the recovery in the rate of profit after a crisis and the next major crisis: i.e., it would predict only a cyclical movement. There would be no basis for predicting a long term decline in the rate of profit as the means of production developed, because it would be possible that the devaluation after each crisis could be severe enough to allow the rate of profit to stay at the same average level (or higher) across each cycle. But since there are good reasons to suppose that such devaluations would not be permanent, there is likely to be a tendency for the rate of profit to move cyclically *and* to decline over the long term.

However, we need to distinguish this from the effects of the *destruction* of the material elements of capital. Unlike devaluation, this cannot be reversed by price changes. Value cannot be recovered once its embodiment in use values is destroyed. The destruction of the material elements of capital therefore tends to set back the decline in the rate of profit until this is reversed by new investments.

This approach also suggests a new measure of the rate of profit. Above, we argued that surplus value is unaffected by revaluation or devaluation, but that profits *are* (if we define profits more broadly than just profits from production). For some purposes (though not for testing Marx's law) it may be relevant to measure the rate of profit as the ratio of surplus value *plus revaluation* to the capital stock. We would expect this to be much more volatile than the ratio of surplus value to the capital stock, and generally also to be lower (since devaluation is more common than positive revaluation). The numerical example in Appendix A includes both measures of the rate of profit.

The Rate of Profit, the Rate of Accumulation and the Rate of Growth

So far, we have considered the interpretative virtues of a measure of the rate of profit using fixed assets at pre-production cost: i.e., why this fits better with the LTFRP as Marx formulates it. However, testing Marx's law is not an end in itself. Marx's law is only useful insofar as it helps to explain phenomena in which we are interested.

The most important reason to test Marx's law is to see if the falling rate of profit can explain economic crises. But another, related reason to measure the rate of profit is to see if it can explain movements in other measures of economic performance.

Marx suggests one such relationship when he comments that the falling rate of profit leads to a falling rate of expansion of the stock of capital:

> As the capitalist mode of production develops, so the rate of profit falls, while the mass of profit rises together with the increasing mass of capital applied. Once the rate is given, the absolute amount by which capital grows depends on its existing magnitude. But if this magnitude is given, the proportion in which it grows, i.e. its rate of growth, depends on the profit rate.[134]

The rate of growth of the stock of capital is also called the 'rate of accumulation'. It is connected with the profit rate because any net investment in capital advanced must be funded from surplus value; so if the ratio of surplus value to capital advanced is larger, then, if the share of surplus value spent on investment is constant, the rate of accumulation will increase.

There is, in turn, a connection between the rate of accumulation and the rate of growth of real net output. Broadly speaking there are two ways to increase real net output. One is to increase

[134] Marx, *Capital III*, 1981, 3:356.

the output produced by each unit physical of fixed capital, by, for example, raising the ratio of workers employed to fixed capital, or increasing the intensity or skill of their work: i.e., to raise the capacity utilisation rate. The other is to accumulate more fixed capital, i.e., to increase capacity.

We can specify these relationships mathematically. Let us start with the rate of growth of real output, *Qy*. Here 'real' means 'at constant prices' rather than 'adjusted for MELT inflation' (which would just be a measure of the rate of growth of employment plus value transferred by depreciation). The growth rate of *Qy* can be decomposed as follows:

$$\frac{\Delta Qy_{t-1,t;t,t+1}}{Qy_{t-1,t}} = \frac{\Delta Qy_{t-1,t;t,t+1}}{i_{t-1,t} - d_{t-1,t}} \times \frac{F_{t-1}}{y_{t-1,t}} \times \frac{i_{t-1,t} - d_{t-1,t}}{F_{t-1}}$$

i.e., as the product of the ratio of the expansion of real output to investment, the ratio of fixed assets to output, and the rate of accumulation. Notice here that the first ratio is the ratio of the change in output to the change in fixed assets, while the inverse of the second ratio is the ratio of output to fixed assets. So the first ratio is similar to the inverse of the second ratio, but applied only to *new* assets and *new* output.

Let us call the product of the first two ratios *b*, i.e.

$$b \equiv \frac{\$_{t-1,t}\Delta\, Qy_{t-1,t;\, t,t+1}}{\$_{t-1,t}i_{t-1,t} - \$_{t-1,t}d_{t-1,t}} \times \frac{\$_{t-2,t-1}F_{t-1} \times \dfrac{n_{t-1,t}}{n_{t-2,t-1}}}{\$_{t-1,t}Qy_{t-1,t}}$$

Or, expressed more intuitively,

$$b = \frac{\text{new } Qy}{\text{new } F} \div \frac{Qy}{F}\ .$$ [135]

[135] Here, as elsewhere, we leave out the time subscripts where they can be inferred from earlier equations.

If the rate of capacity utilisation is unchanged, then we would expected the ratio of new *Qy* to new *F* to be higher than the same ratio for the economy as a whole. That is, we would generally expect new fixed assets to be capable of producing more output per unit than existing ones, because they use more advanced production techniques. So we would expect *b* to be greater than one over the medium- to long-term. Over shorter periods, *b* may be volatile as capacity utilisation varies. But as long as it is approximately trendless over the medium to long-term, then over this period the rate of accumulation will be approximately proportional to the rate of growth of output.

That is, since

$$\frac{\Delta Qy}{Qy} = b \times \frac{i - d}{F},$$

if *b* is constant,

$$\frac{\Delta Qy}{Qy} \propto \frac{i - d}{F}.$$

Now consider the relationship between the rate of profit and the rate of accumulation. Let *a* be the ratio of net investment (*i* – *d*) to surplus value after deducting unproductive expenditures (*s* – *u*, discussed in Chapter 4). This is the 'investment ratio':

$$a \equiv \frac{i - d}{s - u}.$$

If *a* is approximately trendless over the medium- to long-term, then since

$$\frac{i - d}{F} = \frac{s - u}{F} \times a,$$

it will be approximately true that

$$\frac{i-d}{F} \propto \frac{s-u}{F}$$

over the medium- to long-term. That is, it will be approximately true that the rate of accumulation of fixed capital will be proportional to the ratio of surplus value after unproductive expenditures to fixed assets.

If the rate of accumulation is proportional to the rate of growth of corporate output, it follows that the rate of profit is also proportional to the rate of growth of output, i.e.

$$\frac{\Delta Qy}{Qy} \propto \frac{s-u}{F}.$$

Finally we stress that this is only a potentially interesting hypothesis, not an implication of Marx's law.

Conclusion

We now have a framework for accounting for the MELT, and the effect on the rate of profit due to devaluation and revaluation. We also have our first empirical hypothesis to test: that the rate of growth of output tends to be proportional to the rate of profit, when capacity utilisation is approximately constant. But to test this hypothesis, we need a method for measuring the numerator of the rate of profit. This chapter has shown that not all definitions of profit fit with Marx's axiom that the sum of profit is equal to the sum of surplus value. Chapter 4 will discuss how this is modified further when we introduce unproductive expenditures of surplus value, taxes, and the financial system. But first, the next chapter continues the task of quantifying the influences on the rate of profit.

Appendix A: A Numerical Counter-Example to the Okishio Theorem Using Pre-Production Prices

As discussed in the last chapter, the Okishio Theorem defines the rate of profit such that input prices and output prices are equal. The counter-examples to the Okishio Theorem either value capital advanced at historical cost or do not include fixed capital (in which case there is no difference between historical cost and pre-production prices). The potential concern with valuing fixed capital at pre-production prices is that a version of the Okishio Theorem might still apply, which would count against this interpretation of Marx's law. So here we will provide a numerical example which shows that cost reducing productivity improvements *can* lead to a falling rate of profit with constant capital valued at pre-production prices, assuming a constant real wage.

To keep the example as simple as possible, we assume an economy which produces a single commodity, 'machines', which depreciate at a rate of 10% per year. We assume the workers are not paid a wage, i.e., they 'live on air', meaning surplus value is equal to the value added by living labour, and we will also assume that employment and hours worked remain constant. This is consistent with Okishio's stipulation that the real wage remain unchanged. It also implies that the cost price of new machines is made up entirely of the depreciated value of the existing machines used to produce them. We will also assume that *a* and *b* are constant at 100% (i.e., that all surplus value is reinvested, and new machines are just as productive as old ones as measured by *b*). This means the value that each machine embodies declines over time, since the number of workers is constant but the quantity of the machines they produce rises. This satisfies the requirement that the cost price per unit decline over time.

These are not realistic assumptions. However, to show that a version of the Okishio Theorem does not apply when valuing constant capital at pre-production prices, we only need one counter-example, whether realistic or unrealistic. Strictly speaking this has already been provided by the existing counter-examples to the Okishio Theorem which assume the existence of circulating capital only: since, in this case, there is no difference between valuing the denominator of the rate of profit at historical cost or at pre-production prices.[136]

However, the example below also hopefully gives the reader a better intuitive sense of how devaluation can work as a continuous process as productivity increases. We can see that, over time, the stock of capital accumulates in physical terms, and, more slowly, in value terms, even though devaluation is a continuous result of rising productivity. Also note that the cost price of each machine declines over time whether we measure it incorporating the effect of devaluation or excluding it, and that it follows from our assumptions that *a* and *b* are constant that the rate of profit is equal to the rate of accumulation, and proportional to next year's rate of growth of physical output. Most importantly, in this example, both measures of the rate of profit fall.[137]

[136] Kliman, *Reclaiming Marx's Capital*, 120–121.
[137] The calculations in the table below run for 3 years: i.e., from points in time 1 to 2, 2 to 3, and 3 to 4. So for year 4 only the stock values that apply at the start of the year (i.e., the end of year 3) apply. This is why in the table only the first three rows have values for year 4.

Table 6

Name	Derivation	Description				
t		Year	1	2	3	4
QF_t	$QF_{t-1} + Qy_{t-1,t} - Qd_{t-1,t}$	Net quantity of machines used as inputs	100.0	125.0	154.5	188.9
$\$_tP_t$	$1 initially, then $\$_{t-1,t}y_{t-1,t} / Qy_{t-1,t}$	Input price of machines	$ 1.00	$ 0.86	$ 0.73	$ 0.63
$\$_tF_t$	$QF_t * \$P_t$	Capital stock (start of period)	$ 100	$ 107	$ 113	$ 119
$L_{t,t+1}$	Assumed constant	Workers = surplus value = net output (SNLT)	10	10	10	
n_t	Assumed constant	Input MELT ($ per worker)	$ 2.00	$ 2.00	$ 2.00	
$ROP_{t,t+1}$	$L_{t,t+1} / (\$F_t / n_t)$	ROP (MELT-adj)	20.0%	18.7%	17.7%	
$\%d_{t,t+1}$	Assumed constant	Rate of depreciation	10%	10%	10%	
Qd_t	$\%d_{t,t+1} * QF_t$	Depreciation quantity	10.0	12.5	15.5	
$\$_td_{t,t+1}$	$Qd_{t,t+1} * \$_tP_t$	Depreciation ($ input prices)	$ 10.0	$ 10.7	$ 11.3	
$y_{t,t+1}$	$L_{t,t+1} + \$_td_{t,t+1} / n_t$	Total value of output (SNLT)	15.0	15.4	15.6	
$Qy_{t,t+1}$	$Qy_{t-1,t} * (b_{t,t+1} * ROP_{t-1,t} + 1)$	Output of machines (quantity)	35.0	42.0	49.8	
Cost price per unit	$\$_td_{t,t+1} / Qy_{t,t+1}$	Cost price per machine ($ input prices)	$ 0.29	$ 0.26	$ 0.23	
$\$_{t+1}P_{t+1}$	$y_{t,t+1} * n_t / Qy_{t,t+1}$	Output price of machines (assuming constant MELT)	$ 0.86	$ 0.73	$ 0.63	
$\$_{t+1}y_{t+1}$	$\$_{t+1}P_{t,t+1} * Qy_{t,t+1}$	Total value = total price of output ($)	$ 30.0	$ 30.7	$ 31.3	
n_{t+1}	Assumed constant	Output MELT	$ 2.00	$ 2.00	$ 2.00	
$\$_{t+1}RF_{t,t+1}$	$(F_{t+1} - y_{t,t+1} + d_{t,t+1} - F_t) * n_{t+1}$	Revaluation	-$ 12.86	-$ 14.16	-$ 14.37	
$RFROP_{t,t+1}$	$(L_{t,t+1} + RF_{t,t+1}) / (\$F_t / n_t)$	ROP including revaluation (MELT-adj)	7.1%	5.5%	5.0%	
Cost price inc. rev.	$(\$_{t+1}d_{t,t+1} - \$_{t+1}RF_{t,t+1}) / Qy_{t,t+1}$	Cost per machine including revaluation	$ 0.65	$ 0.59	$ 0.51	
$\Delta Qy_{t-1,t;t,t+1} / y_{t,t+1}$	$(Qy_{t,t+1} - Qy_{t-1,t}) / Qy_{t-1,t}$	Physical growth rate of output		20.0%	18.7%	

Chapter 3: Turnover Time and the Organic Composition of Capital

One of Marx's major advances over classical political economy is his explanation of *why* the rate of profit tends to fall. This centres on his argument that, as capital accumulates, its 'organic composition' tends to increase. However, as this chapter will argue, this concept of the organic composition of capital is widely misunderstood, and, as a result, so is Marx's explanation. This is largely due to a related failure to integrate it into Marx's understanding of the turnover time of circulating capital.

This chapter will show how these problems can be overcome, both in theory and in a way that can be operationalised using the national accounts; making it possible to quantitatively decompose the rate of profit in way that captures more of the richness of Marx's analysis than existing approaches.

Decomposing the Rate of Profit: Existing Approaches

Marx gives a precise definition of the organic composition of capital in *Capital* I:

> The composition of capital is to be understood in a twofold sense. As value, it is determined by the proportion in which it is divided into constant capital, or the value of the means of production, and variable capital, or the value of labour-power, the sum total of wages. As material, as it functions in the process of production, all capital is divided into means of production and living labour-power. This latter composition is determined by the relation between the mass of the means of production employed on the one hand, and the mass of labour necessary for their employment on the other. I call the former the value-composition, the latter the technical composition of capital [TCC]. There is a close correlation between the two. To express this, I call the value-composition of capital, in so far as it mirrors the changes in the latter, the organic composition of capital. Wherever I refer to the composition of capital, without further qualification, its organic composition is always understood.[138]

[138] Marx, *Capital I*, 762.

In other words, the change in the OCC is the change in the value composition of capital (VCC) insofar as this reflects changes in purely 'technical' or 'volumetric' factors: i.e., holding fixed the unit values of the elements of constant and variable capital.

Nevertheless, the OCC is commonly confused with the VCC, or some similar measure. The most common approach to analysing movements in the rate of profit is to separate out 'distributional influences' from 'technical influences'. For example, the rate of profit can be decomposed into the product of the profit to output ratio, and the ratio of output to the capital stock:

$$ROP = \frac{profit}{output} \times \frac{output}{capital\ stock}.$$

Movements in the second ratio are then supposed to reflect movements in the OCC, or at least to be a reasonable approximation for this. "Marx's" LTFRP then becomes the claim that the rate of profit falls, and it falls primarily due to a falling output to capital ratio.

Gilman's early empirical study of the rate of profit, for example, calculates the OCC as the ratio of constant capital to wages (though he argues that this applies only to constant and variable capital *turned over* – see below).[139] Another important early study, by Mage, defines the OCC as the ratio of the stock of constant capital to new value added, which he defines as $c / (v + s)$.[140] Similarly, Weisskopf uses the ratio of output to profit as a proxy for the influence of changes in the ROSV, and the ratio of output to the capital stock as a proxy for the influence of changes in the OCC.[141] More recently, Kliman takes a similar approach to decomposing changes in the rate

[139] Gillman, *The Falling Rate of Profit*, 16.
[140] Mage, "The 'Law of the Falling Tendency of the Rate of Profit': Its Place in the Marxian Theoretical System and Relevance to the US Economy," 68–74.
[141] Weisskopf, "Marxian Crisis Theory and the Rate of Profit in the Postwar U.S. Economy," 342–343.

of profit (though he is careful *not* to confuse this with measuring the OCC), as do Mohun, Basu and Vasudevan.[142]

Early in *Capital* III, Marx does do something similar. He examines the effect of changes in the rate of surplus value (*s/v*) and the ratio of variable capital to total capital advanced (*v/C*) on the rate of profit (*s/C*). But in doing so, he tells us he is ignoring the influence of the rate of turnover of variable capital; which, as we will explore in this chapter, must be understood if we are to measure the VCC and the OCC accurately.[143]

Marx also has a detailed argument about *why v/C* tends to fall over time, which can only be understood if we understand the differences between the VCC, the TCC and the OCC. He identifies the rising *organic* composition of capital as the main factor that explains the tendential fall in the rate of profit. For Marx, it is almost true by definition that the development of the forces of production under capitalism will result in a growing TCC and hence a growing OCC:

> Apart from natural conditions, such as the fertility of the soil, etc., and apart from the skill of independent and isolated producers… the level of the social productivity of labour is expressed in the relative extent of the means of production that one worker, during a given time, with the same degree of intensity of labour-power, turns into products… This change in the technical composition of capital, this growth in the mass of the means of production, as compared with the mass of the labour-power that vivifies them, is reflected in its value-composition by the increase of the constant constituent of capital at the expense of its variable constituent.[144]

It is less certain (though still likely) that the rising TCC, and hence the rising OCC, will express itself in a rising *value* composition. The chief counter-tendency to this process is the cheapening of constant capital (new and existing). As Marx puts it:

[142] Basu and Vasudevan, “Technology, Distribution and the Rate of Profit in the US Economy,” 72–73; Mohun, “Distrobutive Shares in the US Economy, 1964-2001,” 347–348; Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession*, 128–133.
[143] Marx, *Capital III*, 1981, 142.
[144] Marx, *Capital I*, 773.

> the same development that raises the mass of constant capital in comparison with variable reduces the value of its elements, as a result of the higher productivity of labour, and hence prevents the value of the constant capital, even though this grows steadily, from growing in the same degree as its material volume, i.e. the material volume of the means of production that are set in motion by the same amount of labour-power.[145]

Fine and Harris recognise the importance of Marx's distinction between the OCC and the VCC. They return to Marx's definition of the OCC quoted above, and point out that this makes it clear that the OCC cannot be the ratio of *c* to *v* at current prices. Instead, Marx implies that the OCC is the ratio of constant to variable capital at their 'old values': i.e., holding the unit values of the elements of constant and variable capital constant. [146] In this way, the OCC is equivalent to the VCC insofar as it 'mirrors changes' in the technical composition of capital. Under this approach it also becomes possible to identify the cheapening of constant capital as a distinct counter-tendency to the rising OCC.

There is also the related problem of whether the OCC refers to flow magnitudes or to stocks. Gillman defines the OCC as the ratio of constant capital turned over to variable capital turned over: i.e., he defines it purely in terms of flows. The problem with this approach is that it is not clear exactly how this definition of the OCC relates to the rate of profit, since the rate of profit is the ratio of surplus value to the *stock* of capital, as Marx makes clear.[147] Gilman's definition of the OCC leads him to calculate two separate measures of the rate of profit, one on a stock basis and one on a flow basis.

[145] Marx, *Capital III*, 1981, 342–343.
[146] Fine and Harris, *Rereading Capital*, 59.
[147] Marx, *Capital III*, 1981, 136–137.

Mage draws attention to this problem, and instead defines the OCC as the ratio of a stock to a yearly flow.[148] This aspect of his definition has become widely accepted, and makes it unnecessary to calculate the turnover time to calculate the OCC. Defined in this way, the OCC is no longer a measure of the composition of *capital* tied up at a point in time, but the ratio of capital to an annual flow. If this definition is an accurate interpretation, then it is not clear why Marx devotes considerable space to discussing the turnover time of variable capital, or why he and Engels thought that its tendency to get shorter acted as a counteracting tendency to the falling annual rate of profit.

Below we will set out an alternative approach.

The Stock of Variable Capital for a Single Capitalist

Let us consider the VCC first. As Marx explains in the definition given above, this is the ratio of constant capital, *c*, to variable capital, *v.* As we have seen, Marxists are used to thinking of variable capital as a synonym for annual wages, and hence think of the VCC as the ratio of a stock to a flow.

This chapter proposes that the VCC is better conceived of as the ratio of one portion of the stock of capital advanced to another. But what is the *stock* of variable capital, and how might we measure it? One possibility is to estimate it indirectly, by first measuring the number of turnovers of variable capital that take place during a period, and dividing this by wages. But I have not found anywhere where Marx or Engels gives an actual method for measuring turnover time or the stock of variable capital. Nor are any of the methods proposed in the secondary literature ideal (they are reviewed at the end of the chapter).

148 Mage, “The ‘Law of the Falling Tendency of the Rate of Profit’: Its Place in the Marxian Theoretical System and Relevance to the US Economy,” 69–70.

Indeed, arguably Marx never fully integrates his extensive analysis of turnover time in *Capital* II into his analysis of the rate of profit in Volume 3. As mentioned, early in Volume 3 he explicitly assumes away the effect of changing turnover times on the annual rate of profit.[149] He says he will take this up in a later chapter, but as it turned out, it was left to Engels to write a chapter on the subject which he inserted into Volume 3 as Chapter 4.

As far as they go, Engels' observations in this chapter are sound. He points out that there are two main ways of increasing the rate at which variable capital turns over and hence increasing the rate of profit: shortening production time by increasing the productivity of labour (which, however, also often involves an increase in the OCC); or shortening circulation time, e.g. through faster transportation.[150]

However, I do not think he gives a clear method for calculating the stock of variable capital advanced. He begins by observing, correctly, that "the capitalist himself does not know in most cases how much variable capital he employs in his business", and points out, again correctly, that we cannot calculate the amount of variable capital tied up in a business based on wages data alone.[151] He then tries to set out a method for calculating the number of turnovers of variable capital, based on an example from a spinning mill Marx gives in *Capital* I. However, in this example, Engels explains "[t]he circulating capital was not given; we shall take it to be £2,500".[152] Once Engels has *assumed* we know the value of the circulating capital tied up at a point in time, it is possible to calculate the turnover time of circulating capital, based on the weekly expenses Marx sets out in the original example. Engels may have made this assumption because, as we will see, the value of circulating capital is generally equal to inventories, which

[149] Marx, *Capital III*, 1981, 142.
[150] Ibid., 163–164.
[151] Ibid., 167.
[152] Ibid., 168.

accountants do measure. But Engels does not actually *say* that the two are equal, and, in any case, this needs to be demonstrated, and not merely asserted. So the overall effect seems to be to re-state the original problem in a different form, not to solve it.

To solve it ourselves, we need to conceptualise the circuit though which variable capital passes. Suppose a capitalist starts a new business producing widgets. Before production can begin, she has to obtain some money capital (*M*) to pay her initial expenses, including wages. When the wages bill is due – say, at the end of every week – she pays the workers out of this stock of money capital, and has to ensure that there is enough available at the end of every week to cover this expense.

Suppose our capitalists' wages bill is \$20,000 per year, suppose each batch of widgets takes 2 weeks to produce, and suppose it takes a further 4 weeks to ship to each batch its buyers, whose payment is received at the beginning of the next week. In that case, by the end of the 6th week, our capitalist will have paid out \$120,000 in wages, but not yet received any income from selling widgets. In other words, she has had to *advance* \$120,000 of variable capital. This is tabulated in Table 1.

If our capitalist has no access to credit, and cannot obtain any extra money as production proceeds, she will have to obtain the whole of this \$120,000 before production starts. This is the assumption Marx works with in *Capital* II:

> Take capital A of ₤500, for instance. It is advanced for five weeks, but each week only ₤100 of it successively enters the labour process. In the first week, one fifth of it is applied [₤100]; four fifths [₤400] is advanced without being applied, although since it must be on hand for the labour process for the four following weeks it must certainly be advanced.[153]

[153] Ibid., 374.

That is, Marx argues the capitalist must keep enough capital on hand to cover the entire wages bill from the start of the production period until the end of the circulation period.

Notice that, if this is the case, then the stock of variable capital advanced is not necessarily equal to the wages cost of unsold and unfinished commodities. In our example, at the end of the first week, the wages cost of the stock of widgets will be $20,000, but the stock of variable capital would be $120,000. Only by the end of the 6^{th} week would the two be equal, and even then, this would only be true until payment for the widgets is received at the beginning of the next week. If we use this conception of variable capital advanced, then to measure it precisely, we would need to know the wages bill and the combined length of the production and circulation periods for each industry, and multiply the two together.

In practice, however, the capitalist does not have to keep the entire $120,000 tied up in her stock of capital from the beginning of the production period. If she has access to credit, she only needs to obtain as much money as is necessary to pay her wages bill when it falls due. For example, suppose she did in fact start with $120,000 set aside to pay wages. In the first week, all she has to do is to ensure she can pay $20,000 by Friday. She can lend out the rest of her $120,000 at interest, which may then be lent to another capitalist for some other purpose, such as paying *their* wages bill. If she has a bank account, and leaves the $120,000 deposited there, the banker will perform this function for her. This raises the question of exactly what such a bank account *is*, and what portion of its value, if any, remains tied up in the overall stock of capital. We will address this question in chapters 5 and 6 on finance.

But in this chapter, we will restrict our attention to the capital that must unavoidably be advanced for the wages bill to be paid on time. We will call *this* the stock of variable capital. In effect, we are relaxing Marx's assumption that there are no credit relations. This means that, in the first 6 weeks, the stock of variable capital advanced will not be $120,000 from the beginning of the first week, but will grow from zero to $20,000 at the end of week one, and then grow by a further $20,000 for each of the next 5 weeks. At the end of every week, this will be equal to the wages cost of the inventory of widgets which are unfinished, unsold, or for which payment is yet to be received. And if the workers were paid for their work continuously, rather than having to advance their labour power to the capitalist over the course of every pay period, then the stock of variable capital and the wages cost component of inventories would be equal throughout (as discussed further below).

By the end of the 6th week, the workers will have produced three fortnights' worth of widgets, with batches finished at the end of week 2, week 4 and week 6. At this stage, the first batch has reached its destination, but payment has not yet been received, and the other two batches have not yet completed their circulation period. So the wages cost of the finished widgets for which payment has not yet been received is 3 x 2 x $20,000 = $120,000: again, equal to the stock of variable capital.

What about the workers' consumption? If we assume the workers spend all of their wages at a steady rate throughout the week, and that workers manage to cover these same costs in their first week of work out of their savings (before they have been paid anything), then, throughout these first 6 weeks, the value of their accumulated consumption will be equal to the wages cost of inventories. That is, the wages cost component of inventories will reflect the accumulated value of the labour power that was expended to produce them. In the next chapter, we will see that this is not always the case: that there can be a difference between the price of labour power (the wage) and its value.

But now let us continue with the example. At the start of the 7th week, our capitalist sells her first consignment of widgets, the ones her workers finished producing at the end of the 2nd week. Suppose she sells these above their cost price. This means she recovers the full cost of the wages paid to workers in the first two weeks – \$40,000, equivalent to the variable capital the widgets embody – plus the constant capital component of the widgets' cost price and a profit. So, temporarily, the stock of variable capital falls to \$80,000, before rising back up to \$100,000 when the wages bill is due at the end of the week. That is, \$40,000 is temporarily 'released' from the stock of variable capital when the widgets are sold; then, when the next wages bill is due at the end of the week, another \$20,000 is tied back up. As before, this is equivalent to the wages cost of unsold and unfinished widgets, which is now 7 – 2 = 5 weeks' worth, i.e. \$100,000.

In the 8th week, no widgets are sold and another \$20,000 is paid out in wages. So the stock of variable capital advanced rises back up to \$120,000, i.e. the remaining \$20,000 of the \$40,000 that was released at the start of last week is tied back up, and the wages cost of the stock of unsold and unfinished widgets rises by \$20,000. In the 9th week, more widgets are sold, and variable capital advanced falls back to \$80,000 and then reaches \$100,000 by the end of the week; then, by the end of week 10, it rises back up to \$120,000, and continues to alternate in this way – \$120,000 at the end of even numbered weeks, \$100,000 at the end of odd numbered weeks. This pattern continues while the production period, circulation period and wages stay constant, and the widgets are not sold at a loss.

Expressed more generally, over the period of time between t - 1 and t, the stock of variable capital for capitalist a, v_a, expands by the difference between their wages bill, w_a, and the wages cost component of the total price of their commodities sold during the period, which we will call 'vr_a' (for 'variable capital realised'):

$$v_{a;t} - v_{a;t-1} = w_{a;t-1,t} - vr_{a;t-1,t}$$

This is just a provisional expression: it excludes the effects of revaluation and devaluation, which we will introduce later.

Table 1

Week (t)	Wages paid at the end of each week ($w_{t\text{-}1,t}$)	Wages cost component of income ($vr_{t\text{-}1,t}$)	Wages cost component of unsold and unfinished widgets at end of week (v_t)
1	$20 000	$0	$20 000
2	$20 000	$0	$40 000
3	$20 000	$0	$60 000
4	$20 000	$0	$80 000
5	$20 000	$0	$100 000
6	$20 000	$0	$120 000
7	$20 000	$40 000	$100 000
8	$20 000	$0	$120 000
9	$20 000	$40 000	$100 000
10	$20 000	$0	$120 000
...	...	...	...
20	$20 000	$0	$120 000
21	$20 000	$40 000	$100 000
22	$20 000	$0	$120 000
23	$20 000	$40 000	$100 000
24	$20 000	$40 000	$80 000
25	$20 000	$0	$100 000
26	$20 000	$40 000	$80 000
27	$20 000	$0	$50 000 (inc. -$50,000 revaluation)

But now suppose, due to a technical improvement, from the 20th week onwards it takes 3 weeks instead of 4 for each new consignment of widgets to reach its destination and be sold. This means the widgets shipped in the 20th week will now reach their destination in the 23rd week, and payment will be received at the beginning of the 24th. So, by the end of the 24th week, instead of increasing to $120,000, the stock of variable capital advanced will fall to $80,000. Then, in the 25th week, no widgets will be sold, and variable capital advanced will increase to $100,000. Widgets will be sold again in week 26, and variable capital advanced will fall back down to $80,000; and this pattern will continue. In this case, $20,000 of variable capital has been released permanently, corresponding to the one week's worth of widgets that no longer need to be tied up in the circulation process (and the one weeks' worth of workers' consumption that no longer has to be covered by wage payments in advance of receiving payment for output). This is *not* profit: it is the 'release' of part of the original amount of variable capital that the capitalist advanced.

Now suppose, at the start of week 27, it becomes possible to produce twice as many widgets in the same SNLT and using the same equipment and cost of inputs. That is, the value of each widget halves, and the quantity of output doubles. Suppose this also causes the price of widgets to fall by half. This means the current price of inventories will also fall by half. Similarly, in replacement cost terms, the wages cost component of inventories will also fall by half, from \$100,000 at historical cost to \$50,000 at replacement cost. For the capitalist, this is a loss of \$50,000, which is deducted from their stock of variable capital, and from their profits (as a devaluation). Notice this is quite different from a *release* of variable capital, which transforms part of the value of inventories into cash. But its effect on the stock of variable capital is the same, and we need to account for by incorporating it into our expression for the change in the stock of variable capital advanced:

$$v_{a;t} - v_{a;t-1} = w_{a;t-1,t} - vr_{a;t-1,t} + Rinv_{a;t-1,t} \times \frac{v_{a;t-1}}{inv_{a;t-1,t}}$$

Here, *Rinv* is the effect of revaluation on the stock of inventories as a whole, and it is multiplied by the ratio of *v* to *inv* at the start of the period.

The Stock of Variable Capital for Capital in General

So far, we have not defined what we mean by the stock of 'inventories' precisely. Above, we examined the wages cost component of the stock of unsold and unfinished commodities, and argued this corresponded to the stock of variable capital. But, as usually defined, inventories also include unconsumed inputs (apart from fixed assets), such as fuel and raw materials. In the example above, we have not looked at this component of the capitalists' capital or the variable capital advanced to produce it. So now we need to introduce it.

For the capitalist employing workers to produce fuel or raw materials (e.g. coal), the situation is the same as that set out in the example above. She pays wages to her workers to produce the coal, and for her the cost of these wages is recouped when she sells the coal to another capitalist. Her stock of variable capital is the amount of money tied up at a point in time in unfinished or finished coal which has not yet been sold. This does not yet pose any difficulties, but nor does it address the problem of how the stock of fuel and raw materials should be treated, since in this case the coal in question is in the category of unfinished or unsold commodities.

The problem we want to address arises when the capitalist has finished producing the coal and has sold it to another capitalist, but it has not yet been consumed in their process of production. This is when the coal is classified in the national accounts in the category of fuel and raw materials. This situation poses a problem for the following reason: for the coal-producing capitalist, once she has sold the coal the variable capital it embodies is clearly no longer part of her stock of variable capital; she has recouped the cost of the wages she has paid to the workers who produced it. For the coal-consuming capitalist (e.g. the steel maker), the coal she purchases is not part of her expenses for wages. Obviously she will account for the coal as a purchase like any other. So what has happened to the variable capital embodied in the coal? Has it disappeared simply because one capitalist sold the coal to another? The answer has to be 'no', otherwise if the coal mining capitalist and the steel making capitalist were the same legal entity we would get a different result for the stock of variable capital. Because capital as a whole has not recouped the wages cost of the coal, it remains part of the total stock of variable capital, however the capitalists themselves account for it. Even once the coal is consumed, the variable capital required to produce it is not recouped until the final commodity it is used to produce has been sold. Effectively, the variable capital embodied in the coal is transferred to value of the commodities it is used to produce: i.e., variable capital advanced to produce an intermediate inputs stays 'on the books' until the final commodity is sold.[154]

This means that the direct wages cost component of materials and supplies should be counted as variable capital advanced, as should the direct wages cost component of the materials and supplies used to produce those materials and supplies, and so on. To apply this approach, we need a method for estimating the initial stock of variable capital (since measuring it directly would require data stretching back far into the past). The most straightforward way to do this is to multiply the initial stock of inventories by the direct wages cost of output for the preceding year, i.e.

$$v_0 \approx \frac{w_{-1,0}}{y_{-1,0}} \times inv_0 \,.$$

To track the growth of this stock over time, we can use the same expression as for the individual capitalist, but applied to the economy as a whole:

$$v_t - v_{t-1} = w_{t-1,t} - vr_{t-1,t} + Rinv_{t-1,t} \times \frac{v_{t-1}}{inv_{t-1,t}} \,.$$

To use this in practice, we need a method for measuring the wages cost component of commodities sold during a year, *vr*. We can express *vr* as the product of the wages cost share of

[154] This does not mean that the entire value of the stock of inventories is variable capital. It is still the case that the value of the steel, for example, can be divided into the sum of $c + v + s$ – i.e., the value of constant capital consumed plus the variable capital it embodies plus the surplus value it embodies. But from the perspective of capital as a whole, part of what is constant capital for the steel maker (the variable capital component of the coal used to produce it) is in fact an outlay of variable capital from the perspective of capital as a whole: or, put differently, the steel maker returns the coal mining capitalist's variable capital to her 'prematurely', i.e., before the coal's variable capital is recouped by the sale of a final commodity it is used to produce.

commodities sold during the period, which we will call *wsys*, and the total value of commodities sold during the period, *ys*, i.e.

$$vr_{t,t+1} = wsys_{t,t+1} \times ys_{t,t+1}$$

How might we measure this? In any year we can straightforwardly measure the wages cost share of output *produced* during the period, which is just *w/y*. In practice, this is likely to be very similar to the wages cost share of commodities *sold* during the period. So we can use the following approximation:

$$vr_{t,t+1} \approx \frac{w_{t,t+1}}{y_{t,t+1}} \times ys_{t,t+1} \,.$$

We can measure $ys_{t,t+1}$ as output less the change in inventories excluding revaluation:

$$ys_{t,t+1} = y_{t,t+1} - \left(inv_{t+1} - inv_t - Rinv_{t,t+1}\right).$$

This means we can estimate the stock of variable capital at the end of the year:

$$\begin{aligned} v_{t+1} &\approx v_t + w_{t,t+1} - \frac{w_{t,t+1}}{y_{t,t+1}} \times ys_{t,t+1} + Rinv_{t,t+1} \times \frac{v_t}{inv_t} \\ &= \left(1 + \frac{Rinv_{t,t+1}}{inv_t}\right) v_t + \left(1 - \frac{ys_{t,t+1}}{y_{t,t+1}}\right) w_{t,t+1} \,. \end{aligned}$$

We can also use the estimates of *vr* and *v* to estimate the number of turnovers of variable capital that take place during the period, which we will call *nv*. This is just the ratio of *vr* to *v*: i.e., the ratio of the total value of variable capital turned over to the initial stock of variable capital:

$$nv_{t,t+1} \equiv \frac{vr_{t,t+1}}{v_t} \;.$$

In Chapter 7 we will check this against the ratio of *ys* to inventories, which is a simpler way of estimating *nv*. Effectively this simpler method assumes $v = (w/y) \times inv$ every year, and not just in the first year. The two approximations should give similar results.

We can now estimate the VCC across the economy as a whole. The stock of constant capital is equal to the total stock of produced capital (inventories plus fixed capital) less variable capital, i.e.:

$$c_t = F_t + inv_t - v_t.$$

Constant capital therefore incorporates the stock of fixed capital, and the depreciation and profit components of the total price of inventories.

The VCC is just the ratio of *c* to *v*; i.e.

$$VCC_t = \frac{c_t}{v_t} = \frac{F_t + inv_t - v_t}{v_t}.$$

This measure of turnover time also allows us to apply Marx's neglected distinction between the 'real' rate of surplus value and the annual rate of surplus value.[155] The real rate of surplus value is the ratio of surplus value produced over a single turnover of variable capital to the cost of labour power consumed over a single turnover. Using yearly data, this is

$$ROSV_{t,t+1} = \frac{s_{t,t+1}/nv_{t,t+1}}{w_{t,t+1}/nv_{t,t+1}} = \frac{s_{t,t+1}}{w_{t,t+1}}$$

i.e., just the ordinary ratio of surplus value to wages. The *annual* rate of surplus value, however, is the ratio of surplus value produced over the year to the *stock* of variable capital at the start:

[155] Marx, *Capital II*, 1978, 369–383.

$$AROSV_{t,t+1} = \frac{s_{t,t+1}}{v_t}.$$

Turnover Time in the Secondary Literature

How does this method compare with others? The issue of turnover time is somewhat neglected in the large literature discussing the LTFRP, and is often ignored or mentioned in passing.

Mage, for example, effectively defines the stock of variable capital as the fund put aside for paying wages, less the labour power advanced to capitalists by workers. As he points out, the value of this stock is probably negative in most cases, so it is not clear whether it makes any sense to try to measure its turnover, or why this would be of interest.[156] Nor is it clear why, on this interpretation, Marx and Engels would have thought the issue was important. This is perhaps one reason he defines the OCC as the ratio of the stock of constant capital to the *flow* of wages, because if he defined it as the ratio of a *stock* to a stock it would generally be negative.

Desai goes to the other extreme, abandoning Marx and Engels' stress on the importance of the turnover time of *variable* capital and instead defining turnover time as the ratio of the *whole* stock of capital advanced to *constant* capital turned over. [157]

Webber and Rigby have a better approach. They define variable capital advanced as the wages paid over a period divided by the number of production periods per year, adjusted for the extent to which businesses can delay payment of wages (for example, by only paying wages every fortnight).[158] The problem with this definition is that it neglects the circulation period. But

[156] Mage, "The 'Law of the Falling Tendency of the Rate of Profit': Its Place in the Marxian Theoretical System and Relevance to the US Economy," 37–38.
[157] Desai, *Marxian Economics*, 64–65.
[158] Webber and Rigby, "The Rate of Profit in Canadian Manufacturing, 1950-1981," 37–38.

importantly, they correctly observe that variable capital advanced is equivalent to the wages cost component of inventories.[159]

Fichtenbaum builds on Webber and Rigby's approach, but recognises that the circulation period also needs to be included in turnover time. He uses the approximation that the turnover time of variable capital is equal to the turnover time of inventories, but calculates this for the manufacturing sector only. He also uses this to estimate the stock of variable capital as the wages bill divided by the number of turnovers.[160] This is similar to the approximation we are using to measure turnover time in the first year.

Passarella and Baron define turnover time of variable capital for an individual capitalist as the length of the production period plus the length of the circulation period, and the average turnover time as the average of these individual turnover times weighted by the stock of variable capital to which they apply. As we have seen, when applied at the level of individual capitals, this creates a problem when it comes to circulating capital inputs, because it makes the size of the stock of variable capital, the turnover time, the VCC and the OCC dependent on the number of different businesses involved in a given production process. They also do not make the link between the length of the turnover period, changes in the stock of inventories and the release and tying up of circulating capital, nor do they try to apply their approach in practice using existing data (which would probably only be possible after understanding the link between turnover time and inventories, given the lack of data on production and circulation periods). Finally, they introduce the concept of the 'temporal composition of capital', which was not used

[159] Ibid., 42–43.
[160] Fichtenbaum, "'Business Cycles', Turnover and the Rate of Profit: An Empirical Test of Marxian Crisis Theory," 224.

by Marx or Engels, and seems to unnecessarily complicate their effort to understand the connection between turnover time and the rate of profit.[161]

The OCC

With the stock of variable capital, turnover time and the VCC defined, we are in a position to define the OCC. As mentioned, for Marx this is the "value-composition of capital, in so far as it mirrors the changes in the [TCC]."[162] The TCC "is determined by the relation between the mass of the means of production employed on the one hand, and the mass of labour necessary for their employment on the other".[163]

But to speak of *the* TCC is somewhat misleading. In a single branch which uses a single input, we could measure *the* TCC as the ratio of inputs to hours worked. For the spinning industry, for example, we could measure how many kilograms of raw cotton each spinning worker can turn into yarn per hour (setting aside the depreciation of the machines). But in other industries, there are other, qualitatively different TCCs – e.g., the ratio of iron ore to labour hours in the steel industry. Even within an industry there is generally more than one TCC – e.g., in the steel industry we could also measure the ratio of coal to labour hours. In other words, it is only possible to measure technical compositions of capital in the plural, using a measure with different units for each type of input.

Fortunately, this does not pose problems for measuring the OCC. Following Fine and Harris, and Marx's own definition given above, I take Marx to mean that the OCC measures what would have happened to the VCC over time if only the TCCs had changed – i.e., if unit prices had

[161] Passarella and Baron, "Capital's Pons Ansinorum: The Rate of Turnover in Karl Marx's Analysis of Capitalist Valorisation," 19–20.
[162] Marx, *Capital I*, 762.
[163] Marx, *Capital III*, 1981, 762.

remained constant while the quantities of constant capital and hours worked per turnover had changed.[164]

National accounts can be used to approximate this, since standard measures of inflation rely on tracking changes in volume indexes at fixed prices. Since the OCC measures what would have happened to the VCC over a period of time, to calculate its value at any point in time we have to specify an initial reference point. This is *i* in the expression below.

$$OCC_t = \frac{(F_i + inv_i) \times \dfrac{QC_t}{QC_i} - v_i \times \dfrac{L_{t,t+1}/nv_{t,t+1}}{L_{i,i+1}/nv_{i,i+1}}}{v_i \times \dfrac{L_{t,t+1}/nv_{t,t+1}}{L_{i,i+1}/nv_{i,i+1}}}\,.$$

Here, *QC* is a volumetric index for the stock of fixed assets and inventories. The national accounts report these indexes separately, but to avoid unnecessary complications later, we need a single index. We can construct this in the following way, where *QF* is the volumetric index for fixed assets, and *Qinv* is the index for inventories:

$$QC_t = \frac{F_i \times \dfrac{Qf_t}{Qf_i} + inv_i \times \dfrac{Qinv_t}{Qinv_i}}{F_i + inv_i} \times 100\,.$$

In the definition above, note that the OCC at time *t* is defined in terms of the value added by living labour over a single turnover for the *following* period: i.e., for the period *t, t* + 1. This is because Marx specifies that the TCC is the mass of labour necessary for the employment of the existing means of production. Since the means of production must first be produced and *then*

[164] Fine and Harris, *Rereading Capital*, 59.

the labour power necessary for their employment obtained, we have defined the OCC in terms of employment in the following period rather than the preceding period.

One final aspect of this definition is worth noting. The OCC is *not only* what the VCC would be if there were no devaluation or revaluation. The OCC is *also* influenced by the ROSV, because the ROSV affects the size of the stock of variable capital. This will be important for the decomposition below.

Decomposing Changes in the Rate of Profit

Now that we can measure the OCC, we have the basis for quantifying its influence on the rate of profit. Neither Marx nor Engels gives us a formula for doing this, but in his chapter on turnover time, Engels makes a relevant observation. He argues

> the formula *p' = s'v / C* [the rate of profit] is strictly correct only for a single turnover period of the variable capital, while for the annual turnover the simple rate of surplus-value *s'* has to be replaced by *s'n*, the annual rate of surplus-value, *n* standing for the number of turnovers that the variable capital makes in the course of a year.[165]

This suggests a decomposition based on three terms, not two: i.e., separating the influence of the ROSV, the VCC and turnover time. Our expression for the rate of profit:

$$ROP_{t,t+1} = \frac{s_{t,t+1}}{F_t + inv_t}$$

can also be expressed in the more familiar form:

$$ROP_{t,t+1} = \frac{s_{t,t+1}}{c_t + v_t}$$

[165] Marx, *Capital III*, 1981, 142. It is also worth observing that in Volume 2 Marx comments that confusion surrounding the distinction between the annual rate of surplus value and the rate of surplus value “led to the complete destruction of the Ricardian school”, suggesting he thought this distinction was rather important. Marx, *Capital II*, 1978, 373.

since we now know $c + v = F + inv$.

If we divide through by our estimate of v_t, this becomes:

$$ROP_{t,t+1} = \frac{s_{t,t+1}/v_t}{c_t/v_t + 1} = \frac{s_{t,t+1}/v_t}{VCC_t + 1}.$$

Now, since

$$v_t = \frac{vr_{t,t+1}}{nv_{t,t+1}}\ ;$$

$$ROP_{t,t+1} = \frac{s_{t,t+1} \times \frac{nv_{t,t+1}}{vr_{t,t+1}}}{VCC_t + 1}.$$

Substituting in our expression for the estimate of vr:

$$ROP_{t,t+1} = \frac{s_{t,t+1} \times nv_{t,t+1} \times \frac{y_{t,t+1}}{w_{t,t+1}} \times \frac{1}{ys_{t,t+1}}}{VCC_t + 1} = \frac{\frac{s_{t,t+1}}{w_{t,t+1}} \times nv_{t,t+1} \times \frac{y_{t,t+1}}{ys_{t,t+1}}}{VCC_t + 1}.$$

We also know that the ratio of s to w is the rate of surplus value; i.e.

$$ROSV_{t,t+1} \equiv \frac{s_{t,t+1}}{w_{t,t+1}}\ .^{166}$$

Therefore

$$ROP_{t,t+1} = \frac{ROSV_{t,t+1} \times (nv_{t,t+1} \times \frac{y_{t,t+1}}{ys_{t,t+1}})}{VCC_t + 1}.$$

[166] Though this definition is modified in the next chapter.

This breaks up the expression for the rate of profit into three component parts: the rate of surplus value, the VCC, and the number of turnovers of variable capital multiplied by the ratio of output to sales (*y* to *ys*, which will drop out further below).

Next, we want to separate the influence of the OCC from the effect of other changes in the VCC. So we will rearrange the expression as follows:

$$ROP_{t,t+1} = \frac{ROSV_{t,t+1} \times nv_{t,t+1} \times \dfrac{y_{t,t+1}}{ys_{t,t+1}}}{\dfrac{VCC_t + 1}{OCC_t + 1} \times (OCC_t + 1)}.$$

As an approximation, we could use these four terms as the basis for our decomposition of the rate of profit. But the ratio (*VCC* + 1) / (*OCC* + 1) in fact incorporates several different influences. The difference between the change in constant capital in purely volumetric terms and the actual change in constant capital is the effect of changes in the prices of the elements of constant capital. However, for the variable capital component the relationship between the OCC and the VCC is more complicated. The purely volumetric influence is the effect of changes in the total SNLT performed by productive workers. But the stock of variable capital is also influenced by the ROSV, the turnover time of variable capital, and any devaluation or revaluation of the existing stock of inventories. We want to separate out all these influences. First, we can re-arrange the expression in the following way:

$$\frac{VCC_t + 1}{OCC_t + 1} = \frac{\dfrac{C_t - v_t}{v_t} + 1}{\dfrac{C_i \times \dfrac{QC_t}{QC_i} - v_i \times \dfrac{L_{t,t+1}/nv_{t,t+1}}{L_{i,i+1}/nv_{i,i+1}}}{v_i \times \dfrac{L_{t,t+1}/nv_{t,t+1}}{L_{i,i+1}/nv_{i,i+1}}} + 1}$$

$$= \frac{C_t}{v_t} \times \frac{v_i \times \frac{L_{t,t+1}/nv_{t,t+1}}{L_{i,i+1}/nv_{i,i+1}}}{C_i \times \frac{QC_t}{QC_i}} = \frac{C_t}{C_i \times \frac{QC_t}{QC_i}} \times \frac{L_{t,t+1}/nv_{t,t+1}}{L_{i,i+1}/nv_{i,i+1}} \times \frac{v_i}{v_t}.$$

The first ratio here is the ratio of the stock of capital advanced after the effect of price changes to the stock of capital advanced excluding them. So this is a measure of the combined effect of devaluation and revaluation on the existing stock of capital advanced at time *i*, and the effect of the cheapening of capital on newly produced capital advanced since time *i*. We will set this aside to separate out the effects of the rate of surplus value and changes in turnover time on the ratio of the stock of variable capital to living labour employed, i.e., on:

$$\frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{v_i}{v_t} \times \frac{nv_{i,i+1}}{nv_{t,t+1}}.$$

First, since

$$v_t = \frac{vr_{t,t+1}}{nv_{t,t+1}} ;$$

$$\frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{v_i}{v_t} \times \frac{nv_{i,i+1}}{nv_{t,t+1}} = \frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{vr_{i,i+1}}{nv_{i,i+1}} \times \frac{nv_{t,t+1}}{vr_{t,t+1}} \times \frac{nv_{i,i+1}}{nv_{t,t+1}} = \frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{vr_{i,i+1}}{vr_{t,t+1}}.$$

We are also using this approximation for *vr*:

$$vr_{t,t+1} = \frac{w_{t,t+1}}{y_{t,t+1}} \times ys_{t,t+1} ;$$

so

$$\frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{vr_{i,i+1}}{vr_{t,t+1}} = \frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{\frac{w_{i,i+1}}{y_{i,i+1}} \times ys_{i,i+1}}{\frac{w_{t,t+1}}{y_{t,t+1}} \times ys_{t,t+1}} = \frac{w_{i,i+1}/L_{i,i+1}}{\frac{y_{i,i+1}}{ys_{i,i+1}}} \Bigg/ \frac{w_{t,t+1}/L_{t,t+1}}{\frac{y_{t,t+1}}{ys_{t,t+1}}} .$$

That is, our expression is equal to the ratio of the initial wage rate to the ratio of output to sales, divided by the same ratio for the current period.

The wage rate is determined by the rate of surplus value, since:

$$ROSV_{t,t+1} = \frac{s_{t,t+1}}{w_{t,t+1}} = \frac{L_{t,t+1} - w_{t,t+1}}{w_{t,t+1}} = \frac{L_{t,t+1}}{w_{t,t+1}} - 1$$

$$\frac{w_{t,t+1}}{L_{t,t+1}} = \frac{1}{ROSV_{t,t+1} + 1}.$$

As the next chapter will discuss, here we are implicitly assuming that the wage is equal to the total cost of the commodities consumed by producers. In the next chapter we will relax this assumption, which will change our definition of the ROSV. But for the moment, we can now say:

$$\frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{vr_{i,i+1}}{vr_{t,t+1}} = \frac{\frac{y_{t,t+1}}{ys_{t,t+1}} \times (ROSV_{t,t+1} + 1)}{\frac{y_{i,i+1}}{ys_{i,i+1}} \times (ROSV_{i,i+1} + 1)}.$$

Hence (VCC + 1) / (OCC + 1) can be expressed as the product of the ratios of: capital advanced at current prices to capital advanced at initial prices; the current number of turnovers to the initial number of turnovers, after multiplying by the ratio of output to sales; and the ratio of the current rate of surplus value plus one to the initial rate of surplus value plus one, i.e.

$$\frac{VCC_t + 1}{OCC_t + 1} = \frac{C_t}{C_i \times \frac{QC_t}{QC_i}} \times \frac{\frac{y_{t,t+1}}{ys_{t,t+1}}}{\frac{y_{i,i+1}}{ys_{i,i+1}}} \times \frac{ROSV_{t,t+1} + 1}{ROSV_{i,i+1} + 1}.$$

Now, applying this to the rate of profit:

$$ROP_{t,t+1} = \frac{ROSV_{t,t+1} \times nv_{t,t+1} \times \dfrac{y_{t,t+1}}{ys_{t,t+1}}}{\dfrac{VCC_t + 1}{OCC_t + 1} \times (OCC_t + 1)}$$

$$ROP_{t,t+1} = ROSV_{t,t+1} \times nv_{t,t+1} \times \frac{y_{t,t+1}}{ys_{t,t+1}} \times \frac{C_i \times \dfrac{QC_t}{QC_i}}{C_t} \times \frac{\dfrac{y_{i,i+1}}{ys_{i,i+1}}}{\dfrac{y_{t,t+1}}{ys_{t,t+1}}} \times \frac{ROSV_{i,i+1} + 1}{ROSV_{t,t+1} + 1} \times \frac{1}{OCC_t + 1}$$

$$= \frac{ROSV_{t,t+1}}{ROSV_{t,t+1} + 1} \times nv_{t,t+1} \times \frac{C_i \times \dfrac{QC_t}{QC_i}}{C_t} \times \frac{y_{i,i+1}}{ys_{i,i+1}} \times \left(ROSV_{i,i+1} + 1\right) \times \frac{1}{OCC_t + 1}.$$

Between any two periods, the average exponential growth rate of the rate of profit is the difference between the natural logarithm of the rate of profit in each period. We can use this to decompose changes in the rate of profit between any period *t, t* + 1 and a later period *f , f* + 1 in the following way:

$$\log(ROP_{f,f+1}) - \log(ROP_{t,t+1})$$

$$= \log\left(\frac{ROSV_{f,f+1}}{ROSV_{f,f+1}+1}\Big/\frac{ROSV_{t,t+1}}{ROSV_{t,t+1}+1}\right) + \log\left(\frac{nv_{f,f+1}}{nv_{t,t+1}}\right)$$

$$+ \log\left(\frac{C_i \times \frac{QC_f}{QC_i}}{C_f}\Big/\frac{C_i \times \frac{QC_t}{QC_i}}{C_t}\right)$$

$$+ \log\left(\frac{y_{i,i+1}}{ys_{i,i+1}} \times \frac{ys_{i,i+1}}{y_{i,i+1}} \times \frac{ROSV_{i,i+1}+1}{ROSV_{i,i+1}+1}\right) + \log\left(\frac{OCC_f+1}{OCC_t+1}\right)$$

$$= \log\left(\frac{ROSV_{f,f+1}}{ROSV_{f,f+1}+1}\Big/\frac{ROSV_{t,t+1}}{ROSV_{t,t+1}+1}\right) + \log\left(\frac{nv_{f,f+1}}{nv_{t,t+1}}\right)$$

$$- \log\left(\frac{C_f}{QC_f}\Big/\frac{C_t}{QC_t}\right) + \log\left(\frac{OCC_t+1}{OCC_f+1}\right).$$

Notice here that this measure no longer depends on choosing an arbitrary initial point in time *i*.

This allows us to neatly separate out the influence on the rate of profit of the rate of surplus value, the turnover time of variable capital, the effect of (inflation-adjusted) changes in the prices of the material elements of capital advanced, and the effect of changes in the OCC. In the expression above, these correspond to each of the four logarithms in order.

Note that, in each case, this is not 'what the rate of profit would have been in the year beginning at time *f* if the OCC were the only factor that changed since the initial year', but rather 'the influence which changes in the OCC have had since the initial year given other factors also changed'. If we were using the first type of measure, the negative influence of the OCC could never exceed the initial level of the rate of profit, since no matter how much the OCC rises, it can never make surplus value and hence the rate of profit negative. But since we are using the second type of measure, it is possible for the cumulative negative influence of the OCC to exceed the initial level of the rate of profit. The advantage of this approach is that, each year, the sum of the four influences is equal to the change in the rate of profit.

Also note that the third term, the effect of changes in prices on the stock of capital advanced, just subtracts the log of the ratio of the average price of capital advanced at times *f* and *t* (i.e., the ratio of the total values of the stocks divided by their volumes), since:

$$\frac{C_f}{QC_f} \Big/ \frac{C_t}{QC_t} = \frac{PC_f}{PC_t}$$

where *PC* is an index of the average price level of constant capital.

Thus this incorporates the effect of both revaluation (i.e., the effect of price changes on the already existing stock) and the effect of price changes on the newly produced stock. We will now separate these out. Recall from the last chapter that:

$$RF_{t,t+1} \equiv F_t - F_{t+1} - i_{t,t+1} + d_{t,t+1}$$

where *RF* is revaluation of fixed assets. This can be generalised to apply to any two points in time *t* and *f*:

$$RF_{t,f} \equiv F_f - F_f - i_{t,f} + d_{t,f} \ .$$

A similar relationship is true for the revaluation of inventories:

$$Rinv_{t,f} \equiv inv_f - inv_t + ys_{t,f} - y_{t,f} \ .$$

So now we can measure total revaluation, *R*:

$$R_{t,f} \equiv RF_{t,f} + Rinv_{t,f} \ .$$

Returning to the expression for the ratio of the average prices of capital advanced between two points in time, we can separate out the influence of revaluation on the pre-existing stock of capital advanced from its influence on the value of the newly produced stock:

$$\frac{C_f}{QC_f}\bigg/\frac{C_t}{QC_t} = \frac{C_f}{QC_f} \times \frac{C_f - R_{t,f}}{C_f - R_{t,f}}\bigg/\frac{C_t}{QC_t}$$

$$= \frac{C_f}{C_f - R_{t,f}} \times \frac{C_f - R_{t,f}}{QC_f}\bigg/\frac{C_t}{QC_t} = \frac{C_f}{C_f - R_{t,f}} \times \frac{C_f - R_{t,f}}{C_t \times \frac{QC_f}{QC_t}}.$$

So

$$-\log\left(\frac{C_f}{QC_f}\bigg/\frac{C_t}{QC_t}\right)$$

$$= -\log\left(\frac{C_f}{C_f - R_{t,f}} \times \frac{C_f - R_{t,f}}{C_t \times \frac{QC_f}{QC_t}}\right)$$

$$= -\log\left(\frac{C_f}{C_f - R_{t,f}}\right) - \log\left(\frac{C_f - R_{t,f}}{C_t \times \frac{QC_f}{QC_t}}\right).$$

Here, the first term is the log of the ratio of the final stock of *C* to what the stock of *C* would have been if there had been no revaluation over the previous year. This (multiplied by minus one) is the effect of revaluation on the rate of profit. The second is the log of the ratio of *C* excluding revaluation to the initial stock of *C* multiplied by its volumetric increase (in other words, what *C* would have been if the initial stock and the quantity of investment in inventories and fixed capital was valued at initial prices). This is the effect on the rate of profit of the cheapening (or otherwise) of the elements of capital advanced on the value of its newly produced material elements. Finally, we can incorporate this into the decomposition of the rate of profit:

$$\log(ROP_{f,f+1}) - \log(ROP_{t,t+1})$$

$$= \log\left(\frac{ROSV_{f,f+1}}{ROSV_{f,f+1}+1} \Big/ \frac{ROSV_{t,t+1}}{ROSV_{t,t+1}+1}\right)$$

$$+ \log\left(\frac{nv_{f,f+1}}{nv_{t,t+1}}\right) - \log\left(\frac{C_f}{C_f - R_{t,f}}\right) - \log\left(\frac{C_f - R_{t,f}}{C_t \times \frac{QC_f}{QC_t}}\right) + \log\left(\frac{OCC_t + 1}{OCC_f + 1}\right).$$

Conclusion

Now we have explored the relationships between inflation, capital advanced, revaluation, the turnover time of variable capital, the VCC, the OCC, the real and the annual rates of surplus value, and, of course, the rate of profit. But to actually measure any of these, we need methods for measuring output and surplus value using the national accounts. This is what we will set out in the next chapter.

Chapter 4: Surplus Value, Profit and Output

The previous chapters have discussed how to decompose changes in the average rate of profit and how to measure its denominator. This chapter considers how to measure the numerator of the rate of profit.

The main theme of the chapter is that the relationship between surplus value and profit is not straightforward, even at the aggregate level. It begins by looking at Marx's distinction between productive and unproductive labour, and how this influences the relationship between profit and surplus value. It then shows how this relationship is further mystified by borrowing and saving: specifically, how government borrowing can create additional after-tax profit from production, without any change in the production or expenditure of surplus value; and how differences between wages and workers' consumption also mean that surplus value can differ from profits from production (both before- and after-tax). Finally it shows how we can measure output, surplus value, unproductive expenditures of surplus value and profits from production before- and after-tax, using the national accounts, after taking these complications into account.

The Forms of Appearance of Surplus Value

To explain the transformation of values into prices, Marx starts from the premise that total profit is equal to total surplus value. This is also the basis on which he develops the LTFRP. Then, as *Capital* III progresses, Marx explains how surplus value becomes divided up into interest, rent, and profits retained by enterprises.[167] Surplus value can also be spent by the state, and by businesses on paying managers and other unproductive employees. Moreover, the surplus value produced by workers in any given country is not necessarily equal to the surplus value

[167] Marx, *Capital III*, 1981, 459–953.

appropriated in that country. All of this obscures the fact that workers' surplus labour is the source of profit.

How, then, are we to measure surplus value using national accounts? In *Capital*, Marx generally assumes productive workers spend all of their wages buying the commodities they need to consume to reproduce their labour power over a single period. In that case, surplus value can be looked at in two equivalent ways. On the income side, surplus value is equal to the total income capitalists receive for selling commodities after subtracting wages paid to productive workers and the productive consumption of constant capital.[168] On the expenditure side, surplus value is the total price paid for all newly produced commodities after subtracting productively consumed constant capital, less productive workers' total *expenditure*.[169] Thus surplus value encompasses a great many expenditures, including: personal consumption of anyone who is not a productive worker, government spending on commodities other than labour power (consumption out of unproductive government employees' wages is also surplus value, but is covered by the first category), and all net investment, including investment in employing additional labour power. In order to measure this, we first need a method for distinguishing productive from unproductive workers.

Unproductive Labour

Like Marx's theory of value, this is seen by contemporary mainstream economists as a quaint concern, peculiar to Marx and the classical political economists. In fact no economic analysis is possible unless we distinguish productive from unproductive activities.[170] The question is where to draw the line.

[168] Marx, *Capital I*, 320–321.
[169] Marx, *Capital II*, 1978, 586–587.
[170] Shaikh and Tonak, *Measuring the Wealth of Nations*, 32–34.

Marx's position emerges from a critique of Adam Smith. He argues Smith characteristically jumbles together two conceptions of productive labour, one correct and one incorrect. Smith's correct conception is the following:

> [Smith] defined productive labour as labour *which is exchanged directly with capital*; that is, an exchange through which the means of production required for labour, and value in general – money or commodities – are first transformed into capital and labour into wage labour in its scientific meaning. Thereby also what is *unproductive labour* is absolutely defined. It is labour which is not exchanged against capital, but *directly* against revenue, that is, against wages or profit, including of course the various categories of those who share in the profit of the capitalist, as interest and rent… These definitions are therefore not derived from the material processes of labour – neither from the nature of its product nor from the work performed as concrete labour – but from the definite social forms, the social relations of production, within which these processes are realised.
>
> An actor, for example, or even a clown, according to this definition is a productive worker, if he works in the employ of a capitalist (an *entrepreneur*) to whom he returns more labour than he receives from him in the form of wages; while a jobbing tailor who comes to the capitalist's house and patches his trousers for him, producing a mere use value for him, is an unproductive worker. The labour of the former is exchanged against capital, that of the latter against revenue. The former produces a surplus value; in the latter, revenue is consumed.[171]

Note that here Marx is investigating the question of which labour is productive *under the capitalist mode of production*. With this qualification, he endorses Smith's argument that this is labour that directly augments capital. This is Marx's theoretical starting point. But on its own, this is not a criterion for distinguishing productive from unproductive labour, because it begs the question of which labour augments the stock of capital across the economy as a whole. As we will explore, this is not as simple as identifying which workers allow their employers to

[171] Marx, *Theories of Surplus Value*, 153–154, emphasis in original.

appropriate a profit, because some labour appropriates profit for one capitalist at the expense of others.

From his correct starting point, Marx discusses how Smith goes on to draw the further, incorrect conclusion that productive labour must “fix itself” in “vendible commodities”: i.e., that it must be embodied in a physical object. Labour which produces services would therefore necessarily be unproductive.[172] Against this position, Marx gives the following example:

> The cook in the hotel produces a commodity for the person who has bought her labour as a capitalist, the hotel proprietor. The consumer of the lamb cutlet has to pay for her labour, and this replaces for the hotel proprietor (apart from profit) the fund out of which he continues to pay the cook. But if on the other hand I buy the labour of a cook so that she may cook meat etc. for me, not to make a profit out of it as labour in general but to enjoy it, to use it as that particular concrete labour, then her labour is unproductive; although this labour fixes itself in a material product and could just as well (in its result) be a vendible commodity as it in fact is for the proprietor of the hotel.
>
> The great difference remains however: the cook does not replace for me (the private person) the fund out of which I pay her. For I buy her labour not as a value-creating element, but merely for the sake of its use value.[173]

This may sound as though Marx is saying that all workers employed by capitalists to make a profit are productive, and all other labour is unproductive. But in fact the situation is more complicated. First, Marx allows for the possibility that workers who own their own means of production produce surplus value, and ‘exploit themselves’:

> [I]n the capitalist mode of production the independent peasant or handicraftsman is sundered into two persons. As owner of the means of production he is capitalist, as worker he is his own wage worker. As capitalist, he therefore pays himself his wages and

[172] Ibid., 159–160.
[173] Ibid., 162–163.

> draws his profit from his capital; that is to say, he exploits himself as wage worker and pays himself, with the surplus value, the tribute that labour owes to capital.[174]

Note that this is only true under capitalism. In pre-capitalist societies, some independent peasants and artisans may produce commodities for exchange, but there is no reason for them to treat one part of their income from doing so as wages, and the rest as profit. This only makes sense where they have the alternative to work for a wage.

Second, Marx argues that some workers who are employed by capitalists do not augment surplus value. Instead, they help their employer to appropriate surplus value produced elsewhere. This includes workers employed in the retail and financial sectors, and follows from Marx's argument that productive labour must *produce* commodities.[175] The retail sector is concerned with the *realisation* of the value which commodities embody, but does not enhance their use value, and therefore does not add to their value either. An exception here is work necessary to transport commodities to their point of sale, which Marx counts as part of the socially necessary labour time involved in producing them, because it enhances the use value of the commodity for its consumer (by changing its location to make it accessible).[176] The financial sector is unproductive because, like the retail sector, it does not directly enhance commodities' use values. Both sectors nevertheless perform important functions for capital, and can *indirectly* increase the average rate of profit. For example, if the retail sector succeeds in selling commodities more quickly, this reduces the turnover time of variable capital; or, if it increases sales relative to its costs, this reduces the surplus value it consumes unproductively relative to total sales. Similarly, if it performs its function for capital effectively, the financial sector can help

[174] Ibid., 192.
[175] Marx, *Capital III*, 1981, 438–439; Marx, *Theories of Surplus Value*, 185.
[176] Marx, *Capital II*, 1978, 225–229.

to direct credit towards capitalists most likely to use it profitability, or to other borrowers from whom it is most likely to extract the highest repayments.

Third, Marx argues supervisory labour that "merely arises from the antagonistic contradiction between capital and labour", rather than being necessary for co-ordinating production, is also funded out of capitalists' revenue, rather than directly augmenting their capital. Again, the more effective the supervisor, the more surplus value they will tend to extract from their workforce, so supervisory labour has an *indirect* effect on the rate of profit. But because this work is not a necessary step in the process of augmenting use values, supervisors do not produce surplus value insofar as they perform this function.[177]

Marx also argues that some labour which produces value does not produce *surplus* value. Workers who produce commodities which are sold at below their cost price are a drain on capital: it costs more to reproduce their labour power than the value the capitalist obtains from purchasing it.[178] Marx sometimes refers to this as simply 'unproductive labour', but it is only 'unproductive' in the sense that it does not produce *surplus* value, not in the sense that it produces *zero* value. As Marx explains early in *Capital* I:

> If we now compare the process of creating value with the process of valorization, we see that the latter is nothing but the continuation of the former beyond a definite point. If the process is not carried out beyond the point where the value paid by the capitalist for the labour-power is replaced by an exact equivalent, it is simply a process of creating value; but if it is continued beyond that point, it becomes a process of valorization.[179]

This is important because a significant number of workers in the government and not-for-profit sectors produce commodities which are sold below their cost price. Universities, for example,

[177] Marx, *Theories of Surplus-Value (volume IV of Capital)*, pt. 3, p. 505.
[178] Assuming away the complications introduced by the transformation of values into prices, and differences between the price and value of labour power.
[179] Marx, *Capital I*, 302.

are generally government-owned or not-for-profit institutions, and usually rely on government funding or private philanthropy to cover some of their costs. But in most cases their employees produce commodities – degrees – which the institution sells to students who pay fees. Rather than saying the teaching staff produce *zero* value, it is more consistent to say that they produce value equivalent to the fees they allow the university to extract from their students: or, equivalently, that the surplus value teaching staff consume in net terms is reduced by the fees they extract.[180]

There is also the question of how the value of capital advanced for unproductive purposes is reproduced. In *Capital* Marx considers this question in some detail, at least insofar as it applies to commercial and finance capital. First, unlike productive constant capital, the constant capital invested in the equipment, buildings and raw materials used for unproductive purposes does *not* transfer its value to output. Yet its cost must be recovered somehow. Exactly how this cost is recovered depends on the unproductive expenditure in question. First consider commercial capital:

> This part of the constant capital advanced would have the same constricting effect on the profit rate as does all constant capital directly invested in production. In as much as the industrial capitalist hands over the commercial side of his business to the merchant, he does not need to advance this portion of capital. Instead of him, it is the merchant who advances it. Yet this is really only an advance in name, in as much as the merchant neither produces nor reproduces the constant capital that he uses (his material expenses). The production of these appears as a separate business of certain industrial capitalists, or at least a part of their business, so that these play the same role as those supplying constant capital to the producers of means of subsistence. The merchant thus

[180] However, this does not mean we should include outlays in these sectors in the denominator of the rate of profit. Except for profit-making government-owned enterprises, these outlays do not function as capital, because they do not function as self-expanding value.

> receives firstly the replacement for this constant capital, and secondly the profit on it. *On both counts*, the profit of the industrial capitalist is reduced.[181]

The phrase 'on both counts' here is crucial. If the profit of the industrial capitalist were only reduced by the size of the profit made by the commercial capitalist, then there would be no change in total profit, or total profits from production. But Marx is saying that the industrial capitalist's profit is also reduced by the cost of replacing the merchant's constant capital. He goes on to explain that one of the functions of the merchant is to reduce these costs by assuming these functions for more than one industrial capitalist:

> But because of the concentration and economy that results from the division of labour, this reduction is less than it would be if he had to advance this capital himself. The reduction in the profit rate is less, because the capital advanced in this way is less.[182]

The same applies to the capital advanced for paying commercial workers, which Marx examines by supposing this capital is advanced by the industrial capitalist:

> The expenditure on [commercial workers' wages], even though incurred in the form of wages, is distinct from the variable capital laid out on the purchase of productive labour. It increases the outlays of the industrial capitalist, the mass of capital he has to advance, without directly increasing the surplus-value. For this is an outlay for labour employed simply in realizing values already created. Just like other outlays of the same kind, this too reduces the rate of profit, because the capital advanced grows, but not the surplus-value. The surplus-value s remains constant, but the capital advanced C still grows from C to ΔC, so that the profit rate s / C is replaced by the smaller profit rate $s / (C + \Delta C)$.[183]

Notice here Marx continues to measure the numerator of the rate of profit as '*s*', even after introducing the unproductive workers. But if the function of selling commodities is performed directly by the industrial capitalist, it is clear that the capitalist must pay for the commercial workers' wages out of the total price the capitalist receives for selling their commodities, and, if

[181] Marx, *Capital III*, 1981, 410–411. Emphasis added.
[182] Ibid., 411.
[183] Ibid., 413.

prices are equal to values, out of the total surplus value produced by their productive workers. Although the total surplus value remains constant, *less of it appears as profit for the capitalist*. The same applies to the costs the industrial capitalist pays for purchasing unproductive supervisory labour power, and administrative labour power.

As Marx puts it elsewhere, the wage of a worker in the commercial sector 'derives from' commercial profit:

> even though the income the circulation agent receives may appear to him as a simple wage, as payment for the work he has performed, and even though, where it does not take this form, the size of his profit may still be only equivalent to the wage of a better-paid worker, this income still derives solely from the commercial profit. This results from the fact that his labour is not value-creating labour.[184]

Mage takes Marx's decision to continue to use '*s'* on the numerator of the rate of profit to mean that the wages of unproductive workers are in fact *constant* capital, because they increase capital advanced without changing the numerator of the rate of profit. If that were true, then, like ordinary productive capital, the wages of unproductive workers would have to transfer their value to output. But in fact workers never *transfer* the value of their labour power to the commodities they produce; they create a wholly new value, throughout the working day, part of which produces a value equivalent to the value of their labour power, and part of which is surplus value (as discussed further below). Moreover, this is true only for productive workers, not for unproductive workers.

The same arguments apply to the costs of reproducing the labour power and other commodities used as inputs in all unproductive sectors: they must, at some stage, be funded 'out of' surplus value. As Gillman argues, this means we must now distinguish between two measures of the

[184] Ibid., 404.

average rate of profit: s / C, the ratio of surplus-value to capital advanced, and $(s – u) / C$, where u stands for certain unproductive expenditures on both wages and constant capital.[185]

However, this still does not answer the question of exactly which unproductive expenditures of surplus value we should subtract. If we subtract *all* unproductive expenditures of surplus value from the numerator, including capitalists' personal consumption (which is certainly unproductive), then we are left with a measure of the ratio of net investment to capital advanced: i.e., a measure of the rate of *accumulation*, not the rate of profit.

In this chapter, we will devote most of the discussion to how to measure surplus value after deducting all unproductive expenditures *except* capitalists' personal consumption. The 'rate of profit' with this measure of $(s – u)$ on the numerator is a measure of the 'maximum' rate of accumulation.

Sometimes it is argued that $(s – u) / C$ is the measure that matters for capitalists' decision making, whereas s / C is the better measure of the maximum potential rate of profit, or maximum possible rate of accumulation. Mohun, for example, argues "trends in productive labour and the means of production with which it works determine what is potentially available for profits".[186] But it is not clear in what sense the cost of paying unproductive wage earners is 'potentially' available for profits, since these employees generally perform necessary functions for capital. As we have seen, they include, for example, most supervisory labour and the entire unproductive machinery of the capitalist state, which will not be eliminated this side of the revolution. As Marx argues:

> The capitalist mode of production, while it enforces economy in each individual business, also begets, by its anarchic system of competition, the most outrageous squandering of labour-power and of the social means of production, not to mention the

[185] Gillman, *The Falling Rate of Profit*, 81–106.
[186] Mohun, "Aggregate Capital Productivity in the US Economy, 1964-2001," 1024.

> creation of a vast number of functions at present indispensable, but in themselves superfluous.[187]

Similarly, from the point of view of accumulation, it does not make sense to say that the 'maximum' rate of accumulation includes surplus value spent on *u*.

On the other hand, as we will explore further, *(s – u) / C* is *not* a relevant measure of the 'rate of profit' for capitalists' investment decisions. This is because not all unproductive expenditures of surplus value are deductions from *profits from production*. Precisely which expenditures *are* deductions from profits from production depends on the measure we use. For most purposes, we will want to define profits from production in before-interest terms. This means that expenses incurred in the financial sector, including wages, are *not* deducted from profits from production. Similarly, if we measure profits from production on a before-tax basis, then wages paid to unproductive government workers and other unproductive state expenditures are not deducted. If we measure profits from production on an after-tax basis, then unproductive state expenditures have an *indirect* influence, insofar as they have an effect on company taxes and pre-tax wages of business employees.

We will explain how to define and measure profits from production on a before- and after-tax basis towards the end of the chapter. For many purposes these are the most important measures of the rate of profit, because they close approximations of rates of return which actually *appear* to (some) capitalists. This is also ultimately what Marx's law sets out to explain. However, measuring the rate of profit with *(s – u)* on the numerator is important both for explaining movements in the rate of accumulation and for understanding the relationship between the production and consumption of value and profits from production.

[187] Marx, *Capital I*, 667.

But first, in order to decompose movements in *(s – u) / C*, we need to estimate the size of *s – u* relative to *s*; meaning we have to measure *s* itself. To do this, we need a method for distinguishing productive from unproductive workers that we can apply to the national accounts. The national accounts are not well set-out to do this, and the different proxies that Marxists employ can lead to significantly different results.[188] However, since we are measuring the rate of profit as *(s – u) / C* and not *s / C*, our measure of the rate of profit will not be affected by the way in which we distinguish between productive and unproductive labour. Whether we classify them as productive or unproductive expenditures, all depreciation and the value of all employees' labour power need to be subtracted from total output to calculate *s – u*. Our choice of approximation for the distinction between productive and unproductive labour will only affect *s*, not *s – u*, and therefore will mainly affect the extent to which we attribute changes in the ROP to changes in the ROSV or to changes in the ratio of *s – u* to *s*. It will also have a small effect on the other elements of the decomposition, because it affects the proportion of capital advanced that we classify as '*v*'.

Because it will not change our most important results, we can afford to use a fairly approximate distinction between productive and unproductive labour. The US national accounts provide data by industry stretching back to 1929, but unfortunately there are three breaks in the series when different industry classifications are introduced. We will use the approximation that all employees in the following sectors are unproductive: wholesale trade; retail trade; finance, insurance and real estate; and government, excluding employees of government enterprises. Fortunately all but one of these categories exists for all years from 1929, and the breaks in the series do not make a great deal of difference to the data.[189] The major deficiency of this approach

[188] Mohun, "Distrobutive Shares in the US Economy, 1964-2001," 349.
[189] The exception is that before 1948 there is no standalone 'retail trade' category, only 'retail trade and automobile services'. I have checked that this and other differences in the classification systems do not

is that it does not attempt to distinguish productive from unproductive employees in the 'services' sector, nor does it identify unproductive supervisory labour. It is likely that the share of unproductive employees in these categories has grown over time, so this is likely to mean we will under-estimate the growth in unproductive employees.

Another problem with this definition is that it does not account properly for the circulating constant capital consumed by unproductive sectors. For example, the retail sector has expenses for inputs such as heating and electricity. For the owners of the utilities which supply these inputs the labour power and constant capital consumed to produce them is consumed productively, since it enlarges their capital if they sell their output above cost price. But since this heating and electricity is part of the cost of *realising* the value of the commodities it is used to help sell, without enhancing their use values, for the capitalist class as a whole the cost of these commodities is a component of both surplus value (s) and its unproductive expenditure (u). Ideally we would classify the labour power used to produce these inputs as unproductive, along with the labour power used to produce the inputs needed to produce these inputs, and the labour power used to produce the inputs for these inputs for these inputs etc. But again, the consequences of not doing this are not dire: it affects our decomposition of changes in the rate of profit, but not the rate of profit itself.

Measuring Surplus Value after Unproductive Expenditures

Before showing how we can use this to measure surplus value, we will start by discussing the more important task of developing an appropriate measure of $s - u$. Intuitively, this seems as though it should be equivalent to something like total profit made by businesses after tax.

make large differences to the results by comparing results for the years in which the classification systems overlap.

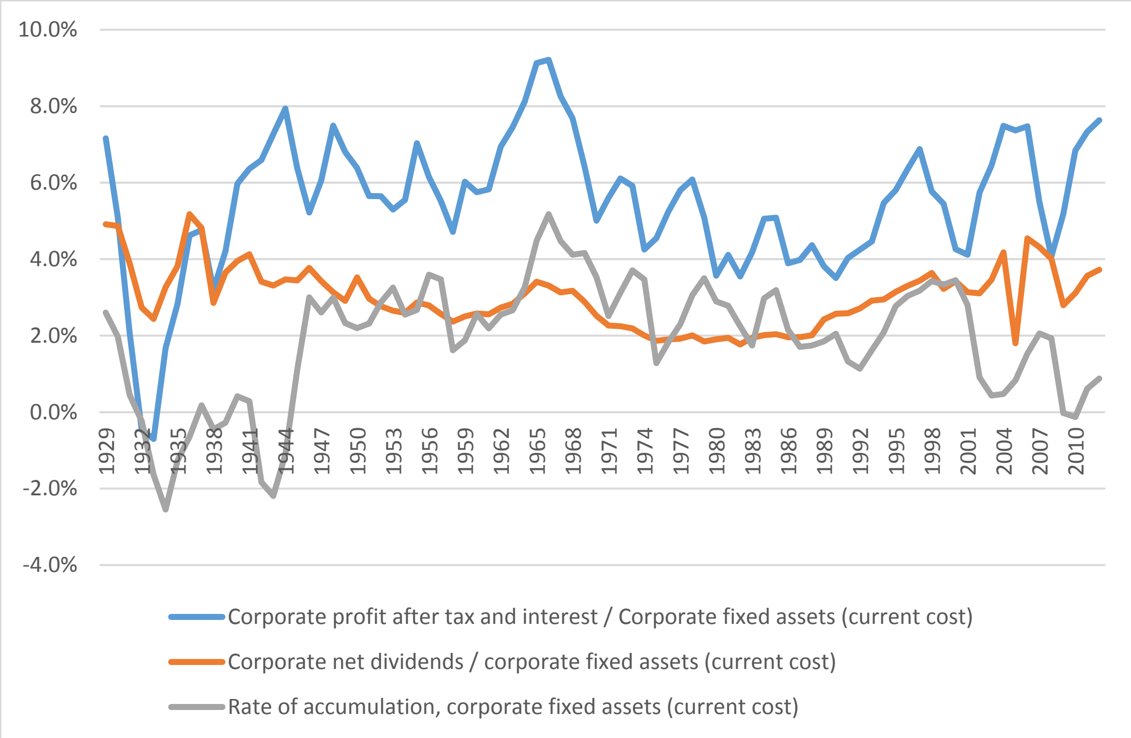
Similarly, intuitively it seems as though *s* should be equal to total profit before tax, plus wages and depreciation in unproductive sectors.

This intuition is reflected in the range of measures Marxists use to measure the numerator of the rate of profit. The broadest definition of the numerator that is regularly used is gross domestic product less depreciation of fixed assets and compensation of employees (excluding measures which try to incorporate expenditures on wages and depreciation in unproductive sectors). Then there is a list of other expenses recorded in the US NIPAs which may or may not be treated as deductions from this 'broad profit': taxes on production less subsidies, net proprietors' income (i.e., income for owners of small businesses), net interest payments (i.e., interest payments paid by domestic businesses), net rental income of persons (which is rent paid on dwellings and land owned by people, including an imputation for the rent that the national accounts treat owner occupiers as 'paying to themselves'), current surplus of government enterprises, and taxes on corporate profits. If we deduct all of these, we arrive at what the national accounts call 'corporate profits after tax', which is really corporate profits from production after taxes and interest, with 'production' defined in a way that incorporates transfers for some financial payments (as discussed further below).[190]

There is a problem with treating any of these measures as a proxy for $(s - u) / C$, which an empirical issue helps to illustrate. From around 1983 until the Great Recession dividend payments by US corporations increased sharply relative to their fixed assets. This is graphed in Figure 1 below. It also includes the 'rate of profit' defined as the ratio of 'corporate profits after tax' to fixed assets, and the ratio of corporate net investment to corporate fixed assets, which is a measure of the rate of capital accumulation.

[190] For results from measuring the rate of profit using nearly all these alternatives (and others) see Basu and Vasudevan, "Technology, Distribution and the Rate of Profit in the US Economy."

Figure 1



Although there is clearly a downward trend in the rate of accumulation from the mid-1960s onwards, the downward trends in dividends and profits relative to fixed assets are interrupted in the mid-1980s. From that period onwards, there is a large increase in dividends relative to fixed assets, along with a much smaller increase in the 'corporate profits after tax' measure of the rate of profit.

Based on evidence such as this, some have drawn the conclusion that corporate managers developed a preference for boosting dividends instead of reinvesting their profits. Duménil and Lévy, for example, explain this as a result of changing incentives faced by corporate managers, whose remuneration is now more closely tied to movements in their company's share price.[191]

[191] Duménil and Lévy, *The Crisis of Neoliberalism*, 152.

But there is another, less intuitive possibility. The divergence between the rate of accumulation and the after-tax 'rate of profit' may be due to an increase in government borrowing. To see how, consider the following scenario. Suppose the government decides to fund a corporate tax cut by increasing the deficit, and leaving government spending unchanged. Suppose revenue from corporate tax falls by $10 billion as a result, and government borrowing increases by the same amount. Assume banks (domestic or foreign) fund this deficit by purchasing $10 billion of extra Treasury bonds. Now suppose, as a simplification, that corporations' investment decisions are completely unaffected by changes in the way a given level of government spending is financed, and that the earnings that they retain are entirely determined by how much they are planning to invest. This implies that the extra $10 billion in after tax profit that they make as a result of the tax cut will be spent entirely on paying dividends. Also suppose that the recipients of these extra dividends leave them as deposits in their bank accounts, rather than spending them. In that case, banks will have an extra $10 billion in funds available: i.e., just enough to cover the value of the new Treasury bonds.

So under these simplified assumptions, a corporate tax cut funded by increased borrowing brings about an equivalent increase in dividend payments, which in turn 'creates' the loanable funds required to finance the increased deficit. Both the income and wealth of shareholders increases by the size of the corporate tax cut, the after-tax profit share of income increases, but shareholders' consumption, and everyone else's, remain unchanged. Most importantly, the after-tax profit rate increases (though before-tax it is constant).

This scenario may or may not help to explain the divergence between the 'after-tax rate of profit' and the rate of accumulation in the US since the 1980s. The more important point here is the effect the increase in the deficit has on the after-tax rate of profit. In this example, there is no change in either the socially necessary labour time performed by productive workers, productive workers' consumption (or their wages), or unproductive expenditures of surplus value (u). So there is no change in $(s - u) / C$, even though the after-tax rate of profit increases. This is one way in which we can be misled if we treat an after-tax measure of profit as a proxy for $s - u$.

What about a pre-tax measure of the rate of profit? It differs from both s / C and $(s - u) / C$. Total pre-tax profit from production is not equal to s because, as we have seen, s includes the costs of wages and other inputs used up by unproductive sectors (and, as we will see below, includes the difference between the price and the value of labour power). On the other hand, $s - u$ is not equal to total pre-tax profit because pre-tax profit does not subtract the costs incurred by the state on reproducing the labour power of the workers it employs and on the cost of other inputs.

Another way of putting the problem is that once we introduce government borrowing, it is no longer simply a question of the *division* of surplus value into after-tax profit, the value of labour power and other inputs used by unproductive businesses, and unproductive government expenditures of surplus value. Government borrowing makes it possible for some of the after-tax profit which companies appropriate to be lent on to the government to cover its expenditures. In this way, compared to a situation in which unproductive government expenditures of surplus value are funded by taxes, government borrowing can 'create' after-tax profit, further obscuring the fact that workers' surplus labour is the source of profit. If we do not account for this, and treat after-tax profit as though it measures $s - u$, we implicitly adopt the fetishistic assumption that government borrowing itself can create surplus value.

The Value of Labour Power

Workers' saving and borrowing introduce similar complications. In *Capital*, Marx generally operates with the assumption that the wages bill is equal to the value of the commodities that productive workers purchase and consume in order to reproduce their labour power. As mentioned earlier, under this simplifying assumption, surplus value can be looked at in two ways. On the income side, it is equal to total output net of productive depreciation less the wages paid to productive workers.[192] On the expenditure side, it is net output less productive workers' total expenditure.[193]

But in reality productive workers' income is not necessarily equal to their expenditure. Just as the state's expenditure need not be equal to its income, wage earners too can save or dis-save, including when considered as a group. This means it cannot be true that surplus value is equal to both new value added less productive workers' wages *and* new value added less productive workers' consumption. We have to choose one or the other.

In Chapter 6 of *Capital* Volume 1, 'The Sale and Purchase of Labour-Power', Marx provides us the concepts we need to resolve this issue. He points out that the existence of a class of people willing and able to sell their labour power does not materialise out of thin air. It depends on certain historical, i.e. *temporal*, antecedents: first, that this class has been stripped of access to the means of production, so that they cannot themselves produce use values to sell or consume; but second, that they *do* have access to the means of subsistence with which to reproduce their capacity to work. The production and reproduction of this labour power must have occurred *before* it is purchased by the capitalist, as well as for the duration of the employment contract:

> Nobody - not even a practitioner of *Zukunftsmusik* [music of the future] - can live on the products of the future, or on use-values whose production has not yet been completed; just as on the first day of his appearance on the world's stage, man must still consume every day, before and while he produces.[194]

[192] Marx, *Capital I*, 320–321.
[193] Marx, *Capital II*, 1978, 586–587.
[194] Marx, *Capital I*, 272.

For the capitalist, how this comes about is mostly a matter of indifference, just as the process of production is a matter of indifference for the purchaser of any other commodity; the capitalist's main interest is in the quality and the *price* of the labour power he is purchasing:

> Why this free worker confronts him in the sphere of circulation is a question which does not interest the owner of money, for he finds the labour-market in existence as a particular branch of the commodity-market.[195]

Nevertheless, like all other commodities, labour power must be produced before it can be sold, and it this process of *production* which endows it with value:

> The value of labour-power is determined, as in the case of every other commodity, by the labour-time necessary for the production, and consequently also the reproduction, of this specific article. In so far as it has value, it represents no more than a definite quantity of the average social labour objectified in it.[196]

Moreover:

> Its value, like that of every other commodity, *is already determined before it enters into circulation*, for a definite quantity of social labour has been spent on the production of the labour-power.[197]

It follows that the value of labour power is *not* necessarily equal to its price, the wage. Before the worker enters the 'very Eden of the innate rights of man' she encounters in the sphere of circulation, she must first possess a hide to bring to market. The value of the means of subsistence she consumes to make this possible is determined by the total price she pays for *those* commodities, not the price the capitalist pays to buy the labour power those commodities are used to produce.

Marx also argues the commodities needed to produce and reproduce labour power are not restricted to those necessary for a bare subsistence, but include commodities purchased to

[195] Ibid., 273.
[196] Ibid., 274.
[197] Ibid., 277. Emphasis added.

replace "[t]he labour-power withdrawn from the market by wear and tear, and by death" with labour power supplied by the next generation of workers. This includes the costs of their education, health care, etc., insofar as these are purchased as commodities. The value of labour power also famously includes a "historical and moral element" determined by "the level of civilization attained by a country" and "the conditions in which, and consequently on the habits and expectations with which, the class of free workers has been formed"; which is also, as Marx argues elsewhere, a result of struggle.[198]

Marx then seems to sweep all these complexities aside when he declares "[n]evertheless, in a given country at a given period, the average amount of the means of subsistence necessary for the worker is a known *datum*".[199] But since Marx's value theory is temporalist, this is not a simplification: it is *true*. The total price paid for the commodities a worker has consumed before she sells her labour power to a capitalist is a known *datum* because these commodities were bought in the past, before the new wage is negotiated. Just as the revaluation of constant capital cannot retroactively change the value of the means of production and raw materials purchased by the capitalist, a change in the wage cannot retroactively change the value of the commodities bought by the worker to reproduce her labour power. The most important determinant of the value of labour power in one period is therefore the price that was *previously* agreed for it, since this is what determines how much income workers have to spend on their consumption.

However, where wages are high enough to allow for it, during most periods productive workers will, as a group, spend less than their total wages on buying commodities. First, a portion of the wage is extracted from them in the form of 'secondary' exploitation: e.g. interest payments, rent above the depreciation of their dwelling or income taxes (as discussed further below). Second,

198 Marx, "Value, Price and Profit," sec. 1.
199 Marx, *Capital I*, 275.

workers need to save money not just to cover large expenses (e.g. cars and houses) they will incur in future during their working lives (which should roughly balance out across workers as a whole over most periods, and are often bought by going into debt), but also for retirement. Like the reproduction of unproductive workers' labour power and the labour power of people unable to work due to unemployment or disability, the cost of reproducing the labour power of retired workers is a deduction from *surplus* value. Workers' access to this surplus value after they retire is determined by the amount of money they have saved from their wages during their working lives (and by their access to other income such as state pensions). That is, it is determined by the extent to which they have kept down the cost of reproducing their labour power while they were working, and the extent to which they have won wages that keep the price of their labour power above this value. Therefore the 'normal' state of affairs, at least in advanced capitalist economies, is that workers are paid a wage at least a little above the value of their labour power.

This can also be a result of rising wages. Even if total saving by the productive working class is zero, if wages rise by enough to allow workers to purchase a larger proportion of the total value they produce, this implies workers are winning wages above the value of their labour power. On the other hand, if real wages *fall* by enough, then the price of labour power can fall below its value, forcing workers to spend savings, go into debt, or cut back consumption (and in doing so reduce the value of the labour power they will sell in future). Marx mentions this possibility, and Grossman rightly argues it becomes particularly important at moments of crisis when wages fall dramatically.[200] Interpretations which define the value of labour power as being equal to its price, such as the New Interpretation, cannot allow for this important aspect of Marx's system. Finally, even if real wages remain constant, the production of relative surplus value through

[200] Ibid., 276–277; Lapides, "Henryk Grossmann on Marx's Wage Theory and the 'Increasing Misery' Controversy," 256–265.

reductions in the labour time that is socially necessary to produce means of subsistence can also allow capitalists to pay a price for labour power below its current value.

Another reason to take this approach is that an income-based definition of surplus value runs into an important problem. Consider a hypothetical economy consisting of productive workers hired by capitalists, with no fixed capital and strictly alternating periods of production and circulation. Suppose the total value of commodities produced is y, productive workers are paid total wages of w, but in order to reproduce their labour power for the next period, at the end the period workers buy commodities with a total price of $r < w$. Finally, assume the portion of output not bought by workers is spent on new investment.

Under these assumptions, profits from production will be $y - w$. But investment will be the larger sum of $y - r$. In practice the credit system makes this possible: by investing their savings or leaving them in the bank workers make them available for spending on investment. If we simply define total 'surplus value' to be equal to profits from production, then we also have to say that net investment can be larger than surplus value, which robs the concept of an important part of its intended meaning.

One implication of instead defining surplus value as net output less productive workers' *consumption* is that, when the price of labour power is above its value, the difference between the two is surplus value. That is, a portion of surplus value is paid to workers as wages. Conversely, if the price of labour power is below its value, then capitalists extract a sum greater than surplus value from workers (and usually degrade the quality of their labour power in the process by preventing workers from reproducing it to the same standard). This means we have to distinguish the rate of surplus value from the rate of *primary exploitation*.

The rate at which productive workers are subjected to primary exploitation is determined by the *price* paid for their labour power. That is, the rate of primary exploitation is defined as the ratio of net output after productive workers' wages to productive workers' *wages*:

$$ROPE_{t,t+1} \equiv \frac{y_{t,t+1} - d_{t,t+1} - w_{t,t+1}}{w_{t,t+1}}$$ [201]

Note that, because they do not produce value, strictly speaking unproductive workers are not exploited. They are, as Carchedi puts it, 'economically oppressed', insofar as their wages are less than the value they would have produced had their labour power been expended productively.[202]

ROPE is what we had previously called the 'rate of surplus value'. But now we need to define the rate of surplus value in terms of workers' consumption, *r* (*r* itself is defined further below):

$$ROSV_{t,t+1} \equiv \frac{y_{t,t+1} - d_{t,t+1} - r_{t,t+1}}{r_{t,t+1}}\ .$$ [203]

We can also measure the rate of *total* exploitation, for which the numerator is net output after subtracting both productive workers' wages and the value extracted from them through secondary exploitation. Secondary exploitation incorporates productive workers' spending on rent and mortgage interest above the value of the depreciation of their houses, interest on paid on other loans and other transfers, and income taxes and payments for social insurance.

[201] The numerator of this expression is not quite equal to pre-tax profits from production, because it does not subtract the constant capital consumed by businesses unproductively or the wages paid by businesses to unproductive workers.
[202] Carchedi, *Frontiers of Political Economy*, 31.
[203] *r* is defined further below in this chapter, as part of the discussion of measuring surplus value.

Measuring Output

Before we can measure surplus value in the way described above, we need a method for measuring the total price of output. For Marx, to count towards new value produced, goods and services must be produced for sale by the expenditure of labour power; i.e., they must be produced commodities.[204] The value they embody is the new value added to them by living labour ('net output') plus the value this labour transfers to them by productively consuming existing commodities. We want to alter the national accounts' definition of gross domestic product to give us a measure of net output which fits this definition.

On the expenditure side, the national accounts define GDP using the identity *C + I + G + X – M*, where '*C*' is personal consumption (which we will call '*PCE'*, to avoid confusing it with capital advanced), *I* is gross private investment, *G* is government spending on 'consumption' and gross investment, and *X – M* is exports minus imports. As the national accounts define them, each of these terms includes items which are not payments for newly produced commodities, and which we therefore want to exclude from net output. Below we will discuss each in turn. Appendix B gives the full, line-by-line definition we are using for output based on this discussion.

Personal Consumption Expenditure

Most PCE is money spent by individuals on newly produced commodities, which we want to include in our measure of output. But PCE also includes spending on housing rent, gambling, 'financial services' (which includes bank fees and the interest rate 'spread' between the rate at which banks lend money and the interest rate they pay depositors, multiplied by total personal deposits) and insurance. Gambling, financial services and insurance are not payments for

[204] Marx, *Theories of Surplus Value*, 154.

produced use values, and we therefore need to exclude them from the total price of newly produced output.

Housing rent is a more complicated case. PCE includes an allowance for the cost of renting dwellings and the land they occupy, whether the dwelling is actually rented out or is occupied by its owner. From a Marxist perspective, in neither case is this part of the total price of output. To see why, it is helpful to consider the rent paid for land and the rent paid for dwellings separately. Rent paid for the unimproved value of land is payment for the use of a non-produced commodity: i.e., a commodity with zero value. So it is clearly a transfer payment, and not a part of output. However, the rent paid for dwellings *is* a payment for the use of a commodity with value. This value is produced when the dwelling is *built*, and realised when the dwelling is sold. In the national accounts, this is *already counted* as part of gross investment. So when the dwelling is later rented by a tenant, they are paying to use an *already produced* commodity, the value of which was already counted towards output when it was produced. By counting dwelling rent towards PCE, the national accounts effectively count part of the value of the house twice: once when it is produced and sold, and then again when it is rented. So we want to exclude both dwelling rent and land rent from our measure of net output.

However, adjusting PCE in this way creates a new complication. The national accounts treat the inputs consumed in order to 'produce' the non- and non-new commodities that are part of PCE as 'intermediate inputs': i.e., as components of the prices of final commodities. So if we subtract the entire value of PCE on financial services, housing rent, gambling and insurance, we are also subtracting the total price of the commodities consumed by the banks, landlords etc. to 'produce' this component of PCE. But, from a Marxist perspective, these inputs are a part of *final* output (and, specifically, a part of unproductive expenditures on surplus value). Therefore we want to add the total price paid for these commodities back in to our measure of output.

We can do this by taking the ratio of intermediate inputs to gross output for the industries in question and multiplying this by each of the components of PCE we are excluding. Unfortunately gross output and intermediate inputs by industry is only published from 1987 onwards, so we will assume that before 1987 this ratio is unchanged. This is far from ideal, but because this is a component of unproductive expenditures of surplus value, this estimate only influences our measures of output and surplus value, and not our measure of $s - u$.

Private Investment

Next we need to adjust the measure of gross private investment used to calculate GDP. The US national accounts now include an estimate of investment in 'intellectual property' through research and development, along with investment in structures and equipment. From a Marxist perspective the labour involved in producing 'intellectual property' is not productive, for a range of reasons we will consider. First, a great deal of what is counted as research and development cannot be sold as a commodity; it is just knowledge that is produced and retained 'in house' that largely exists within the brains of those who produce it. Of the research and development that is produced in a saleable format, there are broadly three cases. First, a business might pay employees to do research and development in order to produce a patent it can sell to another business. These patents sound as though they might be a newly produced commodity (i.e., a use value produced for exchange). But a patent *itself* is just a legal instrument. Its only purpose is to give its owner a monopoly over the use of the process to which it refers. It does not have any use value beyond this. Knowledge of the design or process *itself* has a concrete use value, but the sale of a patent *as such* is just a transfer of the *right to use* this knowledge.

The knowledge *itself* can only be commodified indirectly. One possibility is that research and development may produce knowledge that can then be 'sold' in the form of education or training. For example, researchers at a company or university might develop a new industrial process of some kind, and then charge fees to attend a course to learn how to implement it. But in this case the price of the *education*, which is the commodity in this case, is already accounted for as part of PCE if it is bought by an individual. Only if it is bought by a government or business are we potentially erroneously excluding this from our measure of output by excluding all investment in 'intellectual assets', and even in this case there is no reason for the price charged for the education to be the same as the cost of the investment.[205] The third case is if the research and development leads to the publication of, for example, a book or some computer software. In this case, the money spent on the final commodity – i.e., the books or the computer software – has already been accounted for.

If none of these are the case, and the knowledge is made freely available, then it is not a commodity. Therefore in nearly all cases we should not treat investment in intellectual property as part of output. We will use the approximation that this is true in all cases.

Government Consumption and Investment

The national accounts treat all government spending on 'consumption' and investment as part of GDP. What they mean by 'consumption' is not restricted to spending on ordinary commodities. It also includes spending on compensation for government employees and depreciation of government-owned fixed assets, after subtracting sales to other sectors and own account investment (so that own-account investment can be re-classified as investment). In this way, government employees who do not produce commodities are counted as producing output. So, for example, wages paid to soldiers in the US military are all counted towards GDP.

[205] There is a separate question of whether the research and development itself in this case is productive labour or an unproductive expenditure of surplus value, which is related to the question of whether 'intellectual property' is part of capital advanced, which is discussed below.

From a Marxist perspective the labour of any employee who does not produce commodities is not productive labour, so this imputation is not legitimate. Similarly, fixed assets that are not used to produce commodities do not transfer their value to output, including those owned by the government sector. The only component of government 'consumption' that we do need to include is the unproductive government sector's purchases of 'intermediate inputs'; since, as for other unproductive sectors, this now represents consumption of final commodities. The national accounts list this as a separate line item, but this covers intermediate inputs bought by the whole government sector, and not just the unproductive government sector. So to roughly account for the intermediate inputs used by the government sector to produce commodities, we will multiply total government intermediate inputs by gross government output (according to the national accounts' definition) less government sales to other sectors divided by gross government output.

Government sales to other sectors are already counted towards output elsewhere. For example, if a government enterprise produces a commodity bought for personal consumption, this is counted towards PCE. So there is no need to 'add back in' government sales to other sectors.

Government investment also needs to be modified slightly. In their measure of government investment the NIPAs include 'own account' investment; that is, fixed assets produced by the government sector for use by the government sector. In most cases these fixed assets will be produced directly for use, and not for exchange, and therefore are not commodities, so we will exclude government own account investment from our measure of output. The rest of government investment, excluding investment in intellectual assets, is part of final output.

Net Exports

Finally we need to exclude net exports of items that the NIPAs count as commodities but which in fact are not. From 1967 onwards there is data for 'royalties and license fees' (and for previous years we can back-cast using more aggregated data). We will count 'royalties and license fees' as entirely transfer payments which need to be subtracted from output. We also want to subtract net exports of financial services and insurance, which is more complicated given the available data; but from 1986 onwards the data with which to do this is available (this is also around the time when these payments start to become a significant size), and for previous years we can make estimates (as explained in Appendix B). We also need to 'add back in' an estimate of the intermediate inputs used to produce these non-commodities, as we did for PCE on financial services and insurance.

This completes our redefinition of output. Chapter 7 compares the results it produces with GDP over time. This measure of output is also important for testing the hypothesis that the rate of profit and the rate of growth of output have similar trends. However, the main reason to construct this measure is to allow us to measure surplus value. In order to do that, we need to subtract productive depreciation and the value of productive labour power from output.

Productive Depreciation

We will count productive depreciation as the capital consumption adjustment used in the NIPAs for the industries we are defining as 'productive' (excluding the NIPAs' allowance for depreciation on intellectual property), adjusted to fit the temporalist definition of depreciation given in Chapter 2. We will also include an allowance for productive depreciation in the government and non-profit sectors. As mentioned, the categories used to define 'productive' industries change a little over time, and are listed comprehensively in Appendix B, but in 1929 they are: agriculture, forestry and fisheries; mining; contract construction; manufacturing; transportation and public facilities; and services.

Because we are using a fairly approximate distinction between productive and unproductive industries the results this gives will also be fairly approximate. However, all depreciation we classify as 'unproductive' will be counted as an unproductive expenditure of surplus value. So, as will be shown below, any over- or under-estimate of *d* caused by our approximate definition of productive and unproductive industries will create an equal under- or over-estimate of *u*. This means our estimate of *s* – *u* will not be affected by this type of error.

Differences between the Total Price and Total Value of Output

As it has been defined, *y* is a measure of the total *price* of output only. International trade means that this can be different from its total value. This is the aggregate effect, at the national level, of transfers between capitals as a result of differences between prices and values.

In principle, if it made sense to calculate a MELT that applied at the world level, and if we could calculate it, we could use this to calculate the difference between total price and total value at the national level. But we do not have an adequate theory that would allow us to do this, even assuming the necessary data were available.[206]

This means that if we take *y* as our starting point for calculating *s*, as we will below, we are not, strictly speaking, calculating the surplus value produced in the US. We are calculating surplus

[206] The method used to calculate the MELT outlined here, for example, does not allow for the existence of more than one currency. Simply using current exchange rates to convert world output into a single currency would create problems: for example, how do we deal with currencies which are kept 'artificially' high or low by currency trading restrictions? The total price of a country's output might be very large if its currency is kept very high in this way. Also, many commodities are not or cannot be traded internationally (e.g. certain services), so the labour time that is socially necessary for their production is determined at a national level, or potentially even more locally than this. The problem of skill differences also becomes quantitatively more significant when looking at the world scale rather than the national scale, and we would need a way of taking this into account. It seems likely that assuming the existence of a world MELT applying to all production is the wrong starting point, and that instead we should calculate a MELT that applies only to commodities traded across currency zones, and explain the interaction between this MELT and the MELT within each currency zone. Note also that the total value of internationally-traded commodities produced in a single country is determined by the SNLT determined at the *world* level, not the national level. So in industries where workers in a given country use more advanced techniques than average, each hour of labour time worked will produce commodities worth more than one hour of average socially necessary labour time. This is probably the main reason for inequality between workers in different nations. Any attempt to calculate the MELT on the world and national levels would need to account for this.

value produced by US workers plus the difference between the total price and the total value of US output; i.e., we are calculating the surplus value 'available' to the US capitalist class (before accounting for financial transfers) after accounting for so-called 'unequal exchange'.

What does this mean for our analysis? As mentioned in Chapter 1, in *Capital* Marx was not discussing movements in a world average rate of profit, but in a national average rate of profit. This is why when Marx discusses the tendency of the rate of profit to fall, he includes the effects of international trade as a potential counter-tendency – which would not make sense if he was considering movements in the average rate of profit at the world level.[207] The main problem this introduces for our analysis is that we cannot separate out the effect on the rate of profit of international trade from the effect of changes in the rate of surplus value. What we will measure as the effect of changes in the 'rate of surplus value' in fact incorporates both these influences together. When conducting the analysis we need to bear this limitation in mind.

This issue also introduces a problem for our terminology. Sometimes 'total surplus value less the difference between total price and total value' is thought to be equivalent to 'total profit', but we have shown that unproductive expenditures of surplus value complicate this issue. For the analysis in this thesis, we need a short-hand way of referring to the former without confusing it with the latter. On the other hand, we generally will not need to distinguish between 'total surplus value less the difference between total price and total value' and the actual surplus value produced, since we cannot measure the latter in any case. So, to distinguish it from total profit, we will just use the names 'surplus value' or 'total surplus value' to refer to 'total surplus value produced by workers in the US less the difference between total price and total value'.

[207] Marx, *Capital III*, 1981, 344–347.

Surplus Value after Unproductive Expenditures

This means that 'surplus value', *s*, can be defined as:

$$s_{t,t+1} \equiv y_{t,t+1} - d_{t,t+1} - r_{t,t+1}$$

where $r_{t,t+1}$ is the total cost of the commodities bought to reproduce the labour power that is expended productively; i.e., its value.

To estimate *r*, we need to estimate the total value of commodities consumed by productive workers and petty bourgeois producers engaged in productive labour. The national accounts do not allow us to estimate *r* straightforwardly, because they do not break consumption down by class categories. But they do compare personal income with personal consumption expenditure for the population as a whole. We will use this to calculate the average propensity to consume personal income, and then multiply this by an estimate of productive workers' wages, to get an estimate of productive workers' consumption.

This estimate is not ideal. In nearly all cases we would expect workers' average propensity to consume to be higher than the general average, because workers have lower incomes. One alternative would be to assume that *all* workers' income is spent on consumption: i.e., to assume that the price and value of labour power are equal. But since wages make up the majority of personal income, the general propensity to consume is likely to be closer to workers' propensity to consume than the propensity to consume of other classes, and to be closer to workers' average propensity to consume than the assumption that this propensity is 100%. More importantly, in trend terms, assuming a 100% propensity to consume for workers would fail to register any changes as a result of changes in taxes on workers' incomes, secondary exploitation from rent, tax and interest, or changes in the proportion of income that workers set aside as savings.

Fortunately, as we will see towards the end of the chapter, we do not need to use this estimate of the average propensity to consume to measure the rate of profit on production; it only affects the decomposition of changes in it. It does, however, affect our measure of the rate of profit in terms of $s - u$.

To calculate the average propensity to consume, we first have to strip out some imputations included in personal income and consumption expenditures as they are defined in the national accounts. To do this, we will start with the adjusted measure of personal consumption expenditure we used to calculate output: i.e., PCE as measured in the national accounts less PCE on housing, gambling and financial services and insurance. However, unlike gambling, financial services and insurance, the real and imputed rent paid for housing is not exclusively a transfer payment (or imputed transfer payment). Like the sale of newly produced commodities, the sale of access to a dwelling includes a portion which covers the cost of producing the commodity (the depreciation of the dwelling) plus profit appropriated by the landlord. Unlike newly produced commodities, none of this dwelling rent embodies newly produced value (as mentioned above). Yet clearly the cost of housing is part of the cost of reproducing labour power. How then are we to account for it?

Marx explains:

> Some of the means of subsistence, such as food and fuel, are consumed every day, and must therefore be replaced every day. Others, such as clothes and furniture, last for longer periods and need to be replaced only at longer intervals. Articles of one kind must be bought or paid for every day, others every week, others every quarter and so on. But in whatever way the sum total of these outlays may be spread over the year, they must be covered by the average income, taking one day with another. If the total of the commodities required every day for the production of labour-power = A, and of those

required every week = B, and of those required every quarter = C, and so on, the daily average of these commodities $= \frac{365A+52B+4C+\cdots}{365}$.[208]

It is perhaps strange that Marx does not mention housing here, but it does not seem fundamentally different from the case of other commodities. If we extend this approach to include housing, then the value of the housing necessary to reproduce workers' labour power is the depreciation of the housing stock they occupy. This applies to all workers, whether the dwelling is rented, mortgaged or owned outright. For workers who rent their dwelling or are paying off a mortgage, the costs they incur as a result contribute towards their secondary exploitation, insofar as they exceed the depreciation of the dwelling.

In the numerator of our measure of the propensity to consume wage income, we therefore need to replace PCE on housing rent with the depreciation of the housing stock. The denominator, income, is personal income less "rental income of persons" and proprietors' net income from the housing sector (since the NIPAs count both towards 'personal income', when in reality they are transfers between individuals, and not new income). Finally, we also want to exclude income from and consumption financed by government social benefits, since below we will separately account for consumption financed this way, on the assumption that all this income is spent on commodities. 'Personal income' as defined in the national accounts only includes social benefits *net* of contributions to social insurance; so on the denominator we need to subtract net social benefits. On the numerator, however, in order to subtract the full value of the commodities we assume are consumed out of social benefits, we need to subtract gross social benefits:

p ≡ [Adjusted PCE (defined in Appendix B) + Depreciation of residential fixed assets (FA 5.4 line 1, adjusted into a temporalist measure) – Government social benefits to persons

[208] Marx, *Capital I*, 276.

(NIPA 2.1 line 17)] / [Personal income (NIPA 2.1 line 7) – Imputed rental income of persons with capital consumption adjustment (NIPA 7.12 line 53) – Proprietors' net income from housing (NIPA 7.4.5 line 20) – Government social benefits to persons [NIPA 2.1 line 17) + Contributions for government social insurance (NIPA 2.1 line 25)].

This is the average propensity to consume income on a pre-tax, pre-social insurance basis. Next, we will make the problematic assumption mentioned above, that this *general* average propensity to consume personal income is equal to the average propensity to consume compensation paid to productive workers. This means the value of the commodities consumed to reproduce productive labour power is $w_{t-1,t} \times p_{t-1,t}$, i.e. wages paid to productive workers multiplied by their propensity to consume.

Next we need to estimate the 'wages' that productive self-employed people 'pay themselves'. We will mostly assume this is equal to the average wage paid to a productive worker, in which case we can say:

$$w(self\text{-}employed)_{t,t+1} \equiv \frac{w(workers)_{t,t+1}}{L(workers)_{t,t+1}} \times L(self\text{-}employed)_{t,t+1}.$$

w overall is the sum of w for workers and w for the self-employed:

$$w_{t,t+1} \equiv w(self\text{-}employed)_{t,t+1} + w(workers)_{t,t+1}.$$

However, until around 1940 this gives the result that productive self-employed people pay themselves total 'wages' which are higher than their total income (i.e., higher than "proprietors' income" in the NIPA for productive sectors). This is probably because in these years the category 'proprietors' includes large numbers of small farmers earning low incomes. So in cases where proprietors' average income is lower than the average wage we will assume proprietors' total 'wage' is equal to their income (as explained in Appendix B).

This allows us to estimate *r* as:

$$r_{t,t+1} \equiv p_{t,t+1} \times w_{t,t+1}$$

and then to calculate surplus value using the definition given further above.

Our analysis of the turnover and stock of variable capital, on the other hand, still needs to be made in terms of wages, since it is wages that capitalists must pay to workers, and forms their variable capital. Appendix C shows that defining surplus value and the rate of surplus value in terms of the *value* of labour power nevertheless does not alter our *method* for decomposing the rate of profit, just the magnitude of one of its elements.

Next, we want to measure unproductive expenditures of surplus value, *u*. This is surplus value spent on purposes other than: net private investment and personal consumption not devoted to reproducing the labour power of employees or self-employed people. Defined positively, *u* is: surplus value spent by unproductive workers and the unproductive self-employed on reproducing their labour power; the depreciation of non-residential fixed assets used by unproductive businesses (since *residential* depreciation is either part of the value of productive or unproductive labour power or non-workers' consumption); all commodities (excluding labour power, which is already counted above) bought by the government sector (whether for consumption or investment) excluding commodities the sector consumes productively; constant circulating capital consumed by unproductive businesses; and the total cost of the commodities bought with government social benefits. We assume this last amount is equal to the social benefits the government pays: i.e., that this income is consumed at an average propensity of 100%. We make this assumption because this income is overwhelmingly paid to people with little choice but to spend it over a short length of time (it includes social security, unemployment insurance, veterans' benefits, Medicare and Medicaid).

This gives the following definition for *u*:

> *u* ≡ Intermediate goods and services purchased by government for unproductive purposes + Intermediate inputs consumed in producing: PCE on finance and insurance, PCE on gambling, PCE on real estate and net exports of other private services + Value of purchases of unproductive labour power + Government social benefits to persons (NIPA 2.1 line 17) + Unproductive non-residential business depreciation of equipment and structures + Government gross investment excluding own account investment – Productive depreciation for government + Value of unproductive proprietors' labour power.[209]

Here, we need to include the intermediate inputs consumed unproductively on producing PCE on finance and insurance, gambling, real estate and net exports of other private services and royalties etc. because we have (correctly) excluded them from personal consumption expenditure, and classified them instead as *u*. As mentioned above, other unproductive industries such as the retail sector also consume commodities unproductively – e.g., the electricity consumed by shops. But unlike the intermediate inputs used to 'produce' financial services etc. the intermediate inputs used by the retail sector are accounted for as part of the cost of the final commodities that we have *not* excluded from personal consumption expenditure. So if we included them again here we would be counting their consumption twice. This means we are effectively incorrectly classifying the value of these commodities as productively consumed constant capital rather than as unproductive expenditure of surplus value. This leads to an equal underestimate of both *s* and *u*, and therefore has no effect on *s* – *u*.

[209] Appendix B defines these in terms of NIPA categories.

With both *s* and *u* defined we can also calculate *s* – *u*. The workings for doing this are included in Appendix B, and give the following result:

> *s* - *u* = Gross private investment in equipment and structures + Net exports excluding financial services, insurance, royalties and license fees + Adjusted PCE – Total non-residential business depreciation of equipment and structures – Productive non-profit and co-op depreciation – Government social benefits – *p* × (All employees' compensation + All proprietors' 'wages').

Our measure of *s* – *u* therefore does not depend on any of the more approximate distinctions we have made between productive and unproductive labour.

We can break this down into several components. First, it is useful to identify the portion of *s* – *u* spent on what we will call, as a shorthand, "non-workers' consumption", plus investment in the private housing stock not including the housing component of the value of labour power:

> Gross private residential investment + Adjusted PCE – Government social benefits – p × (All employees' compensation + All proprietors' 'wages').

Second, there is net non-residential private investment:

> Gross private non-residential investment in equipment and structures – Total non-residential business depreciation of equipment and structures – Productive non-profit and co-op depreciation.

This leaves the third component, which is net exports excluding financial services, insurance, royalties and license fees. This is the difference between value produced in the US and value spent in the US, assuming zero unequal exchange. The difference accumulates (or, if net exports are negative, disaccumulates) as net financial assets (though financial assets also accumulate and disaccumulate for other reasons, as we will explore in the next two chapters).

For some purposes we will also want to calculate $s - u$ excluding investment and personal consumption funded out of 'profits' made by the self-employed. This is the surplus value after unproductive expenditures that is 'available' to the corporate sector, which we will call ($s - u$ - *ep)*, where *'ep'* is 'expenditure by proprietors' (i.e., proprietors' personal consumption and net investment). This is defined in Appendix B.

Profits from Production

Finally we will return to the issue of measuring profits from production. The measures of profit used in the NIPAs are described as measures of 'profits from production' because they do not include profits from capital gains. But they *do* include profits made by businesses from 'output' we excluded earlier: 'output' from 'financial services', insurance, gambling, rental payments for real estate above the depreciated value of dwellings, and net exports of other private services, royalties and license fees. These *are* indeed profits (and they are also forms of appearance of surplus value, and are included in our measure of surplus value above) but they are business profits from *transfers* between individuals and businesses of *already realised value*, and not profits *from production*.

This distinction is important because these two types of profit have different implications for investment decisions. For capitalists considering whether to invest their capital in producing commodities, the rate of return that interests them includes, in the numerator, the total price they would receive for the commodities they would expect to produce, less their costs. These costs include the *price* they pay for labour power, not its value. A portion of that price is then appropriated by *other* capitalists and the state in the form of, for example, interest paid to banks, rent paid to landlords or income taxes. But for these workers' employers (or potential employers) it generally makes no difference whether their workers have to 'spend' income in this way, and certainly is not incorporated into their investment decisions or the rate of return they receive.

Investments in commercial capital also depend exclusively on profits from production. Specifically, their profits depend on selling the commodities they buy at a higher price than they pay for them from the productive capitalist, after subtracting their costs for wages, depreciation and other inputs.[210]

For both commercial and productive capital, the largest component of the *denominator* of the rate of return that interests them is fixed assets plus inventories; i.e., the *produced* component of capital that was Marx's main focus. For productive capital this includes the whole of the variable component of their capital, the whole value of their productive constant capital, and potentially also capital tied up in the unrecovered costs of paying unproductive employees (e.g. managers and accountants, whose wages still contribute to the cost price of commodities and hence to the cost price of inventories, even though they add no *value* to these commodities) and unproductive constant capital (e.g. office space for the unproductive employees). For commercial capital, their fixed assets and inventories exclusively embody the value of their constant capital. This capital is productive for them (i.e., they need it to generate profits), but is unproductive in the sense that it is not used to enhance the use value of commodities, and therefore does not transfer its value to output.

However, fixed assets and inventories are not the whole of the capital which must be invested to make it possible to employ workers to produce or sell commodities. The capitalist must also

[210] Marx, *Capital III*, 1981, 394–416.

buy or rent the land needed for this purpose, pay any necessary taxes or bribes, put money in the businesses' bank accounts and cash registers, buy (other) financial assets or borrow money, and meet other sundry expenses. All of this is capital, some of which contributes to the balance sheet (which includes the businesses' stock of 'goodwill'), and some of which the accountant will 'expense' immediately.

For the purposes of calculating the average rate of profit from production, we will ignore these components of capital. Since these components of capital are not *produced* (except for the labour power of unproductive employees of commercial capital), their cost is determined quite differently from the cost of the produced components of capital advanced. They are 'fictitious' components of capital, which is a concept we will explore further in the next two chapters. Here we need to note that it is only the rate of return *as capitalists measure it* which has a direct influence on their investment decisions. The ratio of profits from production to *produced* commercial and productive capital is therefore only a proxy for the average rate of return on investments in commercial and productive capital as capitalists measure it. However, it is a useful proxy because its dynamics can be described and measured without having to deal with the complications that non-produced capital introduces.

On the other hand, for finance capital and for landlords, non-produced capital is an especially large component of their capital, and the relationship between their profits, surplus value and profits from production is highly mediated. The ratio of their profits to their produced capital is therefore not a good approximation for their average rate of return, and the relationship between the average rate of profit on production and their rates of return involves complications which we cannot consider in detail without exploring the concept of fictitious capital further. For example, for capital advanced as finance, the entire capital is the current exchange value of their holdings of shares or bonds, or the principal on a loan. A financial *institution* (e.g. a bank) depends in an even more mediated fashion on the production of value, since its profits depend on the effectiveness with which it performs its function as a financial intermediary, and its capital is overwhelmingly fictitious. Financial *profits* either derive from profits from production or value extracted through secondary exploitation, or can be fictitious.

We will explore these issues to some extent in the next two chapters, but one important point here is that it does not make sense to count financial profits towards profits from production. If financial profits are extracted in the form of interest or dividends from commercial or productive capitalists then they are already a part of profits from production, if they are extracted from individuals then they are the result of a process that is *secondary* to the direct exploitation of workers in production, and if they are fictitious they are the result of an expansion of the stock of financial assets.

For a landlord, their rate of return is determined in a similarly mediated fashion. The largest component of their capital is usually land, and the part of the exchange value of land which corresponds to its unimproved value does not embody the expenditure of human labour, and is therefore non-produced capital. If they rent to individual people, the landlord's revenue depends on extracting money from already realised value paid in the form of wages, profits paid to individuals in their various forms, or savings, in the same way as financial profit extracted from individuals. If they rent to a productive or commercial business, then the situation is similar to that for interest and dividends paid by these businesses. Again, this is discussed further in the next two chapters, but the important point here is that it does not make sense to account explicitly for landlords' profit or capital as part of calculating the average rate of profit on production.

It is not surprising that studies of the rate of profit based on the corporate sector as a whole, including financial institutions, sometimes find results which appear to be inconsistent with

Marx's LTFRP. By including the profits made by corporations on 'personal consumption expenditure' on financial services, insurance, gambling, and dwelling rent, and 'net exports' of financial services, insurance, patents and licenses, these studies are including profit in the numerator of the rate of profit that is not profit from production. As mentioned above, they are also poor starting points for explaining the rate of accumulation, because although for this purpose we *do* want to include profits appropriated through secondary exploitation, we *also* need to account for the effects of saving and borrowing by workers and the state.

Within the framework we have developed so far, measuring profits from production is relatively straightforward. Our measure of total output already excludes the 'output' recorded in the national accounts from non-commodities (financial services, insurance etc.). To measure total profits from production in the business sector, we will start with this measure of output, after subtracting the total price of the commodities produced by the government and non-profit sectors. Then we subtract the cost of the productive and unproductive labour power and constant capital used to produce and realise profits from production. This includes the cost of wages paid to managers to discipline this labour, and the wages of other unproductive workers hired in the commercial and productive sectors, since these are all costs businesses must pay to produce and realise this profit. This gives us profits from production before tax, interest and rent, π:

$$\pi \equiv by - nfd - nfw$$

where: *by* = output produced by businesses; *nfd* is depreciation of non-residential fixed assets owned by businesses excluding the finance, insurance and real estate sectors ('non-financial depreciation'); and *nfw* is the total wages paid to employees of these businesses and the 'wages' proprietors' of these businesses 'pay themselves'.

As before, we can also measure this excluding non-corporate businesses, by subtracting all of proprietors' income in these sectors (and not just their 'wages'). It is also important to measure profits from production on an after-tax basis, since taxes are relevant for investment decisions. After-tax profits will also be important for assessing the fictitious component of financial profits in Chapter 6. To do this, we need to subtract taxes on production less subsidies, and taxes on corporate income. This creates four measures of profits on production, which are defined in Appendix B.

The denominators for these measures of the rate of profit are the same as those we will use for the rate of profit defined in terms of ($s - u$). For the measures which include non-corporate business, this is non-residential fixed assets plus inventories at pre-production prices for all businesses excluding financial corporations. For the measures which apply to corporate businesses only, this is corporate non-residential fixed assets excluding financial corporations plus corporate inventories, again at pre-production prices. These estimates are not ideal because the category 'financial corporations' is not exactly the same as 'all businesses outside the productive and commercial sectors', but it seems unlikely that the difference in the stock of fixed assets owned by these two categories of business would have a significant effect on the results.

Decomposing Changes in the Rate of Profit from Production

To decompose changes in the rate of profit from production, we will start by replacing ($s - u$) / s with two separate ratios: the effect on profits from production of the ratio of price of labour power to its value, and the effect of the ratio of taxes net of subsidies to before-tax (and before-subsidy) profits from production. That is,

$$\frac{\pi}{s} = \frac{by - nfd - nfr}{y - d - r} \times \frac{by - nfd - nfw}{by - nfd - nfr}$$

where *nfr* the value of the labour power of employees and proprietors of non-financial businesses.

The first ratio is the ratio of what before-tax profit from production to surplus value would be if labour power was sold at its value. Since relatively few commodities are produced by the US government and non-profit sectors the main influence on this ratio should be unproductive expenditures by non-financial businesses. The second is the ratio of the latter to actual before-tax profits from production: i.e., the effect of the difference between the price and value of labour power on this measure of the rate of profit.

Next, we incorporate the combined effect of taxes and subsidies to give us the decomposition of the after-tax measure of profits from production:

$$\frac{\pi - g}{s} = \frac{by - nfd - nfr}{y - d - r} \times \frac{by - nfd - nfw}{by - nfd - nfr} \times \frac{\pi - g}{by - nfd - nfw}$$

The last ratio in this expression is the effect of taxes on after-tax profits from production.

We can use these expressions to perform full decompositions on both the before- and after-tax measures of the rate of profit from production, as set out in Appendix C below.

Conclusion

This concludes the three chapters devoted to measuring and decomposing changes in rates of profit. These chapters have constructed an interpretation of Marx's value theory as it applies to the rate of profit that has aimed to stay as close as possible to Marx's original text. The next chapter considers Marx's less developed but still very valuable work in *Capital* on finance, so that, in Chapter 6, we can construct a theory of average financial rates of return.

Appendix B: Accounting Definitions

Abbreviations for Sources

NIPA = National Income and Product Accounts[211]

FA = Fixed Assets Accounts[212]

VA / GO = GDP-by-industry accounts (including estimates of value added and gross output by industry).[213]

Output (*y*)

Output ($\$_{t-1,t}y_{t-1,t}$) ≡ Gross Domestic Product (NIPA 1.1.5 line 1) – PCE (NIPA 2.4.5 line 1) + Adjusted PCE – Net exports of financial services and insurance – Exports of royalties and license fees (NIPA 4.2.5 line 21) [214] + Imports of royalties and license fees (NIPA 4.2.5 line 45)[215] – Gross private domestic investment in intellectual property products (NIPA 1.1.5 line 12) – Gross government investment in intellectual property (FA 7.5 sheet A line 16, sheet B line 18) – Government consumption expenditures (NIPA 3.10.5 line 1) + Intermediate goods and services purchased by government for unproductive purposes – Government own-account investment (NIPA 3.10.5 line 10) + Intermediate inputs consumed in producing: PCE on finance and insurance, PCE on gambling, PCE on real estate and net exports of other private services

where:

[211] US Bureau of Economic Analysis, "National Income and Product Accounts Tables."
[212] US Bureau of Economic Analysis, "Fixed Assets Accounts."
[213] US Bureau of Economic Analysis, "GDP-by-Industry Accounts."
[214] Before 1967 this is estimated using Exports of Services [NIPA 1.1.5, line 24] * Imports of Royalties and license fees, 1967 [NIPA 4.2.5, line 21] / Exports of Services, 1967 [NIPA 1.1.5, line 24].
[215] Before 1967 this is estimated using Imports of Services [NIPA 1.1.5, line 27] * Imports of Royalties and license fees, 1967 [NIPA 4.2.5, line 45] / Imports of Services, 1967 [NIPA 1.1.5, line 27].

Adjusted PCE ≡ PCE (NIPA 2.4.5 line 1) – PCE on Housing (NIPA 2.4.5 line 50) – PCE on Gambling (NIPA 2.4.5 line 79) – PCE on Financial services and insurance (NIPA 2.4.5 line 86).

Net exports of financial services and insurance ≡ Payments less receipts of financial services (US International Services detailed statistics tables 5a to 5c) + Payments less receipts of net insurance (US International Services detailed statistics tables 5a to 5c).[216]

Intermediate goods and services purchased by government for unproductive purposes ≡ Government intermediate goods and services purchased (NIPA 3.10.5 line 6) * [Gross output of general government (NIPA 3.10.5 line 2) - Government sales to other sectors (NIPA 3.10.5 line 11)] / Gross output of general government (NIPA 3.10.5 line 2).

Intermediate inputs consumed in producing: PCE on finance and insurance, PCE on gambling, PCE on real estate and net exports of other private services ≡

[PCE on Financial services and insurance (NIPA 2.4.5 line 86) + Net exports of financial services and insurance (NIPA 4.2.5 line 22)] * Intermediate inputs for Finance and insurance (VA/GO 1987-92 line 798; VA/GO 97-12 line 850) / Gross output for Finance and insurance (VA/GO 1987-92 line 519; VA/GO 97-12 line 553)

[216] Between 1986 and 1997 there is no data for financial services exported and imported through affiliated corporations. This was estimating by assuming the ratio of affiliated net exports of other private services to unaffiliated other private services was equal to the ratio of affiliated financial services to unaffiliated financial services. Before 1986 there is no data for trade in financial services or insurance. We have estimated them assuming a constant ratio of net exports of financial services and insurance to 'other private services' for all years until and including 1986. Before 1967 there is no data for trade in 'other private services', so we have assumed constant ratios of exports and imports of 'other private services' to exports of all services. Until around 1997 net exports of financial services and insurance are negligibly small (less than 0.05% of output according to our estimates).

+ PCE on Gambling (NIPA 2.4.5 line 79) * Intermediate inputs for Gambling (VA/GO 1987-92 line 824; VA/GO 97-12 line 877) / Gross output for Gambling (VA/GO 1987-92 line 545; VA/GO 97-12 line 580)

+ Intermediate goods and services consumed producing housing sector output (NIPA 7.4.5 line 6).

Business output (*by*) ≡ Output (*y*) – Receipts from sales of goods and services by non-profit institutions (NIPA 2.3.5 line 24) – Government sales to other sectors (NIPA 3.10.5 line 11).

Productive Private Industries

The measures of productive depreciation (*d*), socially necessary labour time (*L*), and the value and price of productive labour power (*r* and *w*) depend on distinguishing productive industries from unproductive industries. For this purpose the private industries listed below were defined as productive. Some government employees are also classified as productive, and the method for estimating this is explained in each case.

A difficulty with the data is that the system of industry classifications changes three times between 1929 and 2013. We need to 'smooth over' the breaks this would otherwise introduce into the series. The NIPA facilitate this by always including at least one year in which the classification systems 'cross over'. From 1929 to 1948, we use the raw data supplied in the NIPAs. In 1949, we calculate the levels of *d, L, r* and *w* as their level in 1948 in each case under the old classification system divided by their level in 1948 under the new classification system multiplied by their level in 1949 under the new classification system. For each subsequent year, we continue to calculate their levels using this ratio under the relevant classification system. This means that although changes in the classification system have influences on the rate of growth of each series, they do not create the appearance of sudden changes in levels between the years for which the classification systems change.

1929 – 1948: Agriculture, forestry and fisheries; Mining; Contract construction; Manufacturing; Transportation and public facilities; Services.

1948-1987: Agriculture, forestry and fishing; Mining; Construction; Manufacturing; Transportation and public utilities; Services.

1988-2000: Agriculture, forestry and fishing; Mining; Construction; Manufacturing; Transportation and public utilities; Services.

2001-2013: Corporate business: Agriculture, forestry, fishing and hunting; Mining; Utilities; Manufacturing; Transportation and warehousing; Information; Professional, scientific, and technical services; Administrative and waste management services; Education services; Health care and social assistance; Arts, entertainment and recreation; Accommodation and food services; Other services, except government.

2001-2013: Non-corporate business: Agriculture, forestry, fishing and hunting; Utilities; Manufacturing; Transportation and warehousing; Information; Professional and business services; Education services, health care, and social assistance; Arts, entertainment, recreation, accommodation, and food services.

Depreciation (*d*)

Productive depreciation in SNLT ≡ $d_{t-1,t}$ ≡ $\$_{t-1,t}d_{t-1,t}$ * [Price index for nonresidential private fixed investment for last year (i.e. t-2, t-1; NIPA 1.1.4 line 9) / Price index for nonresidential private fixed investment for this year (i.e. t-1, t; NIPA 1.1.4 line 9)] * $n_{t-1,t}$ / $n_{t-2,t-1}$.

Productive depreciation at current prices ($\$_{t-1,t}d_{t-1,t}$) ≡ Current cost productive depreciation plus ‘depreciation’ of intellectual assets for non-corporate business (NIPA 6.22, sheets A to D) + Current cost productive depreciation plus ‘depreciation’ of intellectual assets for corporate business (NIPA 6.13, sheets A to D) – Current cost ‘depreciation’ of relevant intellectual assets + Current cost productive depreciation for government + Current cost productive depreciation for non-profit institutions and co-operatives.

Where:

> Depreciation attributed to relevant intellectual assets ≡ Current cost depreciation of private nonresidential intellectual property products (FA 4.4 line 4) – [Current cost depreciation of private nonresidential intellectual property products (FA 4.4) for: Financial corporations (line 36) + Nonprofit institutions (line 68) + Households (line 72) + Tax-exempt cooperatives (line 76)].
>
> Current cost productive depreciation for government ≡ Sales to other sectors (NIPA 3.10.5 line 11) * [Consumption of general government fixed capital (NIPA 3.10.5 line 5) – Current cost depreciation of residential fixed assets for government (FA 5.4 line 8)} / Gross output of general government (NIPA 3.10.5 line 2)
>
> Current cost productive depreciation for non-profit institutions and co-operatives ≡ Receipts from sales of goods and services by non-profit institutions (NIPA 2.3.5 line 24) / Gross output of non-profit institutions (NIPA 2.3.5 line 23)[217] * [Current cost depreciation of non-residential equipment and structures for non-profit institutions (FA

[217] Before 1959, this ratio is assumed to be equal to its level in 1959.

4.4 line 66 + 67) + Current cost depreciation of non-residential equipment and structures for tax exempt co-operatives (FA 4.4 line 74 + 75)].

Non-financial business depreciation (*nfd*) ≡ TSSI depreciation for corporations excluding finance, insurance and real estate + TSSI depreciation for non-corporate businesses excluding finance, insurance and real estate

where

> TSSI depreciation for corporations excluding finance, insurance and real estate ≡ [Consumption of fixed capital for corporations excluding finance, insurance and real estate (NIPA 6.22 sheet A line 1 – 52, sheets B and C line 1 – 50, sheet D line 1 – 51 – 57; note this includes 'depreciation' of intellectual assets) – 'Depreciation' of intellectual assets for non-financial corporations (NIPA 4.4 line 50)] × [Price index for non-residential private investment$_{t-2,t-1}$ (NIPA 1.1.4 line 9, previous year) / Price index for non-residential private investment$_{t-1,t}$ (NIPA 1.1.4 line 9)] × $n_{t-2,t-1}$ / $n_{t-1,t}$.
>
> TSSI depreciation for non-corporate businesses excluding finance, insurance and real estate ≡ [Consumption of fixed capital for non-corporate business excluding finance, insurance and real estate (NIPA 6.13 sheets A to C line 1 – 16, sheet D line 1 – 15; note this includes 'depreciation' of intellectual assets) – 'Depreciation' of intellectual assets for non-corporate business (NIPA 4.4 line 60 + 64)] × [Price index for non-residential private investment$_{t-2,t-1}$ (NIPA 1.1.4 line 9, previous year) / Price index for non-residential private investment$_{t-1,t}$ (NIPA 1.1.4 line 9)] × $n_{t-2,t-1}$ / $n_{t-1,t}$.

Net output (*y* – *d*)

Using this approach we can measure net output in one of three ways. The first and most important is the value added by living labour, *L*:

$$\$_{t-1,t}L_{t-1,t} = \$_{t-1,t}y_{t-1,t} - d_{t-1,t} \times n_{t-1,t} \; .$$

The measure of depreciation used here is the value transferred by fixed assets; and it is equivalent to gross output less the labour time that was socially necessary to reproduce the depreciated portion of fixed assets at the start of the period.

The second is cost of reproducing the depreciated portion of the stock of fixed assets in *physical* terms, at *output* prices. This is net output as measured in the national accounts (except here adjusted for the distinction between productive and unproductive labour):

$$\$_{t-1,t}y_{t-1,t} - \$_{t-1,t}d_{t-1,t} \; .$$

This will usually be higher than the first measure, as technological change tends to make it cheaper, in MELT adjusted terms, to replace a given physical stock of fixed assets over time.

Notice that, unlike other magnitudes, it is not true generally that $\$_{t-1,t}d_{t-1,t} = d_{t-1,t} \times n_{t-1,t}$. The same would true of other inputs if we were using a more consistently temporalist measure of the MELT, rather than the approximation used here.

The third measure of net output subtracts the value required to maintain the stock of fixed at a constant value, after accounting for both depreciation *and* revaluation. This is:

$$\$_{t-1,t}y - \left(d_{t-1,t} - RF_{t-1,t}\right) \times n_{t-1,t} \; .$$

Since devaluation is more common than revaluation, this will usually be the smallest of the three measures.

This also implies three corresponding measures of investment net of depreciation. Different measures will be appropriate for different purposes.

Wages of Producers (*w*)

w ≡ w (workers) + w (self-employed)

where

$w (workers) ≡ Wages paid to workers in productive private industries (as defined above, NIPA 6.2, sheets A to D) + Government employees (NIPA 6.2, sheets A to D) * Government sales to other sectors (NIPA 3.10.5 line 11) / Gross output of general government (NIPA 3.10.5 line 2)

$w (self-employed) ≡ the smaller of:

non-farm proprietors' income for productive industries (NIPA 6.12, sheets A to D) + farm proprietors' income (NIPA 2.1 line 10);

and

$$\frac{\$w\ (workers)}{L\ (workers)} \times L\ (self\text{-}employed).$$

Wages of non-financial business employees and proprietors (*nfw*) ≡ Compensation of employees of businesses excluding finance, insurance and real estate (NIPA 6.2, sheet A line 1 – 54, sheet B line 1 – 52, sheet C line 1 – 52, sheet D line 1 – 57 – 62)

Value of Reproducing Productive Labour Power (*r*)

r ≡ p × w.

Surplus Value (*s*)

$s \equiv y - d - r$ = Gross Domestic Product (NIPA 1.1.5 line 1) – PCE (NIPA 2.4.5 line 1) + Adjusted PCE – Net exports of financial services and insurance – Exports of Royalties and license fees (NIPA 4.2.5 line 21) [218] + Imports of Royalties and license fees (NIPA 4.2.5 line 45)[219] – Gross private domestic investment in intellectual property products (NIPA 1.1.5 line 12) – Gross government investment in intellectual property (FA 7.5 sheet A line 16, sheet B line 18) – Government consumption expenditures (NIPA 3.10.5 line 1) + Intermediate goods and services purchased by government for unproductive purposes – Government own-account investment (NIPA 3.10.5 line 10) + Intermediate inputs consumed in producing: PCE on finance and insurance, PCE on gambling, PCE on real estate and net exports of other private services – $d - p \times w$.

Unproductive Expenditures of Surplus Value (*u*)

$u \equiv$ Intermediate goods and services purchased by government for unproductive purposes + Intermediate inputs consumed in producing: PCE on finance and insurance, PCE on gambling, PCE on real estate and net exports of other private services + Value of purchases of unproductive labour power + Government social benefits to persons (NIPA 2.1 line 17) + Unproductive non-residential business depreciation of equipment and structures + Government gross investment excluding own account investment – Productive depreciation for government + Value of unproductive proprietors' labour power

where the elements not defined above are:

218 Before 1967 this is estimated using Exports of Services [NIPA 1.1.5, line 24] * Imports of Royalties and license fees, 1967 [NIPA 4.2.5, line 21] / Exports of Services, 1967 [NIPA 1.1.5, line 24].

219 Before 1967 this is estimated using Imports of Services [NIPA 1.1.5, line 27] * Imports of Royalties and license fees, 1967 [NIPA 4.2.5, line 45] / Imports of Services, 1967 [NIPA 1.1.5, line 27].

Value of purchases of unproductive labour power ≡ *p* × [Compensation of employees (NIPA 2.1 line 2) - *$w (workers)*]

Unproductive non-residential business depreciation$_{t-1,t}$ ≡ [Depreciation of non-residential business equipment and structures$_{t-1,t}$ (FA 4.4 line 2 + line 3 – line 66 – line 67 – line 70 – line 71 – line 74 – line 75) – Productive business depreciation] × [Price index for non-residential private investment$_{t-2,t-1}$ (NIPA 1.1.4 line 9, previous year) / Price index for non-residential private investment$_{t-1,t}$ (NIPA 1.1.4 line 9)] × $n_{t-2,t-1}$ / $n_{t-1,t}$.

Government gross investment excluding own account investment ≡ Government consumption expenditures and gross investment (NIPA 1.1.5 line 22) – Government consumption expenditures (NIPA 3.10.5 line 1) – Government own-account investment (NIPA 3.10.5 line 10)

Value of unproductive proprietors' labour power ≡ *p* × [*$w (self-employed)* - *$w (self-employed)*]

where *$w (self-employed)* ≡ the smaller of:

Proprietors' net income (NIPA 2.1 line 9);

and

Self-employed persons (NIPA 6.7, sheets A to D line 1) × Compensation of employees (NIPA 2.1 line 2) / Full-time equivalent employees (NIPA 6.5, sheets A to D line 1).

Surplus Value Less Unproductive Expenditures (*s* – *u*)

$s - u$ = GDP – PCE + Adjusted PCE – Net exports of financial services, insurance, royalties and license fees – Gross domestic investment in intellectual property products – Government consumption expenditures + Intermediate goods and services purchased by government for unproductive purposes – Government own-account investment + Intermediate inputs consumed in producing: PCE on finance and insurance, PCE on gambling, PCE on real estate and net exports of other private services – $d - p \times w$ – [Intermediate goods and services purchased by government for unproductive purposes + Intermediate inputs consumed in producing: PCE on finance and insurance, PCE on gambling, PCE on real estate and net exports of financial services and insurance + Value of purchases of unproductive labour power + Government social benefits to persons + Unproductive non-residential business depreciation of equipment and structures + Government gross investment excluding own account investment – Productive depreciation for government + Value of unproductive proprietors' labour power]

= GDP – PCE + Adjusted PCE – Net exports of other private services, royalties and license fees – Gross domestic investment in intellectual property products – Government consumption expenditures – Government own-account investment – $d - p \times w$ – [Government social benefits to persons + Unproductive non-residential business depreciation of equipment and structures + Government gross investment excluding own account investment – Productive depreciation for government].

Now, since GDP = PCE + Gross private investment + net exports + government consumption + gross government investment;

$s - u$ = Gross private investment in equipment and structures + Net exports excluding other private services, royalties and license fees + Adjusted PCE – $d - p \times w$ – [Government social benefits to persons + Unproductive non-residential business depreciation of equipment and structures – Productive depreciation for government].

Further, since

d = Productive business depreciation + Productive depreciation for government + Productive depreciation for non-profits and co-ops;

s – *u* = Gross private investment in equipment and structures + Net exports excluding financial services, insurance, royalties and license fees + Adjusted PCE – *p* × *w* – [Government social benefits to persons + Unproductive non-residential business depreciation – Productive depreciation for government + Productive business depreciation + Productive depreciation for government + Productive depreciation for non-profits and co-ops];

and, since all productive depreciation is non-residential, Unproductive non-residential business depreciation of equipment and structures + Productive business depreciation = Non-residential business depreciation;

s – *u* = Gross private investment in equipment and structures + Net exports excluding financial services, insurance, royalties and license fees + Adjusted PCE – *p* × *w* – Government social benefits to persons - Non-residential business depreciation of equipment and structures - Productive depreciation for non-profits and co-ops.

Surplus Value 'Available' to the Corporate Sector (*s* – *u* – *ep*)

s – *u* – *ep* ≡ *s* – *u* – Proprietors' consumption and net investment = Gross private investment in equipment and structures + Net exports excluding financial services, insurance royalties and license fees + Adjusted PCE – *p* × [*w (workers)* + Proprietors' income (NIPA 2.1 line 9)] – Government social benefits to persons - Non-residential business depreciation - Productive depreciation for non-profits and co-ops – {Gross investment in non-corporate business non-residential equipment and structures (FA 4.7 lines 58 + 59 + 62 + 63) – Current cost depreciation of non-corporate business non-residential equipment and structures (FA 4.4 lines 58 + 59 + 62 + 63) × [Price index for non-residential private investment$_{t-2,t-1}$ (NIPA 1.1.4 line 9, previous year) / Price index for non-residential private investment$_{t-1,t}$ (NIPA 1.1.4 line 9)] × $n_{t-2,t-1}$ / $n_{t-1,t}$ + Gross investment in non-corporate business residential fixed assets (FA 5.7 line 5) – Current cost depreciation of non-corporate business residential fixed assets (FA 5.4 line 5) × [Price index for residential private investment$_{t-2,t-1}$ (NIPA 1.1.4 line 13, previous year) / Price index for residential private investment$_{t-1,t}$ (NIPA 1.1.4 line 13)] × $n_{t-2,t-1}$ / $n_{t-1,t}$}.

Pre-Tax Profits from Production for All Businesses (π)

π ≡ Output of businesses (*by*) – Compensation of employees of private industries (NIPA 6.2, sheets A to D, line 3) + Compensation of employees of finance, insurance and real estate (NIPA 6.2, sheet A line 54, sheet B line 52, sheet C line 52, sheet D lines 57 + 62) – TSSI depreciation for businesses excluding finance, insurance and real estate - *$w (self-employed) + $w (self-employed in finance, insurance and real estate)*

where

Output of businesses (*by*) ≡ *y* – Receipts from sales of goods and services by non-profit institutions (NIPA 2.3.5 line 24) – Government sales to other sectors (NIPA 3.10.5 line 11);[220] and

[220] Before 1959 sales by non-profit institutions are not recorded, so we estimate them by assuming that the ratio of non-profit sales to the current cost depreciation of their fixed assets remains the same until 1959, since we can get the depreciation for the years before 1959 and this is an estimate that does not have any significant effect on the results. Specifically,

Non-profit sales before 1959 ≡ Non-profit sales in 1959 (NIPA 3.10.5 line 11) / [Current-cost depreciation of private non-residential fixed assets for non-profit institutions and tax-exempt co-operatives in 1959 (FA 4.4 lines 66 + 67 + 74 + 75)] * Current-cost depreciation of private non-

TSSI depreciation for businesses excluding finance, insurance and real estate ≡ TSSI consumption of fixed capital for corporations excluding finance, insurance and real estate + TSSI consumption of fixed capital for non-corporate businesses excluding finance, insurance and real estate.[221]

\$w (self-employed in finance, insurance and real estate) ≡ the smaller of:

Nonfarm proprietors' net income excluding finance, insurance and real estate (NIPA 6.12 sheets A to C, lines 1 – 14, sheet D lines 1 – 13) + Farm proprietors' net income (NIPA 2.1 line 10);

and

Self-employed persons excluding finance, insurance and real estate (NIPA 6.7, sheets A to C lines 1 – 14, sheet D lines 1 - 13) × Compensation of employees (NIPA 2.1 line 2) / Full-time equivalent employees (NIPA 6.5, sheets A to D line 1).

Pre-Tax Profits from Production for Corporations (π - πp)

π - πp ≡ Output of businesses – Compensation of employees of private industries (NIPA 6.2, sheets A to D, line 3) + Compensation of employees of finance, insurance and real estate (NIPA

residential fixed assets for non-profit institutions and tax-exempt co-operatives in the current year (FA 4.4 lines 66 + 67 + 74 + 75).

[221] Where: TSSI consumption of fixed capital for corporations excluding finance, insurance and real estate ≡ [Corporate capital consumption allowances (NIPA 6.22, sheets A to D line 1) – Corporate capital consumption allowances (NIPA 6.22, sheet A line 52, sheet B line 50, sheet C line 50, sheet D lines 51 + 57)] * [Price index for nonresidential private fixed investment for last year (i.e. t-2, t-1; NIPA 1.1.4 line 9) / Price index for nonresidential private fixed investment for this year (i.e. t-1, t; NIPA 1.1.4 line 9)] * $n_{t-1,t}$ / $n_{t-2,t-1}$; and Consumption of fixed capital for non-corporate businesses excluding finance, insurance and real estate ≡ [Non-corporate capital consumption allowances (NIPA 6.13, sheets A to D, line 1) – Non-corporate capital consumption allowances for finance, insurance and real estate (NIPA 6.13, sheet A line 16, sheet B line 16, sheet C line 16, sheet D line 15)] * [Price index for nonresidential private fixed investment for last year (i.e. t-2, t-1; NIPA 1.1.4 line 9) / Price index for nonresidential private fixed investment for this year (i.e. t-1, t; NIPA 1.1.4 line 9)] * $n_{t-1,t}$ / $n_{t-2,t-1}$.

6.2, sheet A line 54, sheet B line 52, sheet C line 52, sheet D lines 57 + 62) – TSSI consumption of fixed capital for corporations excluding finance, insurance and real estate – Nonfarm proprietors' net income excluding finance, insurance and real estate (NIPA 6.12 sheets A to C, lines 1 – 14, sheet D lines 1 – 13) – Farm proprietors' net income (NIPA 2.1 line 10) – Non-corporate capital consumption allowances (NIPA 6.13, sheets A to D, line 1) + Non-corporate capital consumption allowances for finance, insurance and real estate (NIPA 6.13, sheet A line 16, sheet B line 16, sheet C line 16, sheet D line 15).

After-Tax Profits from Production for All Businesses (π - g)

Here g ≡ Taxes on production less subsidies on production, excluding financial corporations + Taxes on non-financial corporate income (NIPA 1.14 line 28), where:

> Taxes on production less subsidies on production, excluding financial corporations ≡ Taxes on production and imports (NIPA 1.10 line 7) – Subsidies (NIPA 1.10 line 8) – Taxes on production and imports less subsidies for corporate business (NIPA 1.14 line 7) + Taxes on production and imports less subsidies for non-financial corporate business (NIPA 1.14 line 23).

After-Tax Profits from Production for Corporations ($\pi - \pi p - g + gp$)

Here (g – gp) ≡ Taxes on production and imports less subsidies for non-financial corporate business (NIPA 1.14 line 23) + Taxes on non-financial corporate income (NIPA 1.14 line 28).

Constant and Variable Capital Advanced for All Non-Financial Businesses (C)

$C_t \equiv F_t + inv_t$

where:

F_t ≡ Current cost non-residential business equipment and structures excluding financial corporations in year *t* (FA 4.1 lines 8 + 9 – 34 – 35 – 66 – 67 – 70 – 71 – 74 – 75) * [Price index for nonresidential private fixed investment for last year (i.e. for year *t*-1, *t*; NIPA 1.1.4 line 9) / Average price index for nonresidential private fixed investment for the previous quarter and the following quarter (i.e. the average of the price level for quarters *t*-0.25, *t* and *t, t*+0.25; NIPA 1.1.4 line 9)] * $n_{t,t+1} / n_{t-1,t}$[222]; and

inv_t ≡ Average current cost business inventories for the last quarter of the preceding year and the first quarter of the next year (NIPA 5.8.5 sheets A and B line 1) * [Price index for durable goods for last year (i.e. *t*-1, *t*; NIPA 1.1.4 line 4) / Average price index for durable goods for the previous quarter and the following quarter (i.e. *t*-0.25, *t* and *t, t*+0.25; NIPA 1.1.4 line 4)] * $n_{t-1,t} / n_{t-2,t-1}$.

Constant and Variable Capital Advanced for Corporate Non-Financial Businesses (*C* - *Cp*)

$C_t – Cp_t ≡ F_t – Fp_t + inv_t - invp_t$

where:

$F_t – Fp_t$ ≡ Current cost non-residential non-financial corporate equipment and structures in year *t* (FA 4.1 lines 38 + 39) * [Price index for nonresidential private fixed investment for last year (i.e. for year *t*-1, *t*; NIPA 1.1.4 line 9) / Average price index for nonresidential private fixed investment for the previous quarter and the following quarter (i.e. the average of the price level for quarters *t*-0.25, *t* and *t, t*+0.25; NIPA 1.1.4 line 9)] * $n_{t,t+1} / n_{t-1,t}$[223]; and

[222] As for depreciation, for the years prior to 1948 we divided by the average price level for the preceding and following *years* instead of quarters.
[223] As for depreciation, for the years prior to 1948 we divided by the average price level for the preceding and following *years* instead of quarters.

inv_t - $invp_t$ ≡ Estimated average current cost corporate inventories for the last quarter of the preceding year and the first quarter of the next year[224] * [Price index for durable goods for last year (i.e. t-1, t; NIPA 1.1.4 line 4) / Average price index for durable goods for the previous quarter and the following quarter (i.e. t-0.25, t and t, t+0.25; NIPA 1.1.4 line 4)] * $n_{t-1,t}$ / $n_{t-2,t-1}$.

Appendix C: Decomposing Rates of Profit When the Value of Labour Power is not Equal to its Price

The definitions of turnover time, variable capital, the OCC and the VCC are unaffected by relaxing the assumption that the value of labour power is equal to its price, since they are all defined in terms of wages. This means we can start with the following expression derived in the previous chapter, after substituting (*s – u)* for *s*:

$$\frac{s_{t,t+1} - u_{t,t+1}}{C_{t,t+1}} = \frac{\frac{(s_{t,t+1} - u_{t,t+1})}{w_{t,t+1}} \times nv_{t,t+1} \times \frac{y_{t,t+1}}{ys_{t,t+1}}}{VCC_t + 1}$$

$$= \frac{\frac{s_{t,t+1}}{w_{t,t+1}} \times nv_{t,t+1} \times \frac{y_{t,t+1}}{ys_{t,t+1}} \times \frac{(s_{t,t+1} - u_{t,t+1})}{s_{t,t+1}}}{\frac{VCC_t + 1}{OCC_t + 1} \times (OCC_t + 1)}.$$

Similarly, we can take the results that

[224] This is estimated as: Non-farm corporate inventories + Farm corporate inventories where: Farm corporate inventories ≡ [FA 4.1 lines 22 + 23] * [NIPA 5.8.5 line 2] / [FA 4.1 lines 6 + 7]; and Non-farm corporate inventories ≡ [FA 4.1 lines 18 + 19 – 22 – 23] * [NIPA 5.8.5 line 3] / [Current cost non-residential non-farm business equipment and structures (FA 4.1 lines 8 + 9 – 13 – 14 – 66 – 67 – 70 – 71 – 74 – 75) – FA]. This is assumes that, after separating farms from non-farms, inventories are divided between corporate and non-corporate business in proportion to their fixed assets.

$$\frac{VCC_t + 1}{OCC_t + 1} = \frac{C_t}{C_i \times \frac{QC_t}{QC_i}} \times \frac{L_{t,t+1}/nv_{t,t+1}}{L_{i,i+1}/nv_{i,i+1}} \times \frac{v_i}{v_t}$$

and

$$\frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{vr_{i,i+1}}{vr_{t,t+1}} = \frac{w_{i,i+1}/L_{i,i+1}}{\frac{y_{i,i+1}}{ys_{i,i+1}}} \Bigg/ \frac{w_{t,t+1}/L_{t,t+1}}{\frac{y_{t,t+1}}{ys_{t,t+1}}} \ .$$

We can re-arrange this last expression as follows:

$$\frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{vr_{i,i+1}}{vr_{t,t+1}} = \left(\frac{w_{i,i+1}}{r_{i,i+1}} \Big/ \frac{w_{t,t+1}}{r_{t,t+1}}\right) \times \left(\frac{r_{i,i+1}/L_{i,i+1}}{\frac{y_{i,i+1}}{ys_{i,i+1}}} \Bigg/ \frac{r_{t,t+1}/L_{t,t+1}}{\frac{y_{t,t+1}}{ys_{t,t+1}}} \right).$$

Next, since

$$ROSV_{t,t+1} = \frac{s_{t,t+1}}{r_{t,t+1}} = \frac{L_{t,t+1} - r_{t,t+1}}{r_{t,t+1}} = \frac{L_{t,t+1}}{r_{t,t+1}} - 1 \ ,$$

$$\frac{r_{t,t+1}}{L_{t,t+1}} = \frac{1}{ROSV_{t,t+1} + 1} \, .$$

Therefore

$$\frac{L_{t,t+1}}{L_{i,i+1}} \times \frac{vr_{i,i+1}}{vr_{t,t+1}} = \left(\frac{w_{i,i+1}}{r_{i,i+1}} \Big/ \frac{w_{t,t+1}}{r_{t,t+1}}\right) \times \frac{\frac{y_{t,t+1}}{ys_{t,t+1}} \times (ROSV_{t,t+1} + 1)}{\frac{y_{i,i+1}}{ys_{i,i+1}} \times (ROSV_{i,i+1} + 1)}$$

and

$$\frac{VCC_t + 1}{OCC_t + 1} = \frac{\frac{w_{i,i+1}}{r_{i,i+1}}}{\frac{w_{t,t+1}}{r_{t,t+1}}} \times \frac{C_t}{C_i \times \frac{QC_t}{QC_i}} \times \frac{\frac{y_{t,t+1}}{ys_{t,t+1}}}{\frac{y_{i,i+1}}{ys_{i,i+1}}} \times \frac{ROSV_{t,t+1} + 1}{ROSV_{i,i+1} + 1}$$

(since $vr_{t,t+1} = v_t \times nv_{t,t+1}$).

Applying this to the rate of profit,

$$\frac{s_{t,t+1} - u_{t,t+1}}{C_{t,t+1}} = \frac{\frac{w_{i,i+1}}{r_{i,i+1}}}{\frac{w_{t,t+1}}{r_{t,t+1}}} \times \frac{\frac{s_{t,t+1}}{w_{t,t+1}}}{ROSV_{t,t+1} + 1} \times nv_{t,t+1} \times \frac{C_i \times \frac{QC_t}{QC_i}}{C_t} \times \frac{y_{i,i+1}}{ys_{i,i+1}}$$

$$\times \left(ROSV_{i,i+1} + 1\right) \times \frac{1}{OCC_t + 1} \times \frac{(s_{t,t+1} - u_{t,t+1})}{s_{t,t+1}}$$

$$= \frac{w_{i,i+1}}{r_{i,i+1}} \times \frac{\frac{s_{t,t+1}}{r_{t,t+1}}}{ROSV_{t,t+1} + 1} \times nv_{t,t+1} \times \frac{C_i \times \frac{QC_t}{QC_i}}{C_t} \times \frac{y_{i,i+1}}{ys_{i,i+1}}$$

$$\times \left(ROSV_{i,i+1} + 1\right) \times \frac{1}{OCC_t + 1} \times \frac{(s_{t,t+1} - u_{t,t+1})}{s_{t,t+1}}$$

$$= \frac{w_{i,i+1}}{r_{i,i+1}} \times \frac{ROSV_{t,t+1}}{ROSV_{t,t+1} + 1} \times nv_{t,t+1} \times \frac{C_i \times \frac{QC_t}{QC_i}}{C_t} \times \frac{y_{i,i+1}}{ys_{i,i+1}}$$

$$\times \left(ROSV_{i,i+1} + 1\right) \times \frac{1}{OCC_t + 1} \times \frac{(s_{t,t+1} - u_{t,t+1})}{s_{t,t+1}}.$$

The exponential growth rate of the rate of profit can therefore be expressed as:

$$\log(\frac{s_{f,f+1}-u_{f,f+1}}{C_{f,f+1}})-\log(\frac{s_{t,t+1}-u_{t,t+1}}{C_{t,t+1}})$$

$$=\log\left(\frac{ROSV_{f,f+1}}{ROSV_{f,f+1}+1}\Big/\frac{ROSV_{t,t+1}}{ROSV_{t,t+1}+1}\right)+\log\left(\frac{nv_{f,f+1}}{nv_{f,f+1}}\right)$$

$$+\log\left(\frac{C_i\times\frac{QC_u}{QC_i}}{C_f}\Bigg/\frac{C_i\times\frac{QC_t}{QC_i}}{C_t}\right)$$

$$+\log\left(\frac{w_{i,i+1}}{r_{i,i+1}}\times\frac{r_{i,i+1}}{w_{i,i+1}}\times\frac{y_{i,i+1}}{ys_{i,i+1}}\times\frac{ys_{i,i+1}}{y_{i,i+1}}\times\frac{ROSV_{i,i+1}+1}{ROSV_{i,i+1}+1}\right)$$

$$+\log\left(\frac{OCC_f+1}{OCC_t+1}\right)+\log\left(\frac{ROSV_{f,f+1}}{ROSV_{f,f+1}+1}\Big/\frac{ROSV_{t,t+1}}{ROSV_{t,t+1}+1}\right)$$

$$=\log\left(\frac{s_{f,f+1}-u_{f,f+1}}{s_{f,f+1}}\Big/\frac{s_{t,t+1}-u_{t,t+1}}{s_{t,t+1}}\right)+\log\left(\frac{nv_{f,f+1}}{nv_{t,t+1}}\right)$$

$$-\log\left(\frac{C_f}{QC_f}\Big/\frac{C_t}{QC_t}\right)+\log\left(\frac{OCC_t+1}{OCC_f+1}\right)$$

$$+\log\left(\frac{ROSV_{f,f+1}}{ROSV_{f,f+1}+1}\Big/\frac{ROSV_{t,t+1}}{ROSV_{t,t+1}+1}\right).$$

In other words, the decomposition is the same as before (and, following the steps in the previous chapter, can be extended to distinguish devaluation of existing capital from the cheapening of new capital), except that by removing the stipulation that the price of labour power is equal to its value we have made it more general.

We can use the same kind of approach to decompose changes in rates of profit on production. Below we will do this for the pre-tax, corporate measure of the rate of profit on production.

First we need an estimate of the surplus value produced in the corporate sector alone. This is just for the purposes of the decomposition, so we do not need to be too precise. We will assume that the rate of surplus value in the corporate sector and for the business sector as a whole are equal, which means we can say:

$$(\text{corp } y - \text{corp } d) / (y - d) = \text{corp } s / s$$

and therefore

$$\text{corp } s = (\text{corp } y - \text{corp } d) \times s / (y - d).$$

We will also define corporate unproductive expenditures (corp u) such that:

$$\text{corp } s - \text{corp } u \equiv \text{corp } y - \text{corp } d \text{ (productive and unproductive)} - \text{corp } w * p.$$

This allows us to incorporate the ratios (corp s – corp u) / corp s and (π - πp) / (corp s – corp u) into the decomposition. We also need to calculate the OCC, devaluation etc. as it applies to the non-financial corporate sector only. Rather than give the full working (which is similar to the working for the s – u rate of profit above) we will just state the result:

$$\log\left(\frac{\pi_{f,f+1} - \pi p_{f,f+1}}{C_{f,f+1} - Cp_{f,f+1}}\right) - \log\left(\frac{\pi_{t,t+1} - \pi p_{t,t+1}}{C_{t,t+1} - Cp_{f,f+1}}\right)$$
$$= \log\left(\frac{corp\ s_{f,f+1} - corp\ u_{f,f+1}}{corp\ s_{f,f+1}} \Big/ \frac{corp\ s_{t,t+1} - corp\ u_{t,t+1}}{corp\ s_{t,t+1}}\right)$$
$$+ \log\left(\frac{\pi_{f,f+1} - \pi p_{f,f+1}}{corp\ s_{f,f+1} - corp\ u_{f,f+1}} \Big/ \frac{\pi_{t,t+1} - \pi p_{t,t+1}}{corp\ s_{t,t+1}}\right) + \log\left(\frac{nv_{f,f+1}}{nv_{t,t+1}}\right)$$
$$- \log\left(\frac{C_f - Cp_f}{QC_f - QCp_f} \Big/ \frac{C_t - Cp_t}{QC_t - QCp_t}\right) + \log\left(\frac{corp\ OCC_t + 1}{corp\ OCC_f + 1}\right)$$
$$+ \log\left(\frac{ROSV_{f,f+1}}{ROSV_{f,f+1} + 1} \Big/ \frac{ROSV_{t,t+1}}{ROSV_{t,t+1} + 1}\right).$$

As before, this can be further modified to separate the effects of devaluation of existing capital from the cheapening of new capital.

Chapter 5: Marx on Finance

We now have a method for measuring the rates of profit that are most important for determining productive investment and the rate of accumulation, and we can measure the most important influences on them that Marx identifies. Next, we want to explain how movements in these rates of profit are connected to rates of return on financial investments. This chapter will set out the foundations for doing this through a discussion of Marx's writing on finance in *Capital*.

Money Dealing and Interest-Bearing Capital

Most of Marx's work on finance is in Part 5 of Volume 3 as edited by Engels. Although it is not a complete *theory* of finance as such, it contains the foundations we need to specify the relationship between the average rate of profit and rates of return on financial assets. The preceding sections of Volume 3 explain how competition creates a tendency for rates of profit on productive capital to equalise (Part 2); why this rate of profit has a tendency to fall and its consequences (Part 3); and how commercial capital appropriates surplus value and tends to earn the average rate of profit, even though the workers it employs do not produce new value (Part 4). At the end of Part 4 Marx moves on to consider money-dealing capital. He explains that:

> A certain section of capital must always exist as a hoard, as potential money capital: a reserve of means of purchase and payment, of unoccupied capital in the money form, waiting to be utilized... On top of the taking-in and paying-out of money, and book-keeping, the hoard itself has to be looked after, which is again a special operation.[225]

Money-dealing capital performs these operations. Marx argues that it develops originally to service merchants' need to convert their local currencies into gold, silver and other currencies.[226] Unlike commercial capital, money dealing capital does not buy and sell non-monetary

[225] Marx, *Capital III*, 1981, 432.
[226] Ibid., 435.

commodities. Thus its self-expansion takes the form of *M-M'*: money dealing capital advances its initial capital *M*, and receives $M' = M + \Delta M$, without the mediation of *C*.

Initially the money-dealing capitalist simply functions as a cashier, charging a fee to safeguard hoards of money, balance accounts, and convert currency (or profits from a spread between buying and selling prices).[227] Later this is integrated with the functions of lending and borrowing for profit; i.e., interest-bearing capital. Marx characterises the transaction between the money lender and the actually functioning capitalist this way:

> What the buyer of an ordinary commodity buys is its use-value, what he pays is its value. What the borrower of the money buys is likewise its use-value as capital; but what does he pay for this? Certainly not its price or value, as with other commodities. The value does not change its form between lender and borrower, as it does between buyer and seller, so that this value exists at one point in the form of money, and at another in the form of a commodity. The identity between the value given out and that received back is displayed here in a completely different way. The sum of value, the money, is given out without an equivalent and returned after a certain period of time.[228]

If the sum of money being lent is a direct representation of a quantity of the money commodity, e.g. gold, this characterisation makes sense. The lender gives out the ownership title to a quantity of gold, which has a value. Immediately she receives back a promise to pay, which has no value in itself; during the course of the loan she receives interest, which has (or directly represents ownership over) value; and at the end of the loan she receives back the principal, again in the form of either the gold itself or a direct title of ownership over it.

But lending can also be an exchange of equivalent for equivalent. Suppose, rather than lending ownership over gold, the lender lends inconvertible fiat currency (i.e., currency whose issuer will not redeem it for precious metal). In this case, the object being lent has zero value (since the

[227] Ibid.
[228] Ibid., 474.

labour time required to print the currency is negligible and unproductive), and whatever intrinsic use value the currency might have for the borrower (e.g. as wall paper or heating fuel) does not interest her. What interests the borrower is its exchange value – i.e., the quantity of any other commodity for which it can be exchanged – and it is this which gives it its use value as capital. In exchange for this currency, the borrower gives the lender another object with zero value and similarly irrelevant intrinsic use values: her promise to repay the principal with interest. This promise to pay has a use value as interest-bearing capital. If this promise to pay can be sold on (e.g., if it is a tradeable bond), then it also has an exchange value equivalent to its price (which may differ from its face value). Therefore this transaction is in fact an exchange of equivalent for equivalent. The borrower writes a promise to pay (or the banker records it), which has a use value as interest-bearing capital, and possibly an exchange value on the bond market, but no value. She exchanges this with the lender for inconvertible currency, which has an exchange value, a use-value as potential capital (amongst others), but again, no value.

It is important to note that such promises to pay are assets for their owners, and liabilities for their issuers. Often the two will balance, but not always. For example, if a company issues a bond and its perceived credit worthiness worsens, this does not reduce the liability that the bond represents for the company, but it is likely to reduce the price that bond holders can obtain for selling the bond before maturity.

Currency

Marx attaches particular importance to the connection between currency and precious metals. He even argues that the existence of inconvertible fiat money (i.e., money not convertible by its issuer to precious metals) is impossible:

> Paper money is a symbol of gold, a symbol of money. Its relation to the value of commodities consists only in this: they find imaginary expression in certain quantities of

> gold, and the same quantities are symbolically and physically represented by the paper. Only in so far as paper money represents gold, which like all other commodities has value, is it a symbol of value.[229]

In a footnote to this passage he ridicules Fullarton's view that "all the monetary functions which are usually performed by gold and silver coins, may be performed as effectually by a circulation of inconvertible notes" that may "supersede even the necessity for a standard".[230]

But on this issue history has proved Fullarton right. It is not necessary for notes and coins to be redeemable for precious metals for them to function as money. They only need to be widely exchangeable for commodities. Currencies which were previously promises to pay their bearer their equivalent in gold have now ceased to be promises to pay anything at all.

A similar process may currently be underway with bank deposits. A bank deposit is a promise to pay the depositor currency on request. It can be redeemed by visiting a bank or an automatic teller machine. But increasingly there is no need to do this to perform a transaction. For example, when a customer pays for their shopping using an electronic funds transfer, or even a cheque, they agree to give the shop ownership over a portion of their bank account, mediated by a transaction between their bank and the shop's bank. There is no need for physical currency to be involved. Similarly, and in part for this reason, 'base money' increasingly consists of electronic deposits held by banks in a central bank, rather than physical notes and coins. It is conceivable that electronic deposits could eventually eliminate the need for physical currency altogether, without necessarily causing any major change to the financial system or to social relations generally.

[229] Marx, *Capital I*, 225.
[230] Ibid.

The parallel between this hypothetical scenario and the various suspensions and abandonments of the gold standard is not exact, since these *were* bound up with significant changes in the financial system. But the similarity is that financial instruments which were originally issued as promises to pay the holder some more 'basic' form of money can themselves take on that more basic function.

Social Relations and Interest

Marx sees interest bearing capital as one of the most irrational, mystifying and fetish-inducing expressions of capitalist social relations. Observation of only the legal relations and forms of appearance of interest-bearing capital not only obliterates from view the source of profit in the exploitation of the working class, it obliterates from view the process of production altogether:

> In the real movement of capital, the return is a moment in the circulation process. Money is first transformed into means of production; the production process transforms it into a commodity; by the sale of the commodity it is transformed back into money, and in this form it returns to the hands of the capitalist who first advanced the capital in its money form. But in the case of interest-bearing capital the return, like the giving out, is simply the result of a legal transaction between the owner of the capital and a second person. All that we see is the giving-out and the repayment. Everything that happens in between is obliterated.[231]

For the owner of a bank account, it is not even necessary to bear in mind that they receive interest as part of a social relation they enter into with the bank, let alone to discover that this interest is ultimately the product of surplus value produced by workers. All they need to know is that by leaving their money in an interest-bearing bank account it expands over time; they do not need to enquire into the social relations that make this expansion possible, and in turn make it possible for them to use this money to purchase commodities. They can tacitly treat money as

[231] Marx, *Capital III*, 1981, 470–471.

though this thing itself possesses powers of self-expansion: i.e., they can treat money as though it possesses powers that it does not really have, fetishising it.

In reality, of course, money does not itself produce profit. If I leave two $50 notes in my wallet they will not breed and create another (and even if they *did*, this would not produce surplus value). Instead "interest... is nothing but a particular name, a special title, for a part of the profit which the actually functioning capitalist has to pay to the capital's proprietor, instead of pocketing it himself."[232] Marx calls the profit left after interest has been paid 'profit of enterprise'.

Dynamics of the Interest Rate (I)

For Marx, there is no predictable tendency for the proportion in which interest and profit of enterprise are divided to move towards a particular level, even assuming a given borrowed capital and a given rate of profit. For ordinary commodities:

> If supply and demand coincide, the market price of the commodity corresponds to its price of production, i.e. its price is then governed by the inner laws of capitalist production, independent of competition, since fluctuations in supply and demand explain nothing but divergences between market prices and prices of production.[233]

But for the rate of interest "competition does not determine divergences from the law, for there is no law of distribution other than that dictated by competition..., there is no 'natural' rate of interest".[234] Indeed, "[t]he minimum limit of interest is completely indeterminate. It could fall to any level, however low. But countervailing circumstances constantly enter to raise it above this relative minimum."[235] However, the maximum limit of interest that can be paid is profit after

[232] Ibid., 460.
[233] Ibid., 477.
[234] Ibid., 478.
[235] Ibid., 480.

subtracting managers' wages (though Marx says that in special cases even this limit might be exceeded). If we assume a more or less constant ratio between profit of enterprise and interest,

> the functioning capitalist will be able and willing to pay a higher or lower interest in direct proportion to the level of his profit rate. Since we have seen that the level of the profit rate stands in inverse proportion to the development of capitalist production, it follows that the higher or lower rate of interest in a country stands in the same inverse proportion to the level of industrial development, particularly in so far as the variation in the rate of interest expresses an actual variation in the profit rate. We shall see later on this need by no means always be the case. In this sense one can say that interest is governed by profit, and more precisely by the general rate of profit. And this kind of regulation applies even to its average.
>
> At all events, the average rate of profit should be considered as ultimately determining the maximum limit of the interest.[236]

This passage suggests that Marx saw this as a long term tendency, driven by the tendency of the rate of profit to fall. He also thinks there is an independent tendency for the interest rate to fall, as (1) the relative number of *rentiers* increases, and (2) the development of the credit system reduces the length of time that savings lie idle.[237]

Over the course of the business cycle, Marx argues there is instead likely to be an inverse relationship between the rate of profit and the rate of interest:

> If we consider the turnover cycles in which modern industry moves – inactivity, growing animation, prosperity, overproduction, crash, stagnation, inactivity, etc., cycles which it falls outside the scope of our argument to analyse further – we find that a low level of

[236] Ibid., 481–482.

[237] Ibid., 483. I have doubts about the connection between (1) and movements in interest rates, since the issue is more complex than Marx presents it. Assuming no change in the mass of interest, as Marx is by assuming a constant rate of profit and constant ratio of profit of enterprise to interest, an increase in the number of *rentiers* will only result in a fall in the interest rate if it results in a higher propensity to save income in interest-bearing securities. But assuming the propensity to save increases as income increases, if a given interest income is spread between more people, then they will tend to save less of it, and hence purchase a smaller value of interest-bearing securities.

> interest generally corresponds to periods of prosperity or especially high profit, a rise in interest comes between prosperity and its collapse, while maximum interest up to extreme usury corresponds to a period of crisis... Yet low interest can also be accompanied by stagnation, and a moderate rise in interest by growing animation.[238]

These hypothesised long- and short-term relationships are also discussed below.

When Marx discusses rates of interest, he may also be referring to dividend yields on shareholdings. He writes that the formation of 'joint-stock companies' involves:

> 1. Tremendous expansion in the scale of production, and enterprises which would be impossible for individual capitals. At the same time, enterprises that were previously government ones become social.
>
> 2. Capital, which is inherently based on a social mode of production and presupposes a social concentration of means of production and labour-power, now receives the form of social capital (capital of directly associated individuals) in contrast to private capital, and its enterprises appear as social enterprises as opposed to private ones. This is the abolition of capital as private property within the confines of the capitalist mode of production itself.
>
> 3. Transformation of the actual functioning capitalist into a mere manager, in charge of other people's capital, and of the capital owner into a mere owner, a mere money capitalist. Even if the dividends that they draw include both interest and profit of enterprise, i.e. the total profit … this total profit is still drawn only in the form of interest, i.e. as a mere reward for capital ownership, which is now as completely separated from its function in the actual production process.[239]

As an aside, it is worth highlighting that this passage shows Marx does not see capitalism as synonymous with private ownership of the means of production. Indeed, now that share-issuing corporations dominate the economy, “the abolition of capital as private property within the confines of the capitalist mode of production itself” has largely been achieved. Marx sees this as

[238] Ibid., 482–483.
[239] Ibid., 567–568.

> a necessary point of transition towards the transformation of capital back into the property of the producers, though no longer as the private property of individual producers, but rather as their property as associated producers, as directly social property. It is furthermore a point of transition towards the transformation of all functions formerly bound up with capital ownership in the reproduction process into simple functions of the associated producers, into social functions.[240]

However

> the transformation into the form of shares still remains trapped within the capitalist barriers; instead of overcoming the opposition between the character of wealth as something social, and private wealth, this transformation only develops this opposition in a new form.[241]

The more important point for our present purposes is that profit is now overwhelmingly drawn in this "form of interest". This may have important implications for the tendency of rates of profit to equalise and fall, as Marx argues:

> Since profit here simply assumes the form of interest, enterprises that merely yield an interest are possible, and this is one of the reasons that hold up the fall in the general rate of profit, since these enterprises, where the constant capital stands in such a tremendous ratio to the variable, do not necessarily go into the equalization of the general rate of profit.[242]

When Marxists measure the average rate of profit, we rightly include share-issuing corporations. Marx does not elaborate on the observation above, but he seems to be suggesting that corporations with a high organic composition of capital might be able to attract investment, even in their equity, at something like the general rate of interest, or in any event at a rate of return lower than the general rate of profit. Perhaps he draws this conclusion by making the unjustified assumption that it is possible, in general, to attract equity capital by offering rates of

[240] Ibid., 568.
[241] Ibid., 571.
[242] Ibid., 568.

return similar to debt capital (which would seem to fit with his idea that dividends are a form of interest).

However, it is possible that he had something more interesting and useful in mind, or perhaps was working from a valid observation about rates of profit in practice. In many cases, high organic composition of capital businesses will have fewer competitors. Businesses with high 'sunk costs' tend to be monopolies or oligopolies, because these sunk costs function as barriers to entry (e.g., infrastructure businesses). This does not automatically makes these businesses more profitable, since the profit maximising price, even under monopoly conditions, is a function of only marginal costs, and not sunk costs. But it may make them more likely to deliver dependable profits over a long period, if the high sunk costs function as a barrier to competitors establishing new and potentially more efficient operations that might push down prices, and if the assets with the high sunk costs are also comparatively long lived (again, think of infrastructure). If this is true, it may create the (accurate) perception that investment in these businesses is less risky, and hence make investors prepared to accept a lower rate of return on their capital (both debt and equity). Thus these businesses could obtain the money capital to make investments with lower rates of profit than average.

Duménil and Lévy find that businesses which have a high ratio of fixed capital to wages (and are therefore likely to have high organic compositions of capital) do in fact tend to make lower rates of profit than those with lower organic compositions of capital.[243] This evidence and the reasoning above suggest there is more likely to be a tendency for 'risk adjusted' rates of profit to equalise, rather than rates of profit themselves, but this is an issue we cannot explore further here.

[243] Duménil and Lévy, "The Field of Capital Mobility and the Gravitation of Profit Rates," 417–436.

Money Capital and Fictitious Capital

So far, we (and Marx) have used the term 'money capital' somewhat loosely. But what is 'real' money capital, from the point of view of capital as a whole? This is an important issue because, in the next chapter, we will need to calculate the average rate of return on all financial capital, which means we need to distinguish this from 'genuine' capital.

While discussing "interest-bearing securities, government bonds, stocks, etc.", Marx explains that:

> These securities..., if they are in government bonds, are capital only for the person who has bought them, to whom they represent his purchase price, the capital he has invested in them. They are not capital in themselves, but simple creditor's claims; if they are in mortgages, they are simple claims on future payments of ground-rent; and if they are stocks of some other kind, they are simple property titles which gives the holder a claim to future surplus-value. None of these things are genuine capital, they do not constitute any component of capital and are also in themselves not values. By similar transactions, money that belongs to the bank can be transformed into deposits, so that the bank becomes a claimant for this money instead of its owner, and holds it under a different title. Important as this is for the bank itself, it in no way affects the amount of capital stored in the country, or even the money capital.[244]

Marx goes on to call these instruments 'fictitious capital':

> With the development of interest-bearing capital and the credit system, all capital seems to be duplicated, and some points triplicated, by the various ways in which the same capital, or even the same claim, appears in various hands and in different guises. The greater part of this 'money capital' is purely fictitious. With the exception of the reserve fund, deposits are never more than credits with the banker, and never exist as real deposits.[245]

But even concerning the reserve fund:

[244] Marx, *Capital III*, 1981, 590.
[245] Ibid., 601.

> Just as everything in the credit system appears in duplicate and triplicate, and is transformed into a mere phantom of the mind, so this also happens to the 'reserve fund', where one might finally expect to lay hold of something solid...
>
> Ultimately..., what these reserve funds actually boil down to is the reserve fund of the Bank of England. But this reserve fund, too, has a double existence. The reserve fund of the Banking Department is equal to the excess of notes that the Bank is authorized to issue over the notes that are actually in circulation. The legal maximum note issue is £14 million (the amount for which no metal reserve is required, this being the approximate sum of the government's debt to the Bank), plus the Bank's total reserve of precious metal. So if this reserve is also £14 million, the Bank can issue £28 million in notes, and if £20 million of these are already in circulation, the reserve fund of the Banking Department is £8 million. This £8 million in notes is then the legal banking capital that the Bank has at its disposal and at the same time the reserve fund for its deposits.[246]

So, for Marx, the reserve fund for deposits ultimately amounts to the central bank's stock of precious metals plus its holdings of government bonds (i.e., the government's debt to the central bank), which was the legal limit of notes it could issue, less currency in circulation.

But in a passage quoted above, Marx also identified government debt as fictitious capital. So a significant component of what is, for the bank, its reserve fund, is in fact also fictitious capital. It follows that the non-fictitious component of the central bank's reserve fund reduces to its holdings of precious metals; i.e., to its holdings of commodity money, as opposed to its holdings of credit money.

While Marx does not say this explicitly, it does seem to follow from this that for capital in general, ‘genuine’ money capital can only consist of commodity money; i.e., *produced* capital, such as precious metals. It also seems logical to count the value of commodity money as a

[246] Ibid., 603–604.

component of genuine capital for capital in general, since, unlike paper money and bank deposits, precious metals require a non-negligible amount of productive labour time to produce.

Fictitious capital, on the other hand, is not produced by productive labour, so should not be counted as genuine capital. This is no mere scholastic distinction. A capitalist making an investment decision does not have to consider how much fictitious capital they must advance to invest in a project *in addition to* the constant and variable capital they must advance. Rather, one way of obtaining the credit money capital with which to pay for the constant and variable capital is to borrow it or issue shares. That is, one way of obtaining productive capital is to obtain it from an outside investor, in exchange for a corresponding fictitious capital.

Fictitious Capital and the Dynamics of the Interest Rate (II)

It is worth discussing what fictitious capital represents in more detail. As Marx explains:

> The formation of fictitious capital is known as capitalization. Any regular periodic income can be capitalized by reckoning it up, on the basis of the average rate of interest, as a sum that a capital lent out at this interest rate would yield.[247]

This is now known as determining the net present value (NPV) of an expected future payment stream.

As this expected future payment stream and the interest rate vary, the prices of financial instruments can move up or down independently from the value of genuine capital advanced:

> The independent movement of these ownership titles' values, not only those of government bonds, but also of shares, strengthens the illusion that they constitute real capital besides the capital or claim to which they may give title. They become commodities, their prices having a specific movement and being specifically set. Their market values receive a determination differing from their nominal values, without any change in the value of the actual capital (even if its valorization does change)...

[247] Ibid., 597.

> In so far as the rise of fall in value of these securities is independent of the movement in the value of the real capital that they represent, the wealth of a nation is just as great afterwards as before.[248]

This last sentence is particularly important. Movements in the prices of securities do not, in themselves, represent any increase in real wealth. Yet for their owners these capital gains *are* profits. Here Marx is describing how the expansion of fictitious capital can lead to *fictitious profit.*

These movements are linked to movements in the interest rate. For this reason, Marx argues that, perversely, a falling rate of profit can lead fictitious capital to *expand*:

> Their values, i.e. their listings on the stock exchange, have a necessary tendency to rise with the fall in the rate of interest, in so far as this is a simple result of the tendential fall in the rate of profit, independent of the specific movements of money capital, so that this imaginary wealth, which according to its value expression gives each person his aliquot share of a definite original nominal value, already expands for this reason as capitalist production develops.
>
> Profits and losses that result from fluctuations in the price of these ownership titles, and also their centralization in the hands of railway magnates etc., are by the nature of the case more and more the result of gambling.[249]

Thus Marx's account of the connection between financial markets and underlying profitability goes deeper than simply asserting that capitalists tend to speculate more when the rate of profit on production is low (although this may also be true). Above, Marx does not invoke any such tendency, but instead argues that a falling interest rate tends to create an expansion of fictitious capital. This is a situation out of which those adept at gambling on financial markets are best positioned to profit.

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[248] Ibid., 597–598.
[249] Ibid., 608–609.

Expressed in modern terminology, Marx's idea here seems to be that since the net present value of an income stream is an inverse function of the current interest rate, a lower interest rate will, *ceterus paribus*, mean a higher net present value. So, if shares are trading at their net present values, then a lower interest rate will mean higher share prices.

The problem with this logic is that the falling profit rate (that Marx assumes) will also tend to lead to declining profits over time on any given investment. Indeed, it follows from the equation for NPV that if the rate of interest declines by the same proportion as the mass of surplus value on a given investment declines (i.e., as the rate of profit declines) then NPV will be unchanged.

Marx's proposed short-term relationship between the rate of interest and the business cycle might appear to suggest a more promising explanation of stock market bubbles. If, as Marx argues, the rate of interest is at its lowest point near the peak of the cycle, this would indeed coincide with a higher than usual ratio of stock market prices to productive capital advanced, if stock prices were determined by their NPV. Then, as business activity declined and interest rates rose, stock prices would fall.

However, from the point of view of supply and demand for investment, it is not clear if the interest rate *should* be at its short-term minimum at the peak of the business cycle as Marx predicts. During an economic upturn demand for credit is likely to be relatively high, as businesses borrow money to fund new investments – hence the supply of bonds is likely to be high. This should tend to push *up* interest rates, contrary to Marx’s observations.

Instead, however, if we regard bonds as just one financial instrument amongst others, then we can make sense of both the general pattern of movements in share prices and the short-term dynamics of the interest rate that Marx observes. At the beginning of an upswing in economic activity, share prices of existing companies tend to increase as their genuine capital is revalued upwards, or at least devalued downwards more slowly, and perhaps also because companies with existing assets are generally better placed to take advantage of an upswing than those which have not yet started producing. This means that expected dividend yields tend to be high at the beginning of the upswing, and to decline as share prices rise.

The dynamic for the interest rate is likely to be similar. Sellers of bonds compete with sellers of shares for investors' money. This means that declining dividend yields will tend to put downward pressure on bond yields: i.e., they will tend to put downward pressure on interest rates.

Then, as the downswing commences, the process is likely to tend to be reversed. Genuine capital will be devalued more rapidly, and potentially fictitious capital along with it. Investors may start to sell down their share holdings and hold more of their wealth in 'cash' and term deposits, tending to push down share prices. If this happens to a large enough extent, dividend yields will tend to increase, pushing up the interest rate. Then, with the onset of crisis, the interest rate in most cases will spike dramatically, with the increased risk of bankruptcy.

However, these are just somewhat speculative hypotheses. To better understand the relationship between rates of profit and rates of return on financial instruments, we need a method for quantifying them.

Conclusions

Interest is one of the most mystifying and fetishised forms of appearance of surplus value, and cannot be understood without penetrating beneath the legal relations established between lender and borrower.

Lending is the exchange of a new promise to pay for either an existing one, or a commodity (though this is not how Marx characterises it).

Currency is either a promise to pay gold, or it only represents a claim over a portion of commodities offered for sale in that currency. Again, this differs slightly from Marx's approach because Marx did not think inconvertible fiat money was possible.

Shares, bonds, bank deposits and other financial assets are 'fictitious' capital. This does not mean that they are unimportant, or that their existence is illusory. Rather, it means that an expansion of this capital does not, in itself, expand either a nation's real wealth or its genuine capital. This does not apply to commodity money – i.e., precious metals used as money – which require a non-negligible amount of labour time to produce.

Any promise to make future payment (or payments) can be capitalised into a fictitious capital if that promise can be sold. The method Marx discusses for doing this is a version of what is now called 'net present value', and is a function of expected future payments, the current interest rate and future interest rates.

There is no 'natural' rate of interest, it is determined purely by the supply of and demand for loanable funds. However, Marx argues the rate of interest tends to move within limits set by the rate of profit, since interest is a component of profit. This means there is a (weaker) tendency for the rate of interest to fall, along with the rate of profit. However, over the short- to medium-term business cycle, Marx suggests an inverse relationship between the rate of profit and the level of business activity. The relationship between the dynamics of the rate of interest and the stock of fictitious capital may help to explain movements in share markets.

Other Interpretations

Finally we will consider some other interpretations of Marx's views on finance, highlighting points of difference and briefly justifying the interpretation offered here. The primary focus of most of the literature is Marx’s views on money, and discussion of his views on finance tends to be secondary. A major point of contention is whether Marx held a commodity theory of money – i.e., whether he thought money had to be backed by commodities with real value, such as precious metals – and, if so, whether this invalidates his approach for understanding contemporary economies. Far less (and far too little) attention is paid to the connection between Marx's views on finance and his LTFRP.

Suzanne de Brunhoff's *Marx on Money* is typical in this respect. Although the second part of her two part book is devoted to discussing finance and credit, it does not even mention, let alone explore, Marx's argument that the tendency of the rate of profit to fall influences the interest rate and tends to create economic crises.

Her interpretations of Marx's views on money and fictitious capital are also problematic. For example, concerning Marx's theory of money, she asserts the following:

> all the paper money issued has to circulate; it is spent by the recipients of public payments, who neither keep it nor hold it in reserve. That is Marx's opinion. In contrast, H. Denis and Charles Rist think that inconvertible fiat money can be put away by private individuals and serve as a reserve of value, even if only an imperfect and precarious one... But Marx says nothing of the sort: on the contrary, he indicates that gold cannot be replaced by things without value, by mere symbols, except when it "is a mere coin, a means of circulation".[250]

According to de Brunhoff this point "is not made sufficiently specific and clear in *Capital*", though apparently it is made clearly enough to justify her unequivocal statement that it "is Marx's opinion".[251]

In fact this is a poor interpretation of Marx. It is true that Marx thinks "gold cannot be replaced by things without value, by mere symbols, except when it 'is a mere coin, a means of circulation'."

[250] de Brunhoff, *Marx on Money*, 36.
[251] Ibid., 36–37.

But what he means is that since, in his view, the total stock of paper money in circulation will tend to be equal to the stock of metallic reserves backing it (and for which it is a 'mere symbol'), the function of this paper money is effectively restricted to a means of circulating ownership over fractions of this metallic reserve. If this were true, it would imply that paper money cannot not function as a hoard *in its own right*; the hoarder of paper money would merely be hoarding symbols of ownership over a portion of the central bank's reserves of precious metals. But it certainly would not imply that the recipients of paper money “neither keep it nor hold it in reserve”.

If Marx did hold the position de Brunhoff attributes to him, it would be hard to take seriously. In reality, people and institutions do in fact hoard paper money for various reasons. Central banks and ordinary banks maintain hoards of paper money, and some people keep their savings under their mattresses rather than in a bank account. This has been the case throughout the history of capitalism, for both convertible and inconvertible currencies.

De Brunhoff may have read this position into Marx as a by-product of trying to protect Marx's monetary theory from falsification. When Marx says “[p]aper money is a symbol of gold” de Brunhoff interprets this to mean that, in Marx's view, paper money is unsuitable for hoarding. This allows her to deny that this passage asserts that inconvertible paper money is impossible (which, as we have seen, is inconsistent with Marx’s criticism of Fullarton’s view that inconvertible paper money *is* possible). In fact it is much more plausible (and charitable) to interpret Marx as having made the wrong prediction that inconvertible paper money could never arise, than to suppose Marx thought that no one ever hoards paper money.

Costas Lapavitsas tries to protect Marx's theory of money from falsification in a different way. He argues that, for Marx

> [f]iat money 'stands for' a definite quantity of commodity money... Thus, the decline in the exchange value of inconvertible fiat money, caused by arbitrary increases in its quantity, is commensurate with the decline in the rate of symbolization of commodity money by fiat money. The intrinsic value of the money commodity provides a theoretical reference point for analysis of the exchange value of inconvertible fiat money, though it is no anchor for it.[252]

In this way, Lapavitsas takes a prediction of Marx's (that fiat money must remain convertible) and instead interprets it as a quantity theory of money, applicable to convertible and inconvertible fiat money. He argues that this quantity theory of money is restricted to fiat money, and does not extend to credit money (e.g. bank deposits).[253]

However, as we have seen Marx states quite clearly that he does not only think that the gold price tends to be determined by the ratio of base money to the value of the central bank's stock of gold, but that paper currency must *actually be convertible* to precious metals, and ridicules the view that it could be otherwise.

Lapavitsas's theory also seems inconsistent with recent developments. The US Federal Reserve's 'quantitative easing' programme must have produced a large increase in the ratio of base money to commodity money. According to Lapavitsas's theory, this surely should have led to high rates of inflation, as some feared it would. But this has not happened in practice. This is strong evidence that fiat currency is in no sense a 'symbol of gold'.

Lavoie asserts that it is necessary for Marx's whole theory that money be a commodity, and the fact that money is no longer a commodity makes his value theory invalid.[254] But it is not clear why this should be true. There is nothing to stop us acknowledging that inconvertible currency is the general equivalent, and calculating the MELT on that basis (as we did in Chapter 2).

[252] Lapavitsas, "Money and the Analysis of Capitalism: The Significance of Commodity Money," 647.
[253] Ibid.
[254] Lavoie, "Marx, the Quantity Theory, and the Theory of Value."

Moseley and Foley worry that this kind of *ex-post* calculation of the MELT leaves its determination ‘hanging theoretically’, because it cannot explain *why* the MELT and the total price of output reach any given level.[255] In other words, what is lacking is a theory of inflation.

It would of course be desirable to have such a theory. But since inconvertible currency is *credit* money, it seems logical to start with an explanation of credit and financial rates of return in general. The rate of inflation could then be looked at as the real rate of return for holding cash, and compared with other financial rates of return. However, there is not space to develop this line of enquiry further in this thesis.

Let us now consider some other interpretations of what Marx means by ‘fictitious capital’, and the connection between financial profits and surplus value. De Brunhoff gives a different interpretation of the meaning of fictitious capital to the one offered here. She argues:

> one part of banking assets rests entirely on banking activity itself and does not correspond to any liquid savings... [T]hese assets tend to become purely 'fictitious'; Marx means by this that they tend to evade the conditions of the circulation of capital.[256]

This is a vague formulation. Does she mean that purely fictitious capital completely evades the conditions of the circulation of capital? What does she mean by the conditions of the circulation of capital – does she mean that these assets can be valourised out of something other than surplus value? Can an asset itself 'tend to be' fictitious – does this mean it is in the process of becoming more fictitious? What would it mean for an asset to be only partially fictitious? Or is it that a greater proportion of the assets to which she refers become fictitious? De Brunhoff neither raises nor addresses these questions. Nor, in general, does she seem interested in laying the basis for performing quantitative or empirical analysis.

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[255] Moseley, *Marx’s Theory of Money*, 7.
[256] de Brunhoff, *Marx on Money*, 94.

Lapavitsas and Levina provide a more useful attempt to understand the connection between financial profits and surplus value in their article 'Profit from Production and Upon Alienation'. They argue:

> there are two forms of financial profit associated with financial assets. Despite exhibiting great variety, financial assets typically assign to the holder a claim on a flow of value that the issuer expects to generate in the future. In this respect, financial assets give rise to profit that originates in the future flow of surplus value. However, financial assets also generate a further form of financial profit that accrues immediately from the sale of financial assets and lacks a direct connection to future flows of value. Thus, financial institutions, nonfinancial enterprises and even individuals earn financial profits by simply trading financial assets.[257]

Thus, in effect they argue that dividend and interest payments originate from surplus value (although they identify some exceptions), but realised capital gains instead reflect a re-division of existing loanable capital (and therefore lack a direct connection to surplus value).

The problem with this approach is that it only gives an explanation for the origins of *realised* capital gains. But if we want to explain the dynamics of financial markets, we also want to incorporate holding gains on financial instruments into the analysis, since these also matter to investors.

Their paper also argues that Marx treated interest from lending for consumption, or to pay other debt, differently from lending for investment. In Lapavitsas and Levina's words, for Marx this interest "may be a mere transfer and need not represent real surplus-value" since "it is loaned as money, not as capital, but it becomes *capital* to its owner through the mere act of lending it out". It represents "a form of interest which belongs to earlier modes of production". Similarly, they quote Marx saying that "the lending of houses, etc., for individual use" is "secondary

[257] Lapavitsas and Levina, "Financial Profit: Profit from Production and Profit upon Alienation," 15.

exploitation", as we observed in the previous chapter; though they do not distinguish between the rent charged for depreciated value of the dwelling and the remaining rent.[258]

Finally, in a recent article Alan Freeman adds the value of some types of debt instrument to the denominator of his estimates of the rate of profit in the US and UK.[259] He argues these debts are a part of money capital advanced. The problem with this position is that fictitious capital is a financial asset for its owner, but it is also a financial *liability* for its issuer. Therefore it is not correct to count it only as an asset and add this to capital advanced. However, Freeman's argument that it is necessary to incorporate fictitious capital into our analyses of the connection between crises and movements in the rate of profit is persuasive, and the next chapter attempts to do this.

[258] Ibid., 7.

[259] Freeman, "The Profit Rate in the Presence of Financial Markets: A Necessary Correction," 2012, 167–192.

Chapter 6: The Rate of Profit and Financial Rates of Return

As we have seen, fictitious capital can grow in a way that is not directly determined by profitability from producing and selling commodities. This chapter shows that when fictitious capital grows in this way it can create ‘fictitious profits’: an imbalance between the total profit that investors appropriate for themselves as individuals, and the surplus value available to ‘pay for’ these profits. This has implications for the relationship between the average rate of profit and the average rate of return on financial assets, which can help to explain ‘bubbles’ and ‘crashes’ on financial and property markets.

The chapter begins with some simplified representations of financial markets to show how fictitious profits emerge. It then discusses the general relationship between fictitious profits, non-fictitious profits and surplus value after unproductive expenditures, and which measure of the stock of capital is relevant for calculating the average rate of return on individuals’ investments in financial assets, non-corporate businesses and rental property. It also introduces the ‘non-fictitious’ rate of return on individuals’ capital, which measures what their average rate of return would be if total fictitious profit were zero. It shows how changes in this rate of return can be decomposed into the effect of changes in the rate of profit and changes in the ratio of what counts as capital for *individuals* to the stock of produced capital over which individuals’ capital is ultimately a claim. Then it shows how a similar approach can be used to calculate the average rate of return and the non-fictitious rate of return on individuals’ financial capital only (i.e., excluding investments in businesses or rental property they own which are not mediated through financial instruments). Finally it discusses the implications this has for movements in rates of return and interest rates over the long- and short-term, and how this accords with Marx’s observations.

The Separation between Financial Profits and Profits from Production

So far we have dealt with one form of appearance of surplus value, profits from production, and seen how this differs from surplus value and surplus value after unproductive expenditures. Profits from production (and profits from secondary exploitation) are profits which *businesses* record on their balance sheets. But businesses and their assets are ultimately owned by *people* (and mostly by members of the capitalist class) whether through direct ownership, through share certificates, or more indirectly through money lent by individuals to banks.

To explore some of the complexities involved in determining the relationship between rates of return on these forms of capital, and rates of return for businesses themselves, we will start with a simplified representation of a financial market. Suppose the global economy consists of two firms, A and B; suppose in each case their profit from production are equal to the surplus value their workers produce, after deducting unproductive expenditures, and suppose they distribute all these profits to their shareholders as dividends. Further suppose that, initially, the total market capitalisation of each company is equal to the value of their stock of genuine capital (fixed assets plus inventories). Market capitalisation is the total number of shares held by all investors in a company, multiplied by the current share price. Assume this is $100 trillion for A, and $200 trillion for B.

Now suppose that A’s profit from production is $10tn, and B’s is $20tn. It follows that the rate of profit for each company is 10% ($10tn / $100tn = $20tn / $200tn). Also assume each has issued 1tn shares; since we have given the market caps, this means A's share price is $100tn / 1tn = $100, and B's share price is $200tn / 1tn = $200. Since we assume all profits are distributed as dividends, the dividend per share will be $10tn / 1tn = $10 for A, and $20tn / 1tn = $20 for B. It follows that the dividend yield for A is $10 / $100 = 10% and for B is $20 / $200 = 10%.

In this example the connection between the rate of profit and the rate of return on financial instruments is very simple. Because there are no capital gains, because all surplus value is realised as profit which is paid out as dividends, and because market capitalisations are equal to capital advanced, we have the result that the rate of profit, the rate of return on financial instruments and the dividend yield are all equal.

In reality, market capitalisations are generally higher than the current market value of a company's net assets. This is because, in most cases, investors are prepared to pay a premium for ownership of an established company, because established companies tend to be less risky investments, because buying a financial instrument means it is not necessary to amass the whole capital required to start a new business, and because buying a financial asset is much simpler than the messy business of exploiting workers oneself. On the other hand, companies with market caps below the current value of their net tangible assets are at risk of being bought out and having their assets sold off, because, theoretically, this would make these investors a quick profit (though the risks involved mean that this does not always happen in practice).

Returning to the example, let us suppose there is a 5% increase in the share prices of A and B, creating a small divergence between the each company's market capitalisation and its genuine capital. This means A's market cap becomes $105tn, and B's becomes $210tn. A's dividend yield will be $10tn / $105tn = 9.5%, and B's dividend yield will be the same. Note that, in this way, dividend yields have fallen independently of movements in the rate of profit, purely driven by increased demand for these stocks.

The increase in the share prices also creates capital gains, which we need to incorporate into our measure of the rate of return on the shares. The capital gain on each A share is $105 - $100 = $5, and on each B share it is $210 - $200 = $10. So the total return (capital gain + dividends) on each A share is $10 + $10 = $20, and on each B share it is $20 + $20 = $40. The rate of return relative to the initial share price for A shares is \$20 / \$100 = 20%, and for B shares is \$40 / \$200 = 20%, giving us a rate of return figure for individuals who own shares in both companies that is considerably higher than the rates of profit for these companies themselves.

Note that, in this case, this extra financial profit is not a deduction from the wealth of the investors who bought in at this higher price. Their personal wealth is unchanged: they have just exchanged a sum of money for shares with an equivalent exchange value. It is not even necessary that large numbers of investors 'buy in' at this new price: the 'market value' of the shares is just determined by the price at which they last traded. The result is that all investors who owned shares before the change in the share price make a capital gain. This capital gain is part of their rate of return, because it constitutes an increase in their wealth. The increase in wealth is 'fictitious' in the sense that it does not constitute an increase in *genuine* wealth, across society as a whole; but for the beneficiaries of these capital gains this increase in wealth is quite real, and could be realised by selling their shares.

This is similar to the result from Chapter 2, where we saw that incorporating capital gains on productive assets makes it possible for companies' total profit to exceed or fall below their total surplus value after unproductive expenditures and their total profits from production. Here we have just applied the same reasoning to financial assets.

Capital gains can also have consequences for the mass of the dividends paid by companies. For example, company A might own shares in company B. If it realises the profits from its capital gains and distributes them to its shareholders as dividends, then even the total dividends paid out to shareholders would exceed $s – u$ and profits from production.

In both these examples, the difference between shareholders' profit and surplus value after unproductive expenditures is 'fictitious' profit. We will define this concept more precisely below.

Note here that the fictitious *profits* discussed in these examples are all the result of the creation of more fictitious *capital*.

There is no absolute theoretical limit to the generation of fictitious profits. For example, there is no theoretical limit to how high share prices can be bid. If investors are prepared to pay ever higher prices for a stock then its share price will rise ever higher, creating continual fictitious profits for existing owners of the stock. In practice such bubbles do not last forever, because eventually investors are not prepared to make ever larger bets that others will buy the stock for a higher price than they have. Under the right conditions, however, investors have repeatedly demonstrated that they are willing to make financially irrational decisions.

The creation of fictitious profits does not *automatically* create a bubble. As we will see, it may simply depress the future rate of return on financial assets relative to the rate of profit. Indeed, as mentioned above, in the normal course of events, we would expect market capitalisations to be higher than the stock of capital owned by companies, and, after excluding fictitious profits, for the average rate of return on financial assets to be lower than the average rate of profit. If we can understand and quantify these relationships we are likely to be in a better position to explain the relationship between rate of profit and financial crises.

To do this, we first want appropriate measures of the average rate of return on individuals' capital and their average yield: that is, the ratio of individuals' profits to their capital both including and excluding capital gains. To do this, we need an appropriate measure of the total stock of individuals' capital.

A problem we immediately encounter is that, as Marx puts it, "everything in the credit system appears in duplicate and triplicate".[260] For example, banks lend on sums of money that they

[260] Marx, *Capital III*, 1981, 3:603.

receive from depositors to borrowers. This multiplies the claims on what we could call ‘gross financial income’ and gross financial income itself. For example, suppose person X lends $100 to bank Y, and Y lends $100 to company Z. In this situation, total gross debt is $200, and $200 of fictitious capital has been created. Assuming there is no revaluation, X has a claim worth $100 on interest from Y, and Y has a $100 claim on interest from Z. But if Y has lent this $100 on at an interest rate greater than or equal to the interest rate it pays X, then Y can pay its interest bill out of the money it receives from Z. In effect, bank Y has made it possible for person X to lend to company Z without X having to seek out Z, assess its credit worthiness, and directly bear the risk that Z will default. In playing this role, Y has doubled gross debt, and doubled gross fictitious capital. So if we simply measured the stock of fictitious capital as the gross stock of financial assets across all entities, transactions like this would make our measure of fictitious capital larger, and potentially much larger than a situation in which X lent directly to Z.

However, the fact that bank Y acts as an intermediary does not mean that company Z needs to appropriate twice as much profit to keep the rate of return on X's fictitious capital constant. The bank only keeps the difference between the interest it charges Z and the interest it pays X (the 'spread' between the two interest rates, multiplied by the value of the loan); and, after the bank has paid its expenses, this income can be returned to its creditors and shareholders.[261]

For our purposes here, the only financial assets that are relevant are those held by individuals. Financial arrangements between companies ultimately only function to re-distribute ownership of assets and claims on future value between companies, but do not, in themselves, change the total claims held by individuals over the business sector as a whole (though they may do so indirectly, by affecting prices of shares held by individuals). For example, if a person owns shares

[261] It follows that measuring the average rate of return as the ratio of profits to a gross measure of financial assets, as Freeman does, creates an artificially low estimate of the rate of return. Freeman, “The Profit Rate in the Presence of Financial Markets: A Necessary Correction,” 2012.

in a company which in turn owns shares in another company, in effect that person's investment is divided between the two companies. To avoid double counting, we need to count just the financial assets owned by individuals, and not also the financial assets owned by companies in each other.

Fictitious and Non-Fictitious Profits

Next we want to define non-fictitious profit more precisely. What does it mean for a profit to be either 'fictitious' or 'non-fictitious'? Marx himself does not explicitly make this distinction, but we need it if we are trying to explain financial profits using value theory. One candidate for 'non-fictitious' profit is total profit from production after-tax. But as the last chapter explored, this would create the implication that 'non-fictitious' profit can be created through government borrowing. It would also mean that 'non-fictitious' profit cannot be extracted through secondary exploitation.

Another possibility is that fictitious profit is equal to individuals' capital gains. As mentioned in the last chapter, Marx observes that capital gains in stock markets do not, in themselves, make any difference to the real wealth of a nation. This is because they cannot produce value: a capital gain in a share certificate cannot make any difference to the use values of the commodities produced over a year, and neither, therefore, can it add to their value. But in some cases, capital gains in financial assets can (indirectly) embody genuine increases in wealth. For example, if a company invests in produced capital out of profits it retains, this will tend to increase the market value of the shares it has issued, and appear as capital gains for the individuals who own them. So just as it is possible for dividends to represent fictitious profit (as we saw above), it is also possible for capital gains to be the result of genuine increases in wealth.

A better starting point is to ask: what is the value of the commodities these profits 'could be' used to buy, without increasing debt? This includes commodities bought directly by individuals themselves (e.g., for their own consumption) and commodities bought for investment by the businesses they own. More precisely, what is the actual total value of domestic net investment and consumption out of non-wage income, less net borrowing from the rest of the world? This is what we will call 'non-fictitious' profit. This is what total domestic profit for individuals ultimately 'counts for'; i.e., the value of the commodities it can be used to obtain.

Our framework is well-suited to measuring this. Chapter 4 gave a method for calculating $s - u$, which is equivalent to the sum of consumption out of non-wage income, net domestic investment and net exports of produced commodities. We just defined non-fictitious profit as consumption out of non-wage income, plus net domestic investment, less net borrowing from the rest of the world (otherwise known as the capital account surplus). So, if we use the letter Ψ for non-fictitious profit, this definition is equivalent to:

$$\Psi \equiv s - u - net\ exports\ of\ produced\ commodities - capital\ account\ surplus$$

Throughout this chapter we will use Greek letters to denote magnitudes related to individuals' profit, as opposed to profits direct appropriated by businesses.[262]

As it is defined here it is possible to measure Ψ using the national accounts, but it is useful to unpack this expression further. By definition, the capital account surplus is equal to the current account deficit: that is, the difference between national income and national expenditure must, by definition, be covered by net national borrowing. The current account deficit is equal to net imports (as defined by the national accounts, including net imports of both commodities and financial services, insurance, patents and licenses) less 'net foreign sourced income' (*NFSI*): i.e.,

[262] In Chapter 4, however, we did make an exception to this rule in order to use the letter 'π' to stand for profits from production. This is because using 'π' for 'profit' will be familiar to most readers.

net payments of interest, dividends and other income by the rest of the world to domestic recipients (including businesses, governments and individuals). Non-fictitious profit can therefore be expressed as:

$$\begin{aligned}\Psi = s - u - net\ exports\ of\ produced\ commodities \\ &- \big(net\ imports\ of\ produced\ commodities \\ &+ net\ 'imports'\ of\ financial\ services, insurance, patents\ and\ licenses \\ &- NFSI\big) \\ &= s - u + NFSI \\ &+ net\ 'exports'\ of\ financial\ services, insurance, patents\ and\ licenses \\ &= s - u + NTPF\end{aligned}$$

where *NTPF* ≡ net transfer payments from foreign entities.

That is, non-fictitious profit is the surplus value remaining after unproductive expenditures plus net profits appropriated from transfers from the rest of the world (which, in the national accounts, takes the form of *NFSI* plus net ‘exports’ of financial services, insurance, patents and licenses); or, more strictly, surplus value remaining after unproductive expenditures plus the difference between the total price and total value of output (which, recall from Chapter 4, is incorporated in our measure of *s* – *u*) plus net profits from transfers from the rest of the world.

Tacitly, this assumes all new domestic investment is made by businesses wholly owned by US residents, and that US residents do own businesses which make investments in the rest of the world. We will relax this assumption a little further on. First, however, let us consider how we can use this definition of non-fictitious profit. There are two goals we want to achieve: to compare non-fictitious profit with the relevant measure of total profit for individuals, in order to identify ‘fictitious’ profit; and to calculate the ‘non-fictitious rate of return’ on all capital owned by individuals – that is, what the rate of return for individuals would be if there were no fictitious profit.

We will define total nominal before-tax profit for individuals as the net increase in US residents' wealth brought about by dividends, interest, or any income from businesses they own (excluding the 'wages' we impute to proprietors), and capital gains on all capital owned by US residents, including their financial assets, their equity in non-corporate businesses and the market value of their rental property, net of all personal liabilities (including personal debt and mortgages). The best source of data for this purpose, which can be easily integrated with the framework we have developed so far, is the US Integrated Macroeconomic Accounts (IMAs). These integrate data from the US Flow of Funds Accounts and the US National Income and Product Accounts, to produce, among other things, 'balance sheets' for the US household, business and government sectors. This allows us to calculate net individual profit as net interest, dividends and 'withdrawals from non-corporate business' for households (less proprietors' imputed "wages"), plus revaluation (i.e., capital gains) for financial assets and equity in non-corporate businesses net of any revaluation of liabilities. In the IMAs, 'non-corporate businesses' includes rental property owned by households (and equity in non-corporate businesses incorporates the land value of rental properties). The full definition for individuals' nominal profit after-tax, Λ, is given in Appendix D. We will work with after-tax figures because this is what matters to individuals, and because it is consistent with our measure of $s - u$ and hence non-fictitious profit.

The total capital owned by individuals is their financial assets plus non-corporate equity net of liabilities, which we will call Φ. 'Financial assets' here incorporate everything from share certificates to pension funds to ordinary bank deposits (which, since they pay interest, are a form of capital), and is defined precisely in Appendix D. As mentioned, equity in non-corporate businesses includes not only households' equity in assets owned by actual unincorporated businesses, but also in rental property. The ratio of individuals' profit to their capital is their average rate of return, Λ / Φ.

Over any given period, there is likely to be a wide distribution of rates of return on different types of asset. Investigating this distribution is not the purpose of this thesis, but here we will simply note that less 'risky' assets will often provide profit predominantly or exclusively in the form of an income stream (e.g. bank deposits, 'safer' stocks and property investments) while more 'risky' assets will often be more reliant on giving their owners capital gains. Although they are rarely owned directly by households, Treasury bonds are among the least risky assets, so we would expect them (and hence the interest rate on government debt) to give a below average rate of return that is also less variable than other instruments.

Another major type of asset owned by individuals is owner-occupied dwellings and land. Although these can be a source of capital gains, because they are owned for their direct usefulness and do not generate income, they are not capital, and therefore are not included in measuring Φ.

We also want to calculate the 'non-fictitious' rate of return on individuals' capital: that is, what the average rate of return on individuals' capital would be if individuals' profit were equal to non-fictitious profit. Before we can do this, we have to address the problem mentioned earlier, that our current measure of non-fictitious profit does not take into account investments in produced capital in other countries by companies owned (wholly or in part) by US residents; or investments in produced capital in the US by companies owned wholly or in part by non-US residents. We could only solve this problem properly with data identifying which companies US residents own (including indirectly) and their net investments in produced capital. Even then, identifying the proportion of capital gains on these financial assets which was ultimately a claim over an investment in produced capital would potentially be impossibly labourious.

Instead, we will correct the estimate of non-fictitious profit using the following approximation. First, we can calculate the net financial assets and non-corporate equity issued by US governments and the operations of businesses in the US. This is liabilities for these sectors less their financial assets, which is the net stock of financial assets that are claims on produced capital located in the US. For each year, we can then calculate the ratio between the increase in this stock of capital and net investment in US produced assets. This is a measure of the extent to which the increase in this financial capital and non-corporate equity is 'backed by' an increase in produced capital.

Next, we calculate the difference between Φ and the financial capital and non-corporate equity issued by US governments and businesses. We will call this "US residents' net foreign capital", for which we can also calculate capital gains (by taking overall capital gains for US residents and subtracting the increase due to revaluation in financial assets and non-corporate equity issued by US governments and businesses). We will assume the ratio of these capital gains to the growth in the produced capital located outside the US over which they are a claim is the same as the ratio of capital gains to net investment in produced capital for produced assets in the US. We can then add the result this gives for the increase in net produced capital located outside the US but owned by US residents to US individuals' non-fictitious profits, which we will classify as a part of *NTPF*.

This approach is not ideal for several reasons, but in practice it only makes between zero and two percentage points difference to our estimate of non-fictitious profits (and a much smaller percentage point difference to the non-fictitious rates of return). The full method for making the estimate is given in Appendix D, as well as the full definitions of non-fictitious profit and *NTPF*.

Having made this correction, we can define the non-fictitious rate of return on US individuals' capital as Ψ / Φ.

Next, we need to define and calculate fictitious profit. It sounds as though this might just be the difference between individuals' profit and their non-fictitious profit. But this does not take into account the effect of saving. Income saved by individuals accumulates as financial capital (except for their holdings of hard currency, e.g., money kept under the mattress), which adds to their total claims over produced capital. If individuals' total profit were equal to non-fictitious profit, but saving were greater than zero across all individuals, then the stock of individuals' capital would grow by more than the stock of produced capital over which individuals' capital is a claim. Part of individuals' profit would therefore be fictitious, because it would represent an increase in claims over produced capital in excess of the increase in produced capital.

For this reason, fictitious profit is individuals' profit in excess of non-fictitious profit *after subtracting* the growth in individuals' capital that is due to new injections of capital (i.e., not due to capital gains). We will call this Γ:

> $\Gamma \equiv \Lambda$ – (Ψ – new capital injections by individuals) = $\Lambda - \Psi$ + growth in Φ – capital gains in Φ = Individuals' net dividends, interest and withdrawals from non-corporate businesses after 'wages' + growth in $\Phi - \Psi$.

Or, equivalently:

> $\Gamma + \Psi$ = Individuals' net dividends, interest and withdrawals from non-corporate businesses after imputed wages + growth in Φ.

That is, the sum of fictitious and non-fictitious profits is equal to the growth in individuals' capital plus their net profit-type income payments. Therefore, assuming no change in profit-type income payments or non-fictitious profits, an increase in capital gains will correspond to an increase in fictitious profit.

This highlights an important dynamic. Capital gains in share and property markets tend to be strongly related to business confidence. When business confidence is rising, investors are prepared to pay higher prices for property and financial assets, creating capital gains for those who already own these stocks or property. This is why conditions of *rising* business confidence tend to be the most profitable for investors (i.e., *before* the peak in the business cycle); and often this is especially true when sentiment changes rapidly in the early phase of a recovery. In effect, these capital gains mean investors register profits ‘before’ the value of the commodities which are to ‘stand behind’ them has been produced. These fictitious profits leave a legacy. The additional capital they create increases the denominator of the average rate of return, tending to make it smaller.

When confidence worsens, these fictitious profits start to be reversed by ‘fictitious losses’. A sudden loss of confidence can rapidly wipe trillions off share and property markets through capital losses. This also lays the basis for the rate of return to recover, by reducing its denominator.

Here we are discussing the dynamic for the average rate of return on individuals’ capital. Unlike rates of profit, there is no direct tendency for rates of return on different financial investments to equalise. This is because their strength and order of priority as a claim on future value varies. Currency notes and coins generally have a very strong immediate claim on the value of useful commodities (they are highly 'liquid') because the conditions under which people would stop accepting notes and coins as payment within a given currency zone are usually the least likely to occur in practice. In foregoing interest, holders of these assets pay a price for this liquidity, and run the risk of inflation destroying the value of their holdings. Indeed, they are not even *capital*, because they promise no rate of return. Bank deposits introduce new risks (there might be a run on the bank) but mitigate the inflation risk and promise higher returns by paying interest. Bonds have a different risk/return profile again, and this profile depends on the credit-worthiness of the bond issuer. Equities are usually riskier still, since if a business is wound up, equity only constitutes a claim on the assets of the business after its debts have been paid. For this reason equities usually offer higher rates of return. Finally, there are a range of more 'exotic' financial instruments (a very small proportion of which are held by individuals) which offer different risk / return profiles again. It is reasonable to suppose that there is a tendency for rates of return to equalise across financial assets with risks that are perceived as similar, but not that there is a tendency for rates of return to equalise across financial assets with different risk profiles. Moreover, riskiness is not static: investors are constantly re-evaluating the types of risk entailed by different assets in light of current economic conditions and adjusting their holdings accordingly. So, for example, if sentiment about the economy worsens moderately, 'defensive' stocks might appreciate in value, while the value of ‘riskier’ stocks might decline; but then if sentiment worsens more severely, nearly all stocks tend to lose value.

Thus it can look as though rates of return on financial assets are purely a product of the sentiments of investors, and whether they decide to pay prices for financial assets that produce fictitious profits; and, theoretically, a financial and property market boom followed by a bust could happen independently of movements in the rate of profit. But there is also a quite direct connection between the rate of profit, with *s – u* on the numerator, and the non-fictitious rate of return on individuals’ capital. We can measure the relationship through the following decomposition:

$$\frac{\Psi}{\Phi} = \frac{s - u + NTPF}{\Phi} = \left(\frac{s - u + NTPF}{s - u} \times \frac{\Phi D}{\Phi}\right) \times \frac{C}{\Phi D} \times \frac{s - u}{C}.$$

where *ΦD* is net liabilities of domestic businesses and governments, and *C* here refers to *all* produced capital owned by businesses (not just produced capital for non-financial businesses).

The two ratios within the brackets are the combined effect of non-fictitious profit from the rest of the world and capital owned by US individuals less net domestically issued financial capital. The third ratio is the ratio of US produced capital to domestically-issued financial capital. This is the effect of accumulated past fictitious profits on the domestically issued part of the average non-fictitious rate of return, which, as mentioned above, is likely to be strongly related to business confidence. This ratio is similar to 'Tobin's q'.[263] The final ratio is a measure of the rate of profit. If there is a long term tendency for the rate of profit to fall, then this is likely to be the most important determinant of the non-fictitious rate of return over the long term. By replacing this term with the decomposition of the rate of profit expressed in terms of (*s – u)* we could also calculate the direct effect on the non-fictitious rate of return of changes in the OCC, the ROSV, turnover time etc.

As before, we can calculate the effect of each of these ratios by taking the logarithm of the initial and final levels of the non-fictitious rate of return:

$$\log\left(\frac{\Psi_{f,f+1}}{\Phi_{f,f+1}}\right) - \log\left(\frac{\Psi_{t,t+1}}{\Phi_{t,t+1}}\right)$$

$$= \left[log\left(\frac{s_{f,f+1} - u_{f,f+1} + NTPF_{f,f+1}}{s_{f,f+1} - u_{f,f+1}} / \frac{s_{t,t+1} - u_{t,t+1} + NTPF_{t,t+1}}{s_{t,t+1} - u_{t,t+1}}\right)\right.$$

$$\left. +\ log\left(\frac{\Phi D_f}{\Phi_f} / \frac{\Phi D_t}{\Phi_t}\right)\right] +\ log\left(\frac{C_f}{\Phi D_f} / \frac{C_t}{\Phi D_t}\right)$$

$$+\ log\left(\frac{s_{f,f+1} - u_{f,f+1}}{\mathrm{C}_f} / \frac{s_{t,t+1} - u_{t,t+1}}{\mathrm{C}_t}\right).$$

The actual average rate of return on individuals' capital could be decomposed similarly, by including the ratio of individuals' actual profit to their non-fictitious profits in the decomposition

[263] Tobin and Brainard, William C., "Asset Markets and the Cost of Capital."

above.

We can also measure and decompose changes in the non-fictitious rate of return for individuals' capital excluding equity in non-corporate businesses. This is useful because non-corporate businesses are more likely to continue to exist on a relatively low rate of profit, since in many cases their owners also depend on the existence of their business for their 'wage'. Unless they can get enough proceeds from selling their business to buy another one with a higher rate of profit (a potentially very risky decision) their only alternative is to find employment for a wage elsewhere. Note, however, that the 'non-corporate business' sector as defined in the national accounts also includes rental property owned by individuals, which can be bought or sold as an investment with fewer personal consequences.

Investors in an unprofitable corporation, on the other hand, can sell their shares and buy others instead without this affecting their employment in any way. As mentioned, this creates a tendency for rates of return to equalise across financial assets with risk profiles which are perceived as similar. This means the average rate of return across these financial assets only is a more meaningful measure. For this reason, the non-fictitious rate of return on individuals' financial assets is more likely to have a similar trend to the interest rate than the non-fictitious rate of return on individuals' total capital.

To refer to magnitudes excluding the non-corporate business sector, we will use the same Greek letters as above but in lower case. We will refer to individuals' capital excluding non-corporate businesses (and rental property) as 'financial assets', and profits on these assets as 'financial profits'. Note that this is shorthand for individuals' gross financial assets less liabilities, and individuals' gross financial profits less interest paid out by individuals on their personal debt and mortgages on dwellings they keep for their own use.

First, individuals' non-fictitious *financial* profit, ψ, is individuals' total non-fictitious profit less expenditures by proprietors on investment and personal consumption financed by non-corporate business profits (including rents from housing), which we called *ep* in Chapter 4:

$$\psi \equiv s - u + NTPF - ep.$$

Next, total financial profit is individuals' total profit less withdrawals from non-corporate businesses, plus wages imputed to proprietors (since these 'wages' are not part of individuals' total profit, but *are* part of withdrawals from non-corporate businesses):

$\lambda \equiv \Lambda$ – withdrawals from non-corporate businesses after 'wages'.

The stock of net financial assets owned by individuals is:

$\varphi \equiv \Phi$ – individuals' equity in non-corporate businesses.

Similarly, fictitious financial profit is:

$\gamma \equiv$ Individuals' net dividends and interest + growth in φ - ψ.

This makes it possible to calculate the non-fictitious rate of return on financial assets, ψ / φ, and the average total rate of return on financial assets, λ / φ. Both of these can be decomposed using the same method as above, but replacing $s - u$ with $s - u - ep$, and excluding fixed assets and inventories for the non-corporate business sector.

The Non-Fictitious Financial Rate of Return and the Interest Rate

Finally, here are some hypotheses concerning the relationship between the growth in financial assets and movements in interest rates. As mentioned above, capital gains on financial markets tend to be largest when economic confidence is rising. If investors' expectations concerning future profitability improve, and people are sufficiently confident about their financial situation to move their savings into riskier classes of financial asset, then fictitious capital is likely to expand at a faster rate than produced capital, tending to bring down the non-fictitious rate of return and yields on financial assets. Conversely, when economic confidence worsens, investors revise down their estimates of the NPV of financial assets, especially riskier ones, bidding down their prices and hence shrinking the total stock of financial assets, tending to increase the non-fictitious rate of return and yields. So at the peak of the cycle, with confidence at its highest point, we would expect the non-fictitious rate of return and yields to be at their lowest (which also makes it cheapest and easiest to obtain money for more speculative investments); and we would expect the reverse to be true at the bottom of a trough, once financial assets and property have suffered their maximum devaluation.

This is the same dynamic Marx observes for interest rates. Recall from last chapter that Marx observed interest rates to be at their highest during a crash, then to fall as activity starts to pick up, continue to fall until the peak of the cycle, then to rise between the peak of the cycle and the next crash. In general, we would expect interest rates to move in a similar direction to yields on other financial assets, since they are just the yields on the least risky financial assets. We would therefore expect interest rates to move in a similar direction to the non-fictitious rate of return on financial assets. So Marx's observations concerning movements in interest rates seem to fit well with the framework outlined here.

Finally, over the long-term, if there is a declining non-fictitious rate of profit, then this is likely to be the most important influence on the non-fictitious rate of return on individuals' financial assets, yields, and interest rates. This is consistent with Marx's view that the interest rate tends to fall along with the rate of profit over the long term, despite his observation that interest rates tend to move in the opposite direction to the business cycle in the short-term.

All these movements could have significant influences on the real economy. Our hypothesis from

Chapter 2 is that the main influence on the rate of accumulation, and hence on the rate of growth, is movements in the rate of profit over the long term. But over the short-term, movements in financial markets have their own effect on the rate of accumulation, and do not merely reflect movements in the underlying rate of profit. This happens most dramatically during a financial market crash, when the supply of credit is drastically curtailed. Not only does this mean investment declines drastically but many firms stop production, lay off their workers or go bankrupt because they cannot sell their output and cannot borrow.

On the other hand, fictitious profits can also hide the consequences of a falling rate of profit for a time. We have seen how government borrowing can 'artificially' inflate the after-tax rate of profit on production (and the same effect applies to after-tax rates of profit from secondary exploitation); and fictitious profits can 'artificially' inflate investors' wealth and rates of return.

The interest rate cycle is likely to have a particularly significant effect on the rate of accumulation. Lower interest rates encourage people and businesses to borrow to finance consumption and investment, tending to increase the rate of accumulation, the current account deficit and potentially also the value of output (insofar as this investment is spent on employing more living labour). If Marx's hypothesis is true, and interest rates tend to be at their short-term minimum at the peak of the cycle, then movements in the interest rate would aggravate the short-term business cycle itself (or perhaps even explain it).

Conclusion

Marxists have tended to pay more attention Marx's theory of money than his unfinished work on finance. They have paid even less attention to the relationship between finance, the rate of profit and his theory of value. We have shown that by doing so, we can develop a theory that reproduces some of Marx's conclusions and can be applied to existing data. Unlike the previous chapters, this is more an *extension* of Marx's theory than an interpretation as such.

This completes the formalism set out in this thesis. The next chapter presents the results obtained by applying it.

Appendix D: Accounting Definitions for Financial Rates of Return

Individuals' Capital

Including non-corporate equity: Φ ≡ Households' financial assets (IMAs S3 line 103) – Households' liabilities (IMAs S3 line 131).

Excluding non-corporate equity: $\varphi \equiv \Phi$ – Households' equity in non-corporate business (IMAs S3 line 122).

Individuals' Total Profit

Including non-corporate profits: Λ ≡ Households' received property income (IMAs S3 line 14) – Households' interest paid (IMAs S3 line 19) + Revaluation of households' financial assets (IMAs S3 line 89) – Imputed wages paid to proprietors (see Ch 4, Appendix B).

Excluding non-corporate profits: λ ≡ Households' received property income (IMAs S3 line 14) – Households' interest paid (IMAs S3 line 19) + Revaluation of households' financial assets (IMAs S3 line 89) – Households' withdrawals from non-corporate business (IMAs S3 line 18) – Revaluation of households' equity in non-corporate business (IMAs S3 line 92).

Individuals' Non-Fictitious Profit

Individuals' total non-fictitious profit (including profits from non-corporate business) ≡ $\Psi \equiv s - u + NTPF$.

Individuals' financial non-fictitious profit ≡ $\psi \equiv s - u + NTPF - ep$ (see Chapter 4, Appendix B).

Here *NTPF* (net transfer payments from foreign entities) ≡ Net exports of financial services, insurance, patents and licenses (see Chapter 4, Appendix B) + Net foreign-sourced income (NIPA 1.7.5 line 2 – line 1) + Net investment in foreign produced capital owned directly and indirectly by US residents;

> where: Net investment in foreign produced capital owned directly and indirectly by US residents ≡ (Estimated net claims by US households on foreign produced assets / US produced capital) × [Gross investment in non-residential business fixed assets (FA 4.7 lines 2 + 3 – 66 – 67 – 70 – 71 – 74 – 75) – TSSI depreciation of business fixed assets + Net investment in inventories (NIPA 1.4.5 line 5) + Gross investment in tenant-occupied residential fixed assets (FA 5.7 line 12) – TSSI depreciation of tenant-occupied residential fixed assets]
>
> > and:
> >
> > Estimated net claims by US households on foreign produced assets ≡ [Φ – Net liabilities for US business and government (IMA S4 line 104 + IMA S5 line 129 – IMA S5 line 103 + IMA S6 line 131 – IMA S6 line 106 + IMA S7 line 129 – IMA S7 line 101 + IMA S8 line 101 – IMA S8 line 79)] × US produced capital / Φ;
> >
> > US produced capital ≡ Non-residential business fixed assets (FA 4.1 lines 2 + 3 – 66 – 67 – 70 – 71 – 74 – 75) + Residential fixed assets occupied by tenants (FA 5.1 line 12) + Business inventories at end of year (see Chapter 4 Appendix B);
> >
> > TSSI depreciation of non-residential business fixed assets ≡ Current cost depreciation of business fixed assets (FA 4.4 lines 2 + 3 – 66 – 67 – 70 – 71 – 74 – 75) × [Price index for non-residential private investment$_{t-2,t-1}$ (NIPA 1.1.4 line 9, previous year) / Price index for non-residential private investment$_{t-1,t}$ (NIPA 1.1.4

line 9)] × $n_{t-2,t-1}$ / $n_{t-1,t}$.

TSSI depreciation of tenant-occupied residential fixed assets ≡ Current cost depreciation of tenant-occupied residential fixed assets (FA 5.4 line 12) × [Price index for residential private investment$_{t-2,t-1}$ (NIPA 1.1.4 line 13, previous year) / Price index for residential private investment$_{t-1,t}$ (NIPA 1.1.4 line 13)] × $n_{t-2,t-1}$ / $n_{t-1,t}$.

Chapter 7: Results

The results below are presented and discussed in roughly the order the formalism was developed in the previous chapters. The discussion focuses on whether the results support Marx's hypotheses and what they imply about the causes of the Great Recession.

Output and Surplus Value

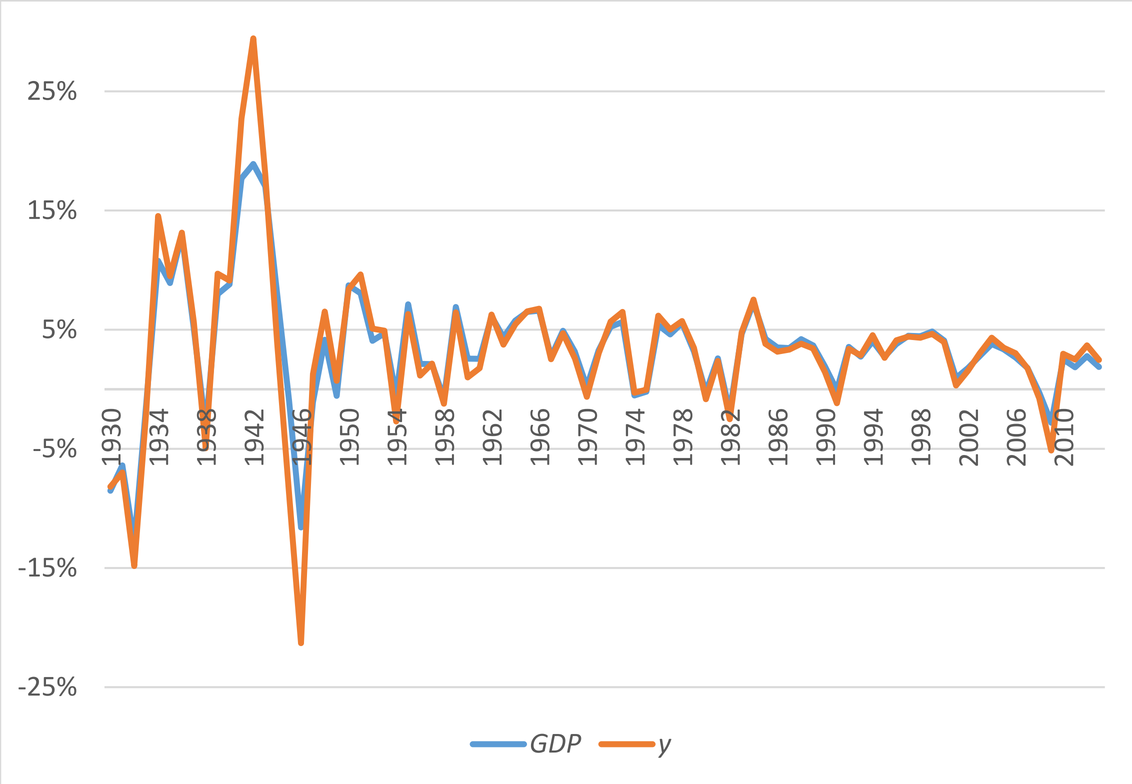
Output of Commodities

The measure of output we are using is the total price of commodities produced each year for final consumption or investment. Figure 1 compares the real rate of growth of this measure with the rate of growth of real GDP; and Figure 2 graphs the ratio of the level of GDP to our measure of output.[264] They show that while the changes affect the *level* of output significantly, they make very little difference to the measure of the real rate of growth of output. They therefore give almost identical measures of economic 'performance' year-by-year; measuring the total price of

[264] Real output is calculated in a similar way to real GDP. Real GDP is nominal GDP (GDP at current prices) divided by the GDP deflator for the current year, multiplied by the GDP deflator for the 'base' year. We could obtain a good estimate of our measure of real output by applying exactly this same approach. The GDP deflator, however, is an index of the price level for all GDP, and our estimate of output excludes some parts of GDP. We have obtained a more accurate estimate of real output by breaking nominal output down into parts (e.g. personal consumption expenditure, investment) and deflating each part by the relevant price index. Chapter 4 already defined our estimate of output on this basis: we identified which components of PCE, exports, imports, gross private investment and government spending are commodities. The NIPA publish price indexes for each of these categories, so we use them to calculate real output. A minor problem is that we only estimate net 'exports' of financial services and insurance, not gross 'exports' and gross 'imports' of these non-commodities, and the price indexes apply only to exports and imports in gross terms. For the purposes of working backwards from 'exports' and 'imports' as defined in the NIPA to exports and imports of commodities, we have just assumed that gross 'exports' of financial services is equal to net 'exports' of financial services, and therefore also that gross 'imports' of financial services is zero. This should only make a very small difference to the estimates of real output, and would make no difference at all if we were using price indexes at a finer level of detail.

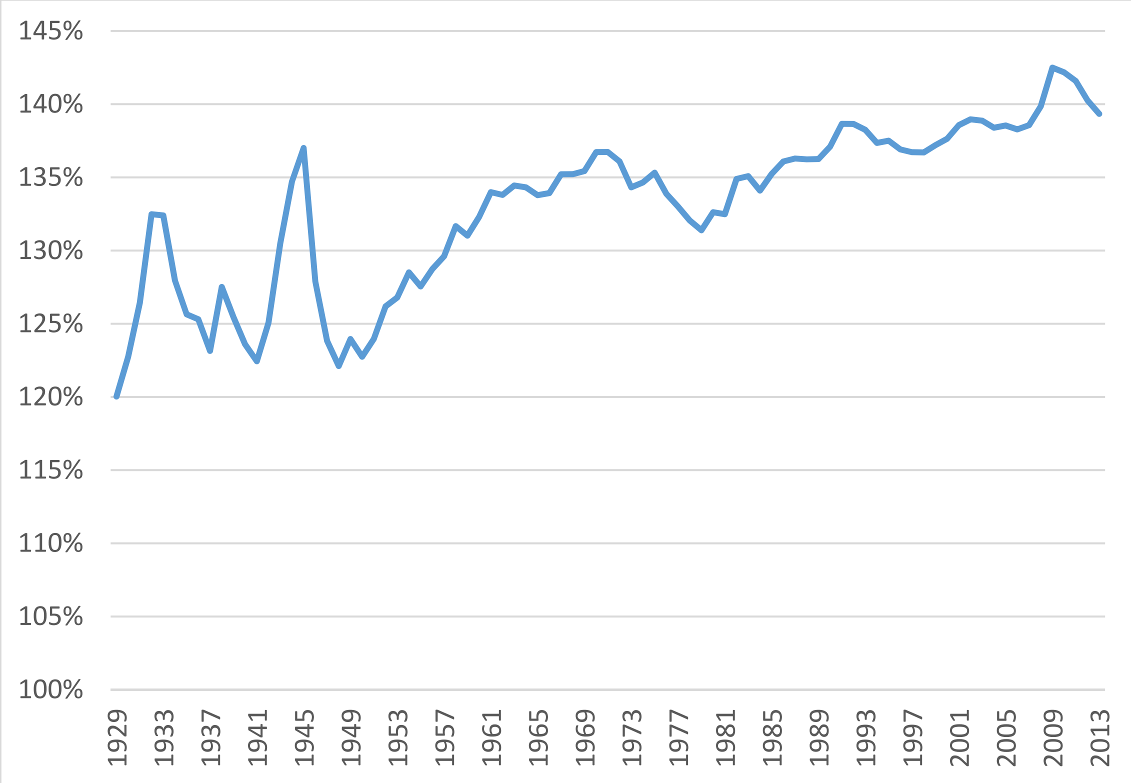
the output of commodities is mainly important to allow for a more accurate measure of surplus value.[265]

Figure 1: Real growth rates of two measures of output



[265] However, it is also interesting to note that as this small difference in growth rates accumulates over time it leads to an increasing ratio of GDP to the total output of commodities. (I am grateful to an anonymous referee for this point.) This means that if it is interpreted as a proxy for a Marxist measure of output, because it includes unproductive sectors GDP progressively overstates the total value of US output.

Figure 2: GDP / y



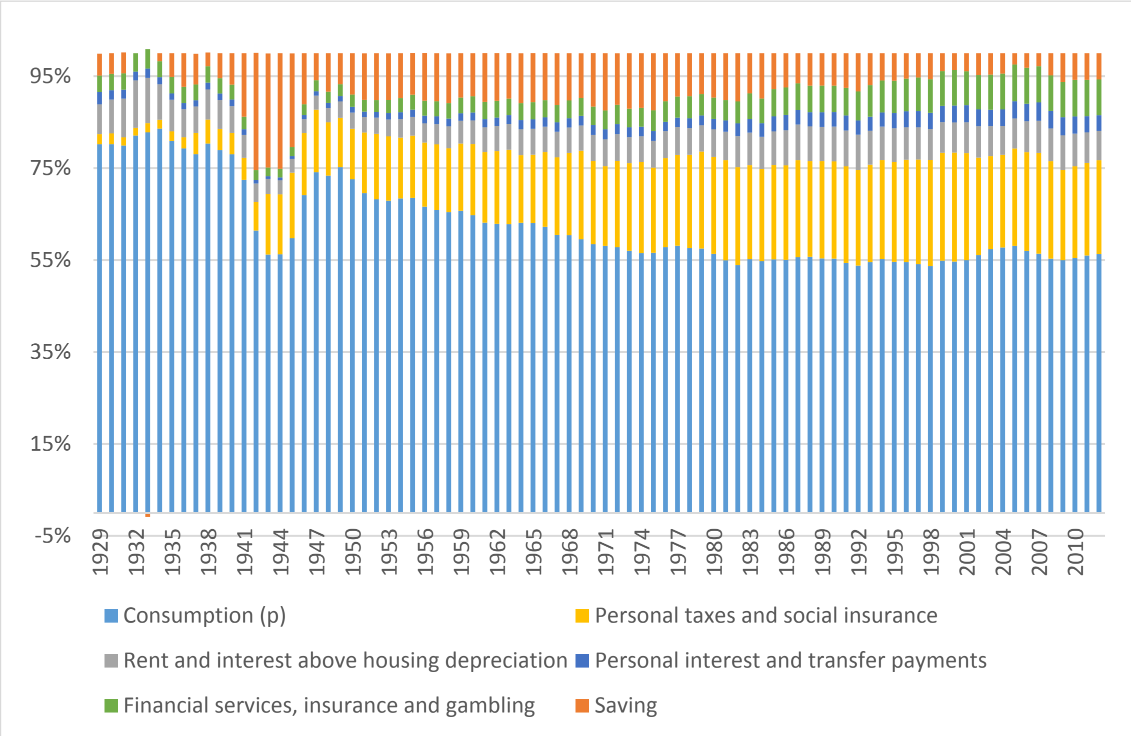
Consumption, Saving and Secondary Exploitation

Our measure of surplus value also depends on estimating the proportion of wages that workers spend buying commodities for consumption. We are assuming that the average propensity to consume employees' compensation (*p*) is equal to the average propensity to spend any personal income on commodities for consumption including housing depreciation. Personal income can also be saved in various forms (e.g. in financial assets or investment in housing net of depreciation) or it can be extracted from productive workers through secondary exploitation.[266] Figure 3 graphs the proportions of personal income spent, saved or appropriated in these ways. It separates secondary exploitation into four categories: housing rent and mortgage interest above the value of housing depreciation; costs of financial services, insurance premiums net of

[266] It can also be extracted from people other than productive workers through the same forms as secondary exploitation (taxes, interest and rent), but strictly speaking this is not a form of *exploitation* since only productive workers produce value.

claims and net losses from gambling; personal taxes and social insurance; and interest on personal loans plus other transfer payments to business and government.

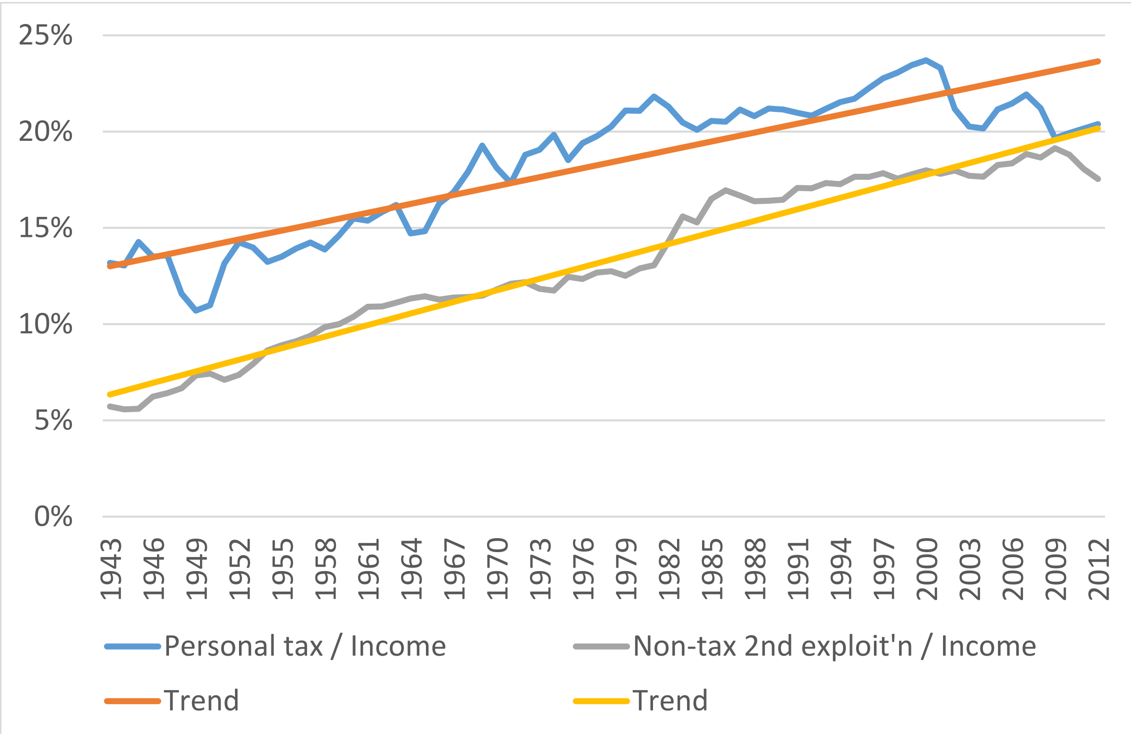
Figure 3: Uses of personal income



From the end of WWII until around 1982, the tendency is for the propensity to consume to decline over time. This is due to increases in all forms of secondary exploitation as a proportion of income, and, to a much lesser extent, an increase in the savings rate. Then until 1998 *p* stays roughly constant, while, proportionately, value extracted through secondary exploitation continues to grow. The savings rate therefore declines significantly, and continues to decline until the Great Recession. This means that the fall in the savings rate begins well before the Federal Reserve's policy of keeping interest rates low to boost consumption during the 2000s; indeed, it starts when interest rates were at record *highs* in the early 1980s. The decline in the savings rate seems more likely to be related to the nature of the recovery from the crises of the 1970s; specifically, as we will see below, the fact that the recovery was not underpinned by a substantial increase in the underlying profit rate or the rate of accumulation of produced capital.

From 1999 until 2005 *p* increases significantly. We can see why more clearly in Figure 4 below. It shows that during the post-war period there was a clear trend for personal taxes to increase as a proportion of personal income *until* 2001; after which the downward trend is clear. This looks to be the result of the Bush tax cuts, which essentially financed reductions in marginal tax rates (especially at higher incomes) by increasing government borrowing. These tax cuts appear to have had the largest effect on the propensity to consume, and a much more significant effect than the decline in the savings rate. This also suggests that the true increase in the average propensity to consume for *workers* is not as large as the measure we are using, since the Bush tax cuts favoured higher income earners, and we are assuming the general average propensity to consume is equal to workers' average propensity to consume.

Figure 4: Forms of secondary exploitation

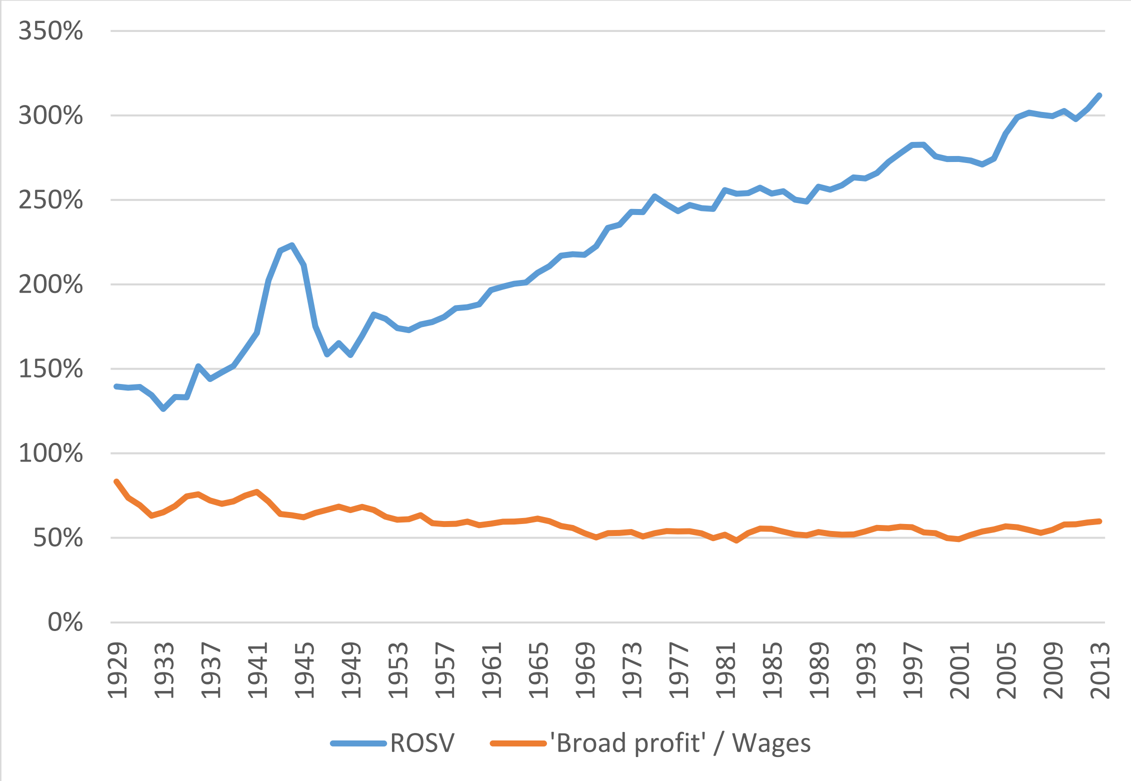


Rate of Surplus Value

We are measuring 'surplus value' as the total price of output net of productive depreciation less the value of the labour power expended by productive workers and productive members of the petty bourgeoisie, and the rate of surplus value (ROSV) as the ratio of surplus value to the value of productively expended labour power. This means the ROSV is quite different from the ratio of 'capital income' or 'broad profits' to total wages, which is often used as a proxy for the ROSV. Nor is the ROSV a proxy for income inequality, or the relative 'strengths' of capital and labour, because surplus value includes the consumption of workers who are unproductive, unemployed or retired. The ROSV as defined here is only intended to measure what Marx intended it to measure: the ratio of surplus labour to necessary labour for productive workers.

We can see in Figure 5 below that this measure of the rate of surplus value has very different levels and trends from the 'rate of surplus value' as it is more usually estimated. Figure 5 compares the ROSV as defined in Chapter 4 with the ratio of 'broad profits' to wages, defined as (GDP – consumption of fixed capital – employees' compensation) / employees' compensation:

Figure 5: Estimates of the rate of surplus value



In *Capital* Marx mostly assumes there is a process of the production of relative surplus value; i.e., a tendency for the rate of surplus value to rise as productivity improvements bring down the cost of reproducing labour power. We can see from the graph above that unlike the ratio of 'broad profits' to wages, the measure of the ROSV used here is consistent with that assumption. On the other hand, if the ratio of 'broad profits' to wages were a good proxy for the ROSV, then the tendency until the end of the post-war boom would have been for the ratio of surplus to necessary labour to *fall* over time; the opposite of Marx's assumption.

Chapter 4 also gave a method for decomposing changes in the ROSV into the effect of increases in productive workers' real consumption and the effect of the production of relative and absolute surplus value.[267] Figure 6 graphs the cumulative effect of these two influences. They

[267] Separating out the effects of the production of relative from absolute surplus value could be done using estimates of hours worked per full-time equivalent employee, making this the basis for defining the

have the effects we would expect: over time, productivity improvements reduce the SNLT required to produce a given bundle of commodities, producing relative surplus value, but this is offset to some extent by increases in workers' real consumption.

Figure 6: Influences on the rate of surplus value

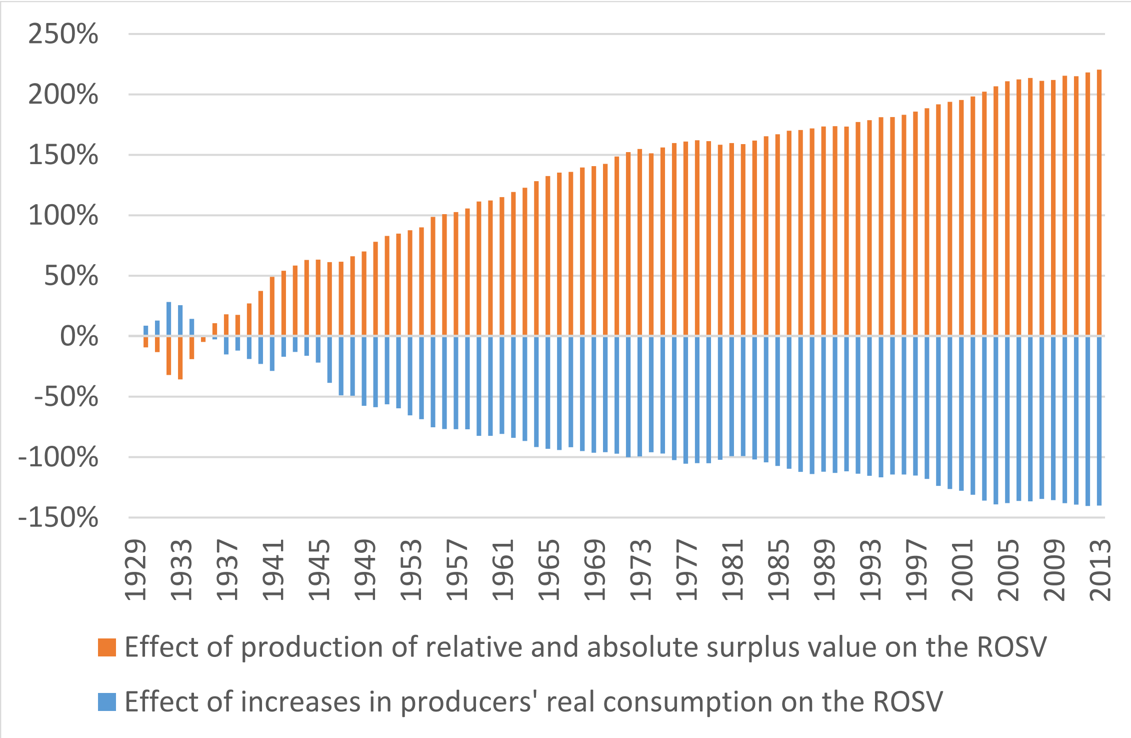


Figure 7 graphs productive workers' real yearly compensation, adjusted for inflation in the Personal Consumption Expenditures (PCE) index. As for all our measure of 'wages', this is *total* employee compensation, which is not just wages and salaries but also employer contributions to pension funds and social security. This is the total wage that *employers* pay. The income available for *workers* to spend or save is their compensation after secondary exploitation.

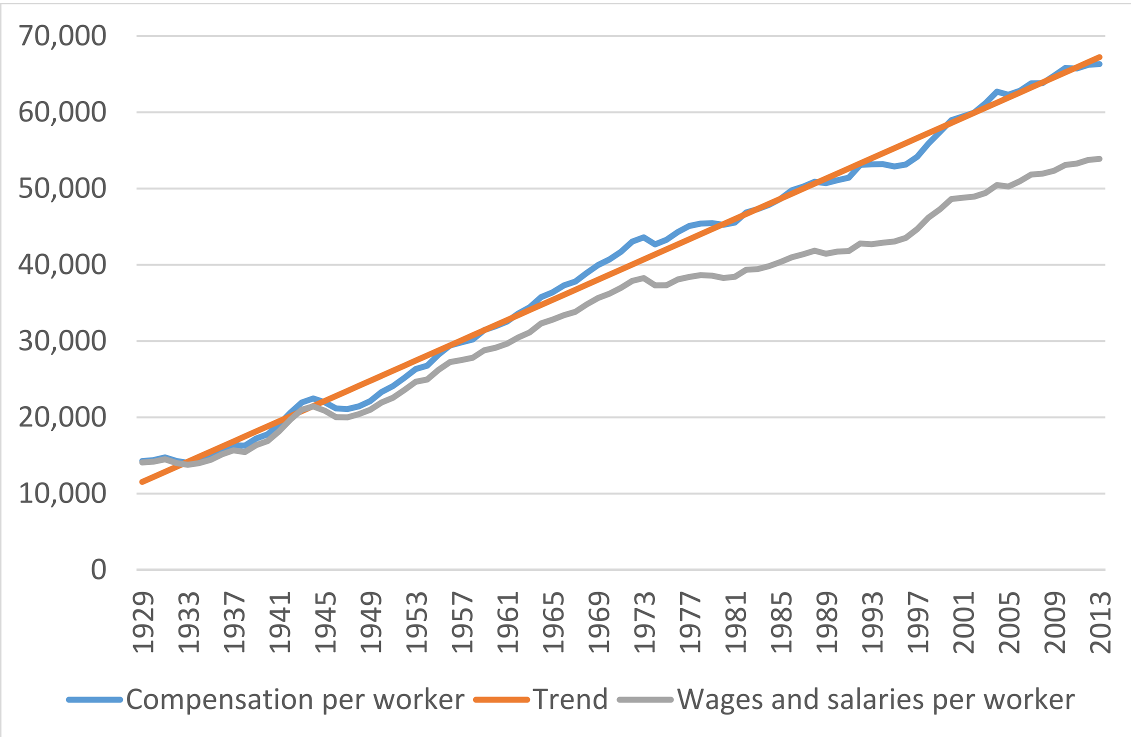
Figure 7 also graphs real 'wages and salaries' per productive worker. This is not a measure of employees' pre-tax income, pre-tax income after contributions to social insurance, after-tax

MELT, and then distinguishing the effect on the ROSV of changes in total hours worked per full-time equivalent employee and the cheapening of commodities consumed by workers.

income, income available to spend or save, *or* the price paid for labour power by employers; and is therefore a meaningless measure for practically all conceivable purposes. It is included in Figure 7 to show how this data can create the misleading impression that growth in the real wage rate slowed significantly since the end of the post-war boom.

We can see that if we instead use a *correct* measure, real total employee compensation per worker, there is extraordinarily little variation around its linear trend; the R squared between the two is 0.994. The rate of growth of real wages per productive workers nevertheless grew a *little* more quickly than average during the post-war boom and between 1996 and 2000; and more slowly than average from 1929-35, 1944-47, 1977-81, 1988-91, 1992-96 and 2004-06.

Figure 7: Average yearly real employee compensation and wages and salaries per full-time equivalent productive worker



Looking at all the data for surplus value and wages period-by-period, we can see that there is a large increase in the actual ROSV during the post-war boom, even though, for wage earners as a whole, their share of national income increased. This suggests that the relative surplus value produced by the productivity increases of the post-war boom was largely spent employing unproductive workers (e.g., in the military during the Cold War). There was also a sharp spike in the ROSV during WWII as productive workers' exploitation was increased to boost military spending. Again, this is not captured by the ratio of 'broad profits' to wages because a large portion of this surplus value was spent unproductively, especially by the military.

After the post-war boom the ROSV grew more slowly until the early 1990s, because productivity increased more slowly, producing relative surplus value at a slower rate. Then the recession of 1991 and the 'jobless recovery' which followed coincided with a sharp increase in ROSV, while the real wage rate stagnated; indicating that a high rate of unemployment allowed bosses to keep wages down. From 1999 – 2003 the effect of this stagnation was reversed, as productive workers won higher than average real wage increases. Real employee compensation returned to its long term trend and the ROSV fell back to around its trend level since the end of the post-war boom. From 2004 until the Great Recession real employee compensation again stagnated, and the ROSV again increased significantly.

The immediate effect of the Great Recession was to halt the production of relative surplus value and the increases in the ROSV. Both tendencies then resumed while the economy recovered during 2012 and 2013, but the real wage for productive workers continued to stagnate.

The most important limitation of these results is the definition of productive workers. It almost certainly includes significantly more workers in industries that are not productive than it excludes workers in industries that are productive, and it makes no distinction between workers and salaried supervisors. This means it overestimates the number of productive workers and their wages, and it is very likely that this overestimate gets proportionately worse over time as the true ratio of unproductive to productive workers grows. This would mean our measure of the ROSV becomes a progressively larger underestimate. On our figures, the ROSV more than doubles between 1929 and 2013; and the true ROSV almost certainly increased by even more.

The results therefore strongly support Marx's hypothesis that the development of the forces of production tends to produce relative surplus value and raise the ROSV. This indicates that a combination of a shorter working day, better living standards for workers and the provision of significant aid to workers in poorer countries could all be achieved under socialism at current levels of productivity. Under capitalism surplus labour is largely wasted. Some is embodied in consumption goods for capitalists, some in actively harmful use values such as weapons, but by far the largest amount is spent on reproducing the labour power of unproductive wage earners. Some of this labour power is unproductive for capital, but socially useful: e.g., health care and education. A much larger proportion does nothing to fulfil human need, and is only 'necessary' because capitalism makes this the case: e.g. much of the retail sector, finance and administration. Much labour is also devoted to a directly repressive and harmful social function: e.g. the military, prison guards, police, supervisors and managers.[268] We can only imagine the possibilities for human development we would liberate if this labour power were instead expended directly satisfying human need, or freed up by shortening the working day; even setting aside the enormous creative and productive potential which ending alienation would unleash.

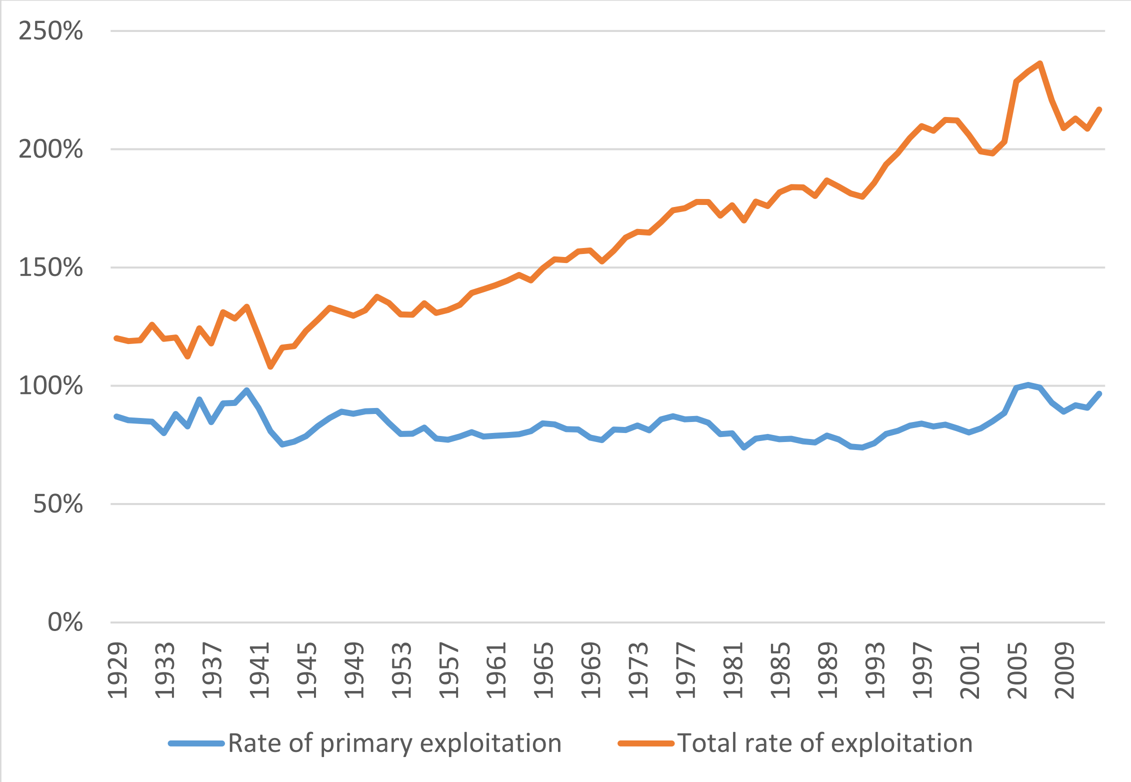
If it is instead measured as the ratio of 'broad profits' to wages, this aspect of the meaning of the ROSV no longer applies, and we are left with a ratio which at best describes a purely distributive relationship.

[268] Though our definition of unproductive labour does not include supervisors and managers in productive sectors.

Chapter 4 also defined two measures of the rate of exploitation: the rate of primary exploitation and the total rate of exploitation. The first is the ratio of net output less the total price of productive labour power to the total price of productive labour power. The second replaces productive *wages* in the numerator and the denominator with the *value* of productive labour power plus the portion of these wages retained as savings. This is productive workers' and proprietors' wages after subtracting the value extracted from them through rent, income taxes and interest.

Figure 8 below graphs both these measures. As we might expect, the rate of total exploitation has a similar trend to the rate of surplus value. Perhaps more surprisingly, the rate of primary exploitation has a weak *downward* trend until 1992. This is because secondary exploitation becomes an increasingly important source of profit and tax revenue. This highlights another major problem with using the ratio of 'broad profits' to pre-tax 'wages' as a proxy for the ROSV: by ignoring secondary exploitation, especially through taxes, it grossly underestimates the level of and growth in the ROSV. Therefore even as a measure of the distribution of income between capitalists and workers the ratio of 'broad profits' to wages is severely deficient.

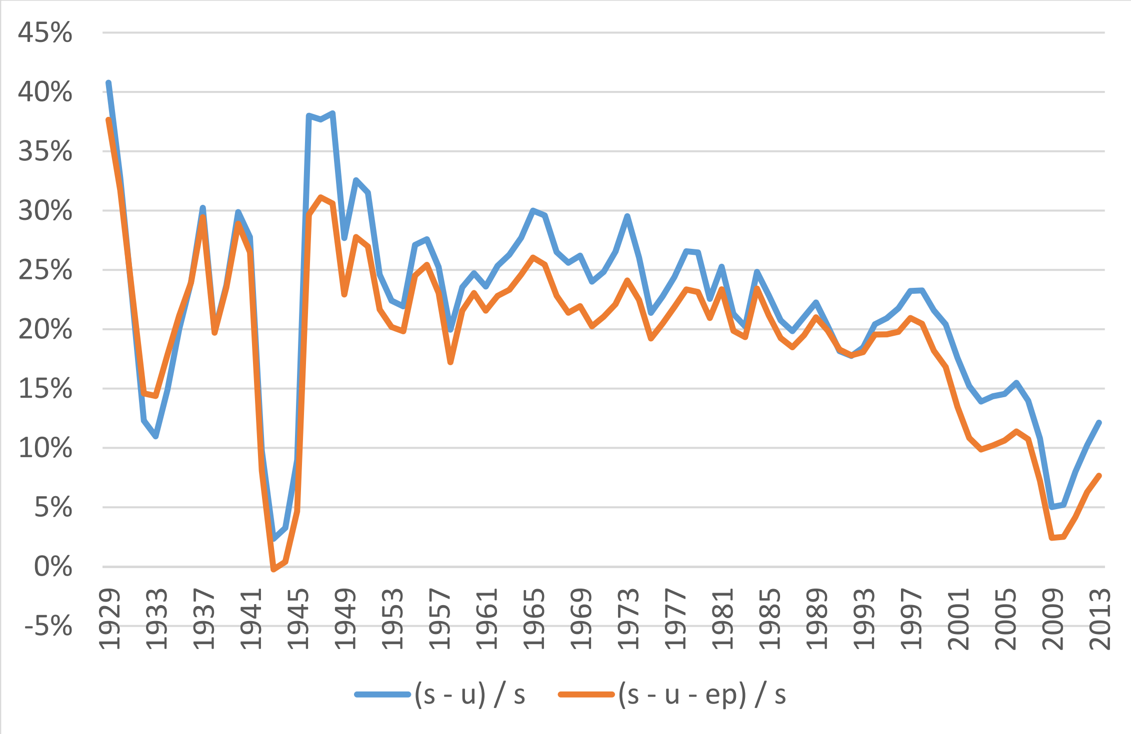
Figure 8: Rates of exploitation



Unproductive Expenditures of Surplus Value

Now we will look at unproductive expenditures of surplus value more directly. Chapter 4 suggested that it is likely that, over time, there is an increase in the proportion of surplus value used to buy inputs and labour power for unproductive sectors. Figure 9 below suggests this is roughly true, but not the entire story. It graphs $(s - u) / s$ and $(s - u - ep) / s$, which is the proportion of surplus value 'left over' for net investment and for business owners' personal consumption for all businesses and for corporations respectively. The difference between the two is that the latter excludes consumption and investment funded out of non-corporate profits (*ep*), and the former depends on our less than ideal method for imputing a value to the labour power of petty bourgeois producers.

Figure 9: Surplus value 'left over' after unproductive expenditures



The most important aspect of the graph is the sharp drop in the ratios from 1998 until the Great Recession. By 2009 only 5% of surplus value remains 'left over' for businesses as a whole, and only 2% for corporations.

What explains this quite dramatic change? Figure 10 and Figure 11 break down unproductive expenditures of surplus value as a proportion of surplus value by institution and by function from 1959 onwards.[269] Figure 10 shows there is a tendency for unproductive expenditures by both government and business to increase over time as a proportion of surplus value. But between 1992 and 1998 government unproductive expenditures fall considerably in

[269] NIPA table 3.15.5 gives estimates of government spending by function, and the text below describes how these categories have been grouped according to a Marxist interpretation. We cannot simply use the estimates of government consumption expenditures and gross investment by function supplied by the NIPA, however, because we have defined these include the pre-tax wages paid to government employees, and not just government employees' consumption. We instead assume that this data gives us the correct proportional breakdown of government spending by function. It is then straightforward to estimate unproductive government expenditures by function.

proportional terms. The large fall in (*s – u) / s* from 1998 is explained in part by the increase in government spending as a proportion of surplus value between 2000 and 2002 back to trend levels; but by 2007 it had fallen back below trend. The more important change before the recession is an increase in unproductive expenditures by businesses as a proportion of surplus value.

Figure 10: Unproductive expenditures by government and business

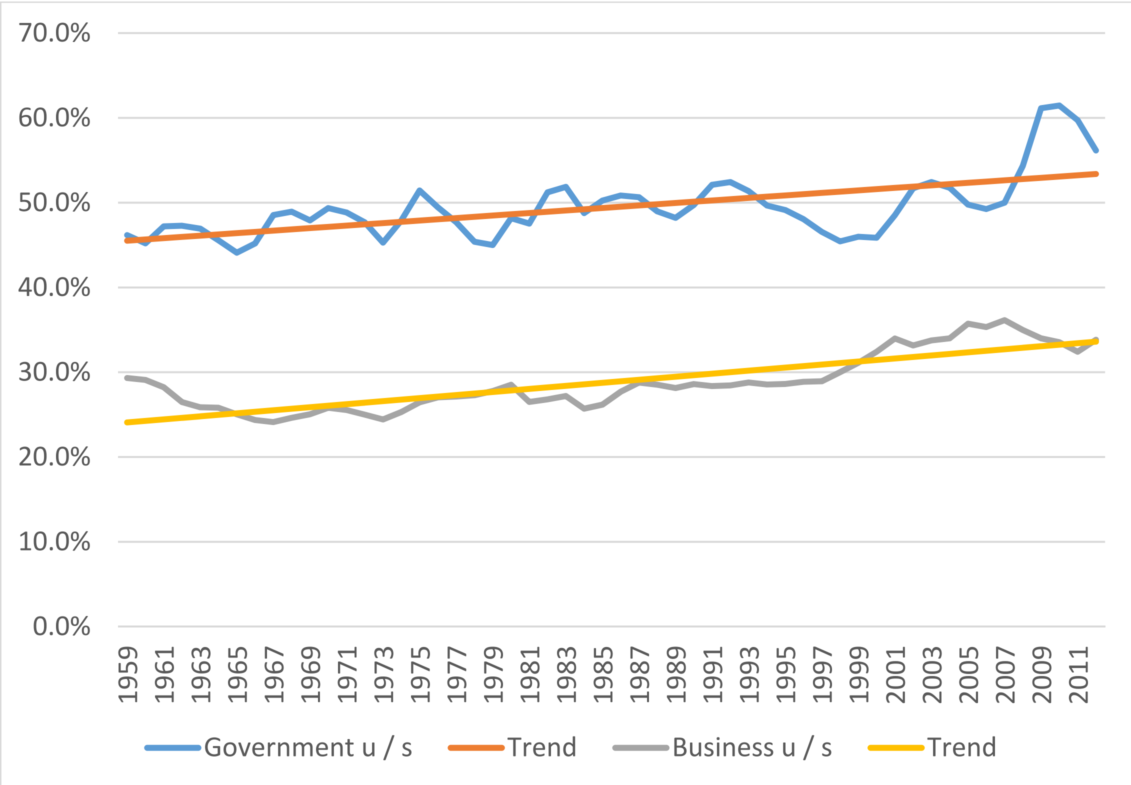
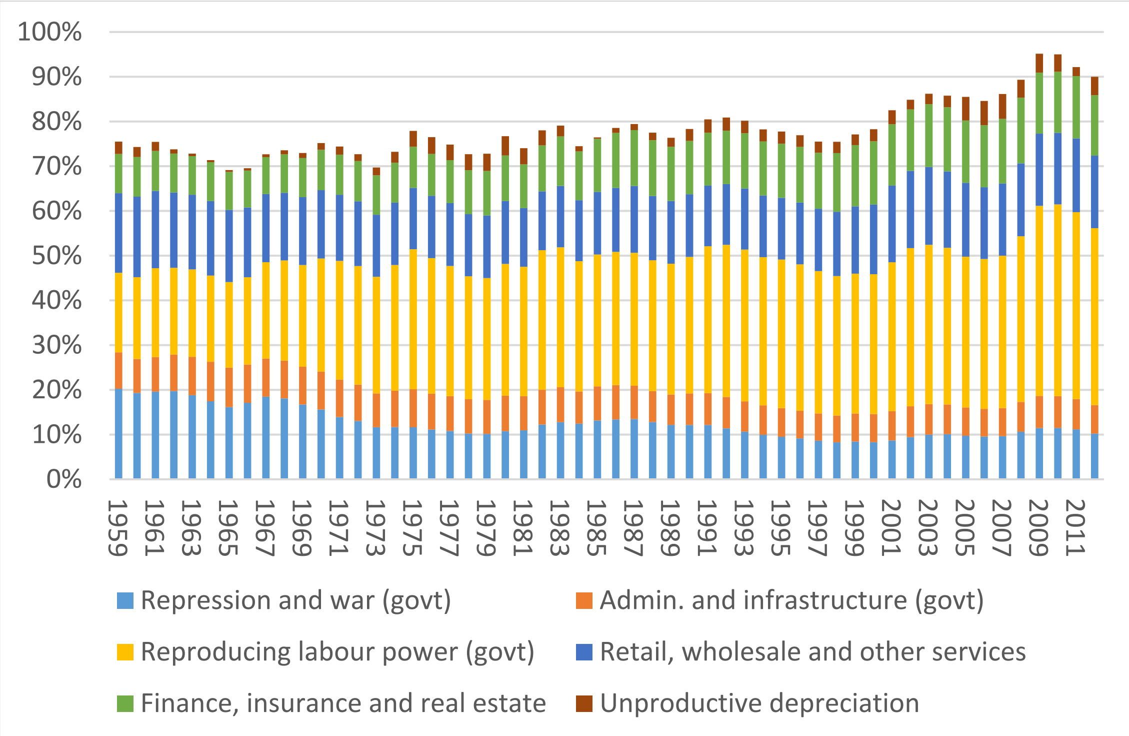


Figure 11 breaks this down further. It uses the NIPA's newly available data for government expenditure by function and combines them together according to a Marxist interpretation. 'Repression and war' is defined as unproductive expenditures on 'national defense' and 'public order and safety'; 'administration and infrastructure' is spending on 'general public service' plus 'economic affairs'; and 'reproducing labour power' is consumption spending on 'housing and community services', 'health', 'recreation and culture', 'education', 'income security' (which is only the cost of *administering* this, and not income security payments themselves) plus gross government social benefits paid to persons. In all cases this covers spending only on the *value* of labour power (rather than all wages, since we are dealing with expenditures of surplus value) and the cost of buying commodities either consumed as intermediate inputs or bought as fixed assets.

Figure 11: Unproductive expenditures by function as percentages of surplus value



Spending on repression and war as a proportion of surplus value nearly halves over the period, with the end of the Cold War and the Vietnam War. This is balanced out by an increase in government spending on reproducing labour power. A great deal of this is probably due to the large increase in the unemployment rate after the post-war boom, and the increased unemployment benefits the state has to pay as a result. *During* the Great Recession this leads to a sharp increase in government expenditure, pushing unproductive government spending up to around 60% of surplus value. But, as mentioned, immediately *before* the Great Recession government unproductive expenditures as a proportion of surplus value are still below trend.

For unproductive expenditures of surplus value by business, the increases in unproductive expenditures are shared roughly evenly between retail, wholesale and other services and finance, insurance and real estate.

The increase in unproductive expenditures as a proportion of surplus value may be an important part of the explanation for the Great Recession. To see if it is, and to judge its relative importance, we first need to examine measures of the rate of profit and the various influences on them.

Measures of the Rate of Profit

'Standard' Measures

To give a point of comparison, we will start by looking at the results produced by some more 'standard' measures of the rate of profit, and some conclusions others have drawn from them. As discussed in Chapters 1 and 2, Marxists do not agree over whether to measure fixed assets at current or historical cost. As mentioned in Chapter 4, they also use many different numerators. A broad definition of 'profit' is gross domestic product less depreciation of fixed assets and compensation of employees. Then there are other business payments which may or may not be treated as deductions from this 'broad profit': taxes on production less subsidies, net proprietors' income (i.e., income for owners of non-corporate businesses), net interest payments, net rental income of persons (which is rent paid for housing, including an imputation for the rent that the national accounts treat owner occupiers as 'paying to themselves'), current surplus of government enterprises, and taxes on corporate profits.[270] If we deduct all of these, we get what the national accounts call 'corporate profits after tax'.

[270] This list is not exhaustive.

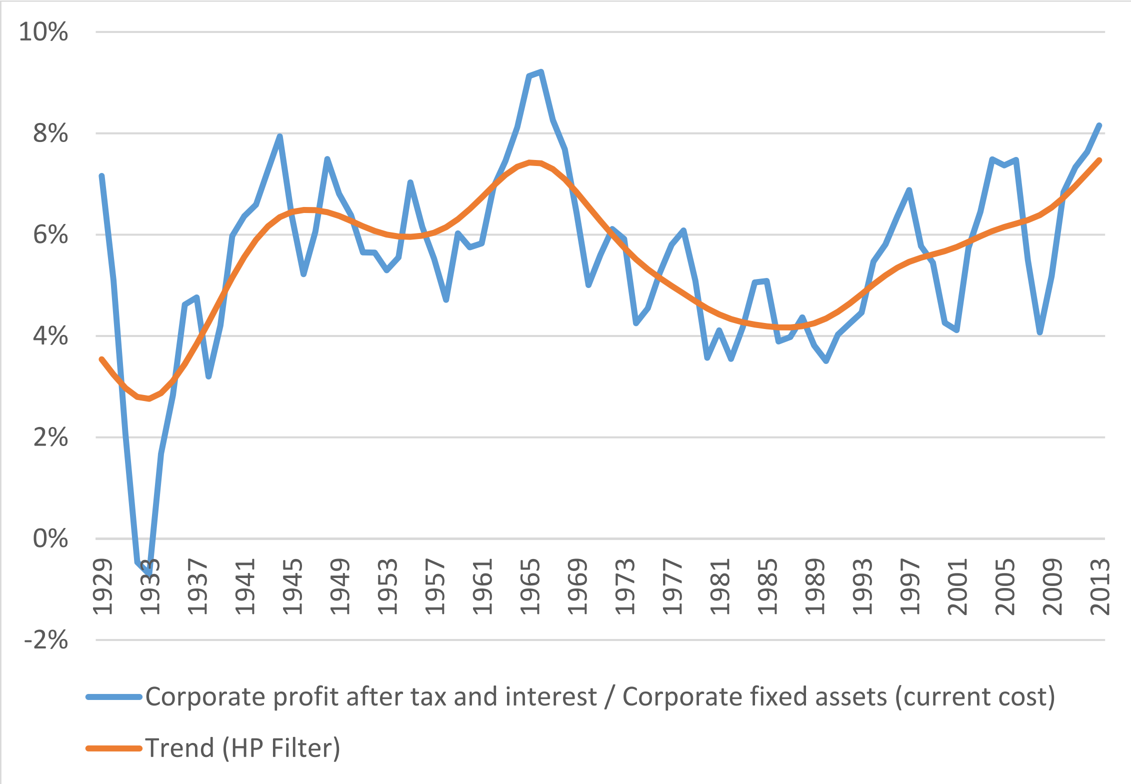
Basu and Vasudevan measure the US rate of profit using nearly all possible combinations of the methods listed above (and some others). They conclude

> [A]ll the measures display similar trends: there is a break in the declining trend in profitability in the early 1980s; the subsequent period is marked by either a trendless or a slowly rising trend in profitability. The only exception is a measure of the rate of profit that uses historical cost valuation for the capital stock and before-tax (both direct and indirect taxes), before-interest profit flow; this measure displays a secularly declining trend for the whole post-war period.
>
> The weight of evidence thus suggests clearly that the current crisis was not preceded by a prolonged period of declining profitability. In fact, the current crisis was preceded by a period of rising profitability, buoyed by favourable trends in both the profit share and technology. Capital productivity increased through the 1990s along with rising labour productivity and declining capital intensity. The tentative hypothesis provided here is that these favourable trends can be explained as the outcome of the specificities of information technology, globalisation and the global relocation of production, and the intensification of managerial control to enforce a steep increase in labour productivity.[271]

Determining trends in this way, by calculating linear trends between 'breaks' identified by the researcher, can be problematic.[272] Nevertheless, some of the measures of the rate of profit listed above *do* have an upward trend in the lead up to the Great Recession, even if we use a better method to calculate the trend. Figure 12 below gives the rate of profit calculated as the ratio of corporate profits after tax (and after-interest) to corporate fixed assets at current cost. It also includes a trend line calculated using a Hodrick-Prescott (HP) filter, which 'smooths' the data series to fit a polynomial function, making it easier to identify trends and inflection points.[273]

[271] Basu and Vasudevan, "Technology, Distribution and the Rate of Profit in the US Economy," 83.
[272] Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession*, 104–105.
[273] Hodrick and Prescott, "Postwar U.S. Business Cycles."

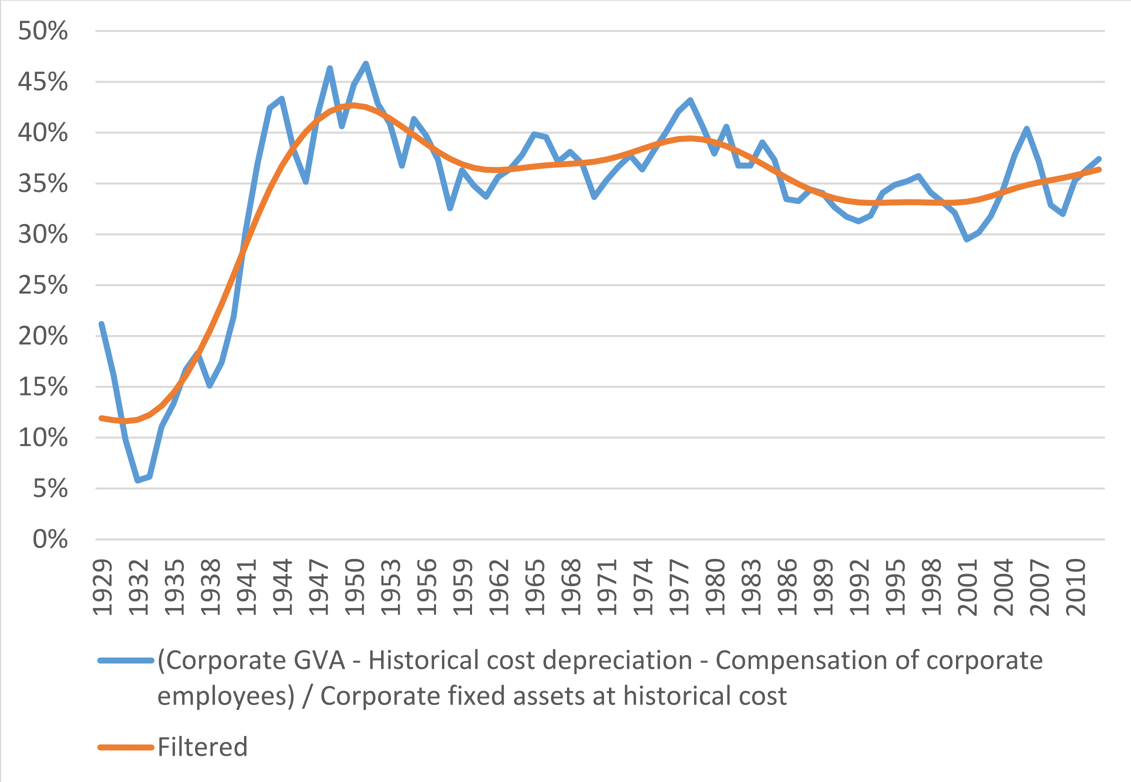
Figure 12: 'Narrow' current cost 'rate of profit'



After 1990 this 'rate of profit' becomes very volatile, though there does appear to be a rising trend.

At the other extreme, if we use a broad measure of 'profit' and corporate fixed assets at historical cost, then there is a clear downward trend during the 1980s and 1990s, and the rate of profit remains low in the lead up to the Great Recession. This is graphed in Figure 13 below. Yet even on this measure, there is no actual *decline* in the rate of profit in the lead up to the Great Recession; and, if anything, there is small upward trend during the 2000s.

Figure 13: Broad, historical cost 'rate of profit'

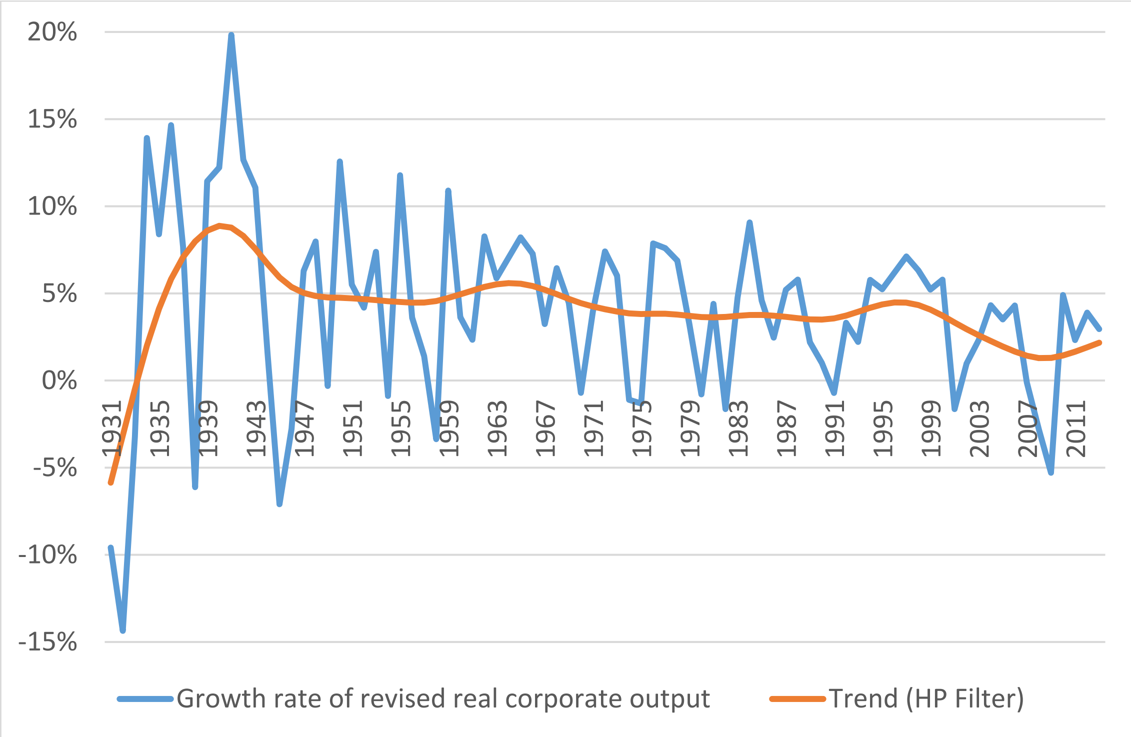


Different measures of the rate of profit such as these have been used to justify very different explanations of the crisis. One debate mentioned in chapters 1 and 2 is whether to use a historical cost or a current cost measure of fixed assets.

Duménil and Lévy, who use current cost measures of the rate of profit, argue there has been a significant divergence between the rate of profit and the rate of growth of real corporate output.[274] We can see this by comparing the trends in Figure 14 below and Figure 12 above.

[274] Duménil and Lévy, *The Crisis of Neoliberalism*, 152.

Figure 14: Growth rate of revised real corporate output



If this reflected a genuine divergence between the rate of profit and the rate of growth, it would be a surprising and interesting result. Duménil and Lévy argue this characterises a distinctively 'neoliberal' 'régime of accumulation', established in the US and elsewhere during the 1980s. They argue that, after WWII, a 'social democratic compromise' was established between the 'popular' and 'managerial' classes, which left the 'capitalist' class (which, for them, is basically equivalent to large shareholders) marginalised compared with other periods. This compromise was centred on:

> (1) a financial sector targeted to the growth of the real economy, and not to "administration" of capitalist collective interests as in neoliberalism; (2) a lesser concern vis-à-vis shareholders (that is, a management aiming at accumulation instead of capital income), low real interest rates, and a "not-too-performing" stock market; and (3) possibly diminished profits that would result from higher labour costs.[275]

[275] Ibid., 16–17.

For Duménil and Lévy, this class compromise broke down with the profitability crisis of the 1970s, and a new 'neoliberal compromise' was formed between the 'managerial' and 'capitalist' classes. Under this arrangement, corporate managers' remuneration became increasingly tied to their companies' share prices, which they boosted with higher dividend payouts at the expense of retaining profits to expand production. They argue this is why the rate of profit stayed relatively high (as they measure it), but the rate of accumulation and rate of growth of output were relatively low.[276] This is the main reason they characterise the Great Recession as a crisis of *neoliberalism* and financialisation rather than a crisis of capitalist production.[277]

Kliman, on other hand, uses historical cost measures of the rate of profit to argue that there was no divergence large enough to warrant this explanation: that, instead, the underlying cause of the Great Recession was the persistently low level of the rate of profit since 1970s. Thus, for Kliman, and for others who advance a falling rate of profit explanation, the financial crash of 2007-08 and the Great Recession which followed were expressions of a contradiction within capitalist production *itself*, not the fault of a particular *type* of capitalism.[278]

New Measures of the Rate of Profit

None of these measures of the rate of profit are good approximations of the rate of profit Marx's law is designed to explain. This thesis has set out two alternative types of measure of the rate of profit: ones based on surplus value after deducting unproductive expenditures, and ones based on profits from production. Both types can be calculated for the corporate sector and for the business sector as a whole, and profits from production can be calculated on a before- and

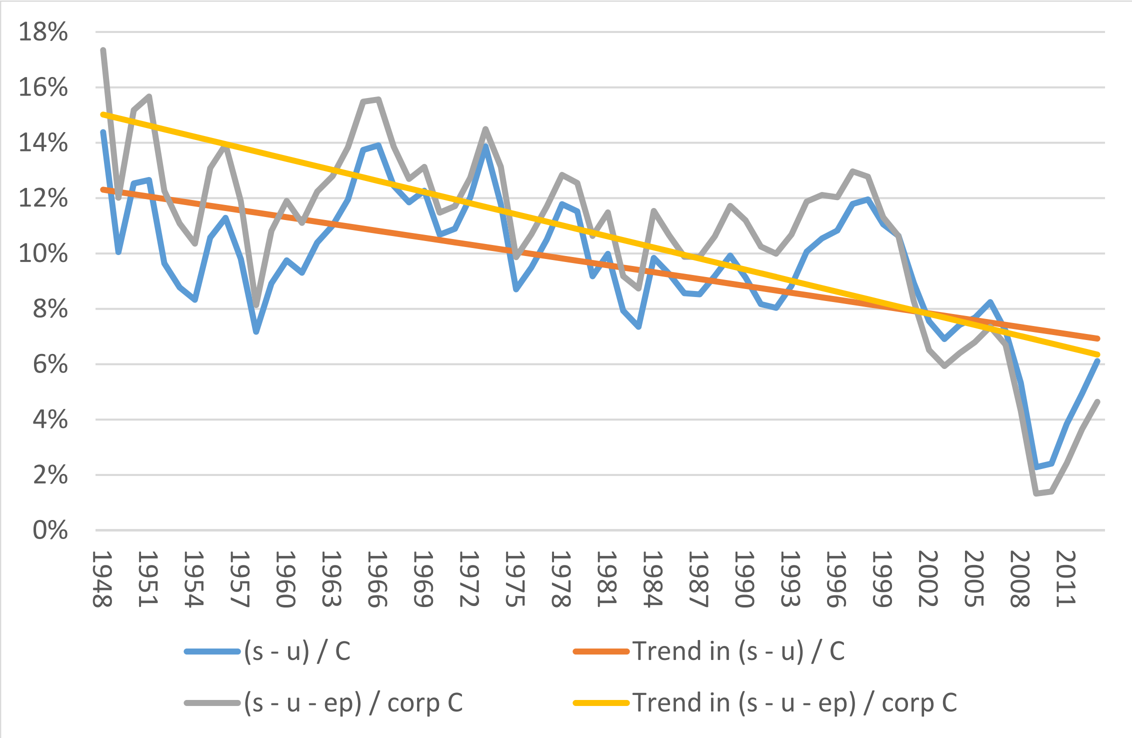
[276] Ibid., 152.
[277] Ibid., 22–26.
[278] Kliman, *The Persistent Fall in Profitability Underlying the Current Crisis: New Temporalist Evidence*; Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession*; Harman, *Zombie Capitalism*; Carchedi, "Behind and Beyond the Crisis"; Roberts, *The Great Recession*; Freeman, "The Profit Rate in the Presence of Financial Markets: A Necessary Correction," 2012.

after-tax basis. This gives six definitions of the rate of profit to measure. They are graphed in pairs in the three figures below. We can only calculate these six measures of the rate of profit accurately from 1947 onwards, since 1947 is the first year for which inventories data is published; but below we will also include some less reliable estimates for some measures from 1930 onwards.

Here we will focus on Marx's hypothesis that the rate of profit tends to decline in the lead up to economic crises, and recovers if and when sufficient capital is devalued or destroyed. Further below we will test Marx's hypothesis that the rate of profit tends to fall over the long term, using (less reliable) estimates of the US rate of profit stretching back to 1869.

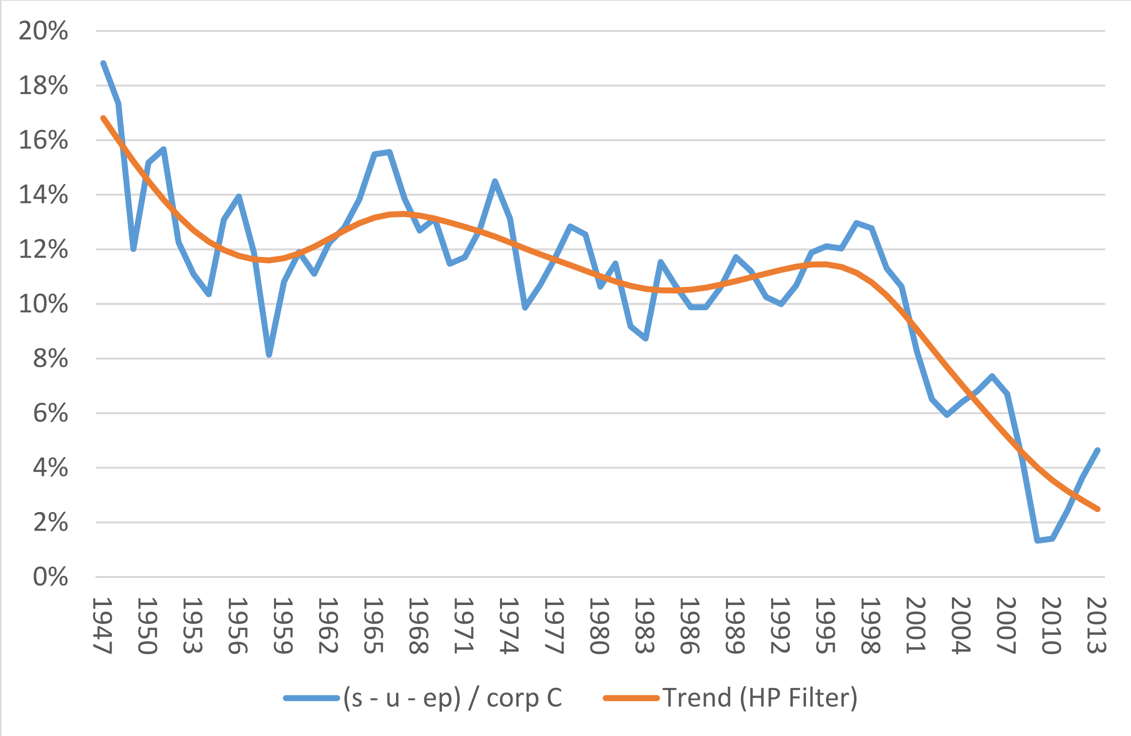
Figure 15 below graphs the two measures of the rate of profit most appropriate for explaining rates of accumulation: one for the whole business sector (with $s - u$ on the numerator, and produced capital for productive and commercial businesses on the denominator) and one for the corporate sector only (with $s - u - ep$ on the numerator, and produced capital for productive and commercial corporations on the denominator). Both measures have downward trends over the period as a whole, and the trend is more pronounced for the corporate sector. The R squared with the linear trend for the corporate sector measure is 0.55, and for the business sector as a whole it is 0.39. This is significant variation around the trend.

Figure 15: Rates of profit based on s – u *with linear trends*



We can visually identify 5 main inflection points: a declining trend from 1947-58, a rising trend from 1958-66, a declining trend from 1966-83, a rising trend from 1983-98, a declining trend from 1998-2010, and finally what looks to be a rising trend from 2010-2013 (but based on only three years of data). This is consistent with the results from applying an HP filter, graphed in Figure 16 (apart from the last possible trend). Most importantly, there can be little doubt that these measures of the rate of profit decline in the lead up to the two major periods of crisis: the crises of the 1970s and the Great Recession.

Figure 16: (s – u – ep) / corp C *with filter*



Both of these measures of the rate of profit also recover to a limited extent after the steep increase in interest rates in 1983 at the end of the crisis which started in the 1970s, and more substantially with the 'jobless' economic recovery starting in 1992. Both measures also recover when the Great Recession ends in 2010; and though by 2013 the recovery in these rates of profit is already as large as the recovery during the 1990s, this still leaves both measures of the rate of profit at below trend levels, and below their levels at the beginning of the recession in 2007.

The next pair of measures of the rate of profit are graphed in Figure 17 below. These are the rates of profit on production for the corporate sector before- and after- taxes and subsidies on production and taxes on corporate income. Again in both cases there is a definite downward trend across the period as a whole, but there are turning points around this trend. The R squared measure of correlation with the trend on the before-tax measure is 0.65, and on the after-tax measure it is 0.43. Until 2002 the main points of inflection appear to be mostly the same, sometimes one year earlier: 1958, 1967, 1982 and 1997. However, the steep decline in all four measures of the rate of profit after 1997 comes to a halt in 2002. Then until 2005 there is sharp increase in both measures of the corporate rate of profit on production, followed by a slight decline until the steeper decline once the recession starts. There is only a much smaller increase in the rates of profit defined in terms of $s - u$. This is discussed further below.

Figure 17: Corporate rates of profit on production

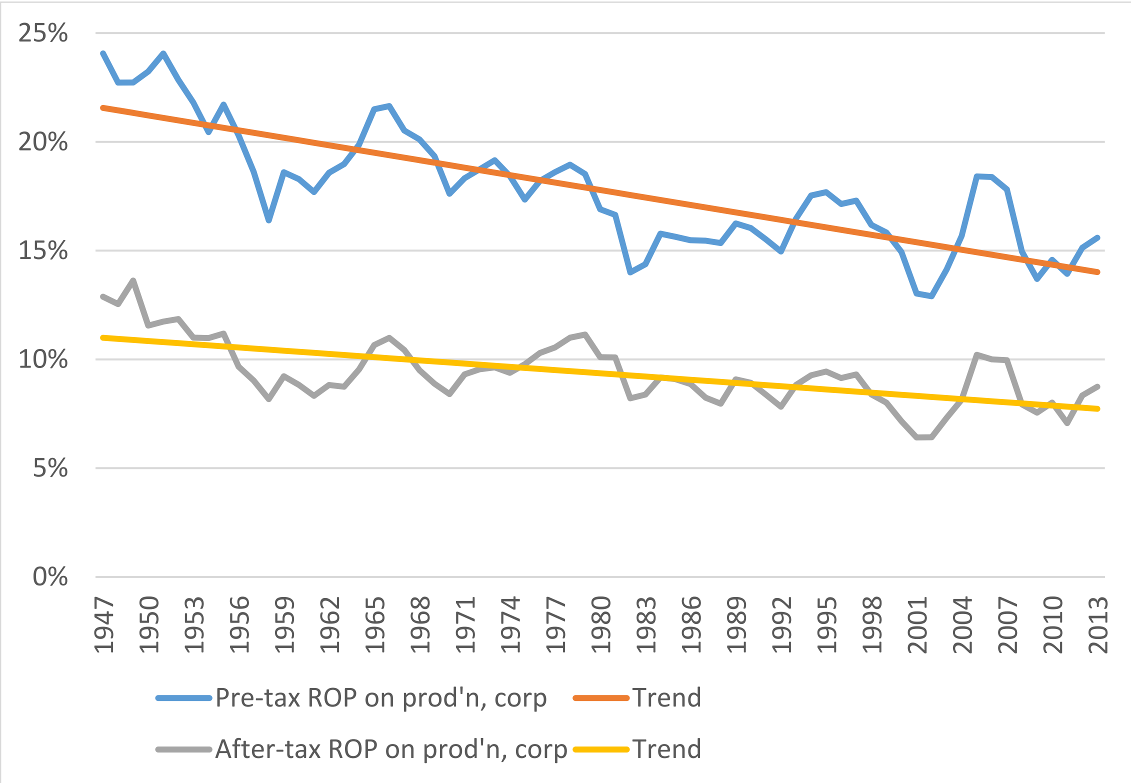
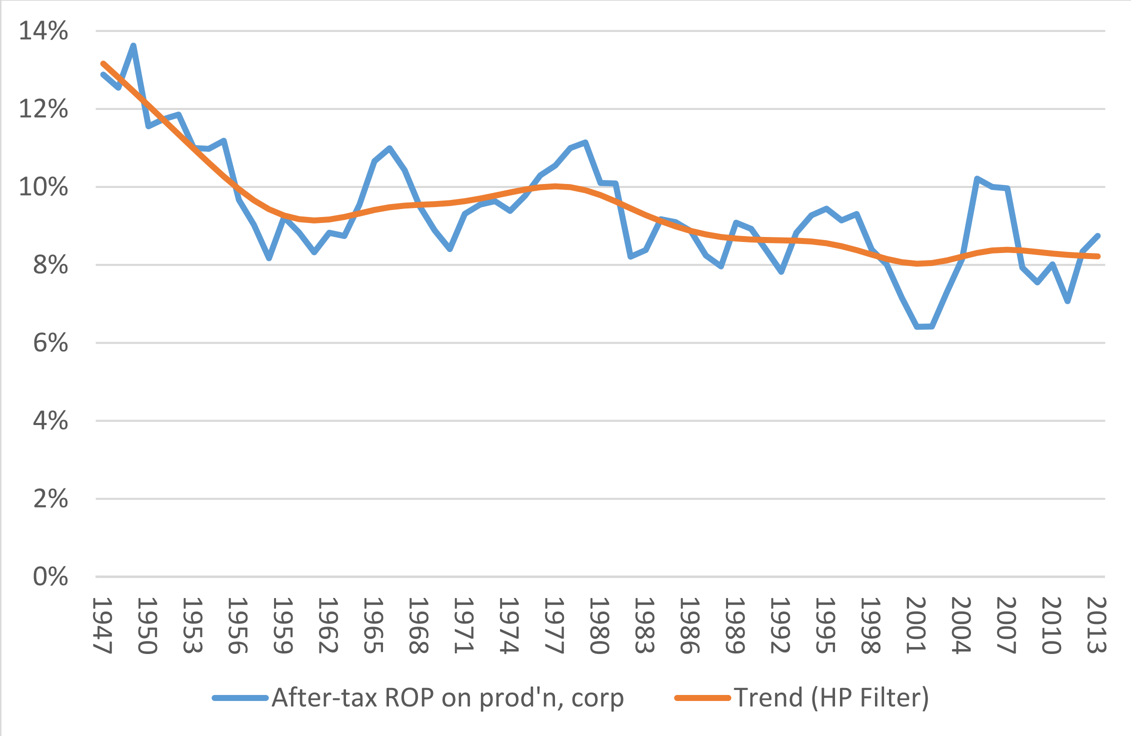


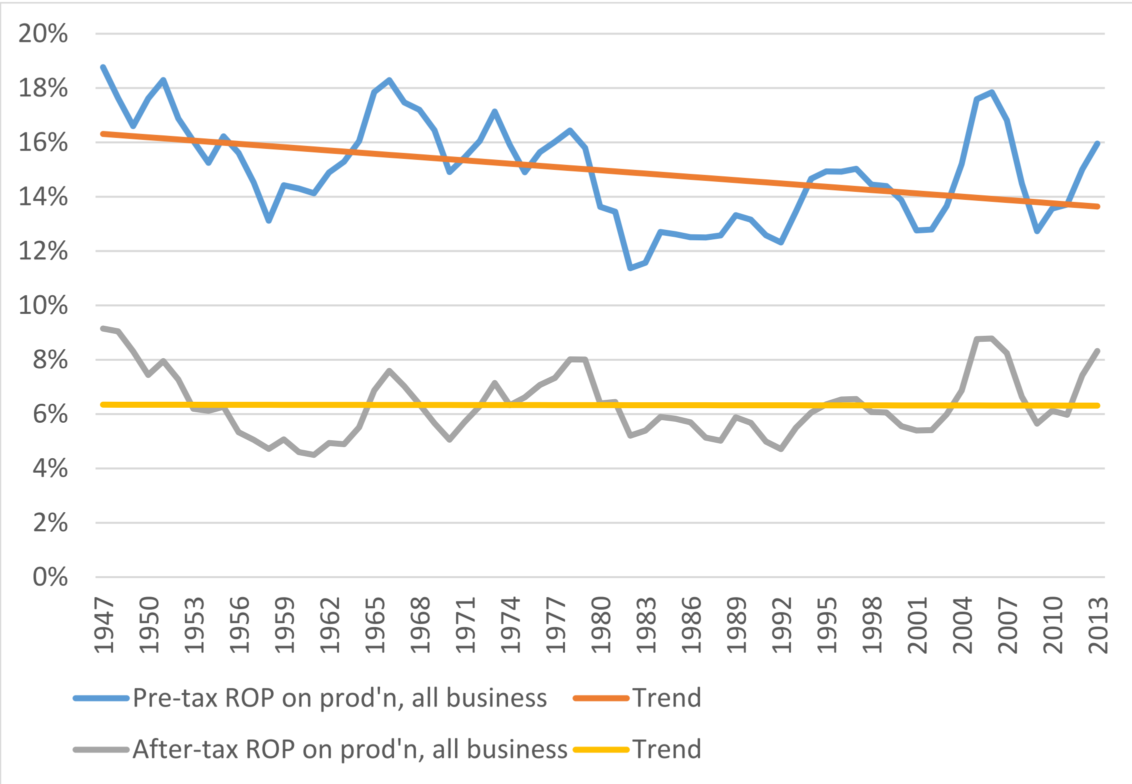
Figure 18: After-tax corporate rate of profit on production with filter



Next, Figure 19 below graphs the rate of profit on production for all businesses, before- and after-tax. These results are much less conclusive. They suggest at most a weak downward trend before-tax and no trend after-tax. In both cases the R squared correlation with the trend is near zero. But these measures are also much less reliable, since they rely on imputations for the 'wages' petty bourgeois producers 'pay themselves' (though, interestingly, this does not seem to make a large difference when comparing the two measures of the rate of profit based on $s - u$). The after-tax measure is particularly unreliable because, after subtracting taxes on production net of subsidies for all businesses, it only subtracts taxes on *corporate* business income. The personal taxes which proprietors pay on their 'profits' are not subtracted, because there is no easy way to measure this.

In retrospect the attempt to measure a rate of profit on production across the corporate and non-corporate sectors was probably misconceived. Theoretically, it is hard to justify combining these two sectors together because it is not clear whether there should be any tendency for the 'rates of profit' appropriated by petty bourgeois producers to equalise with other rates of profit (since, as mentioned in Chapter 4, proprietors depend on their business for their 'wages' as well as their 'profits'). However, measuring $s - u$ across the whole business sector remains important for calculating the average non-fictitious rate of return on individuals' capital and may also be important for explaining the rate of accumulation.

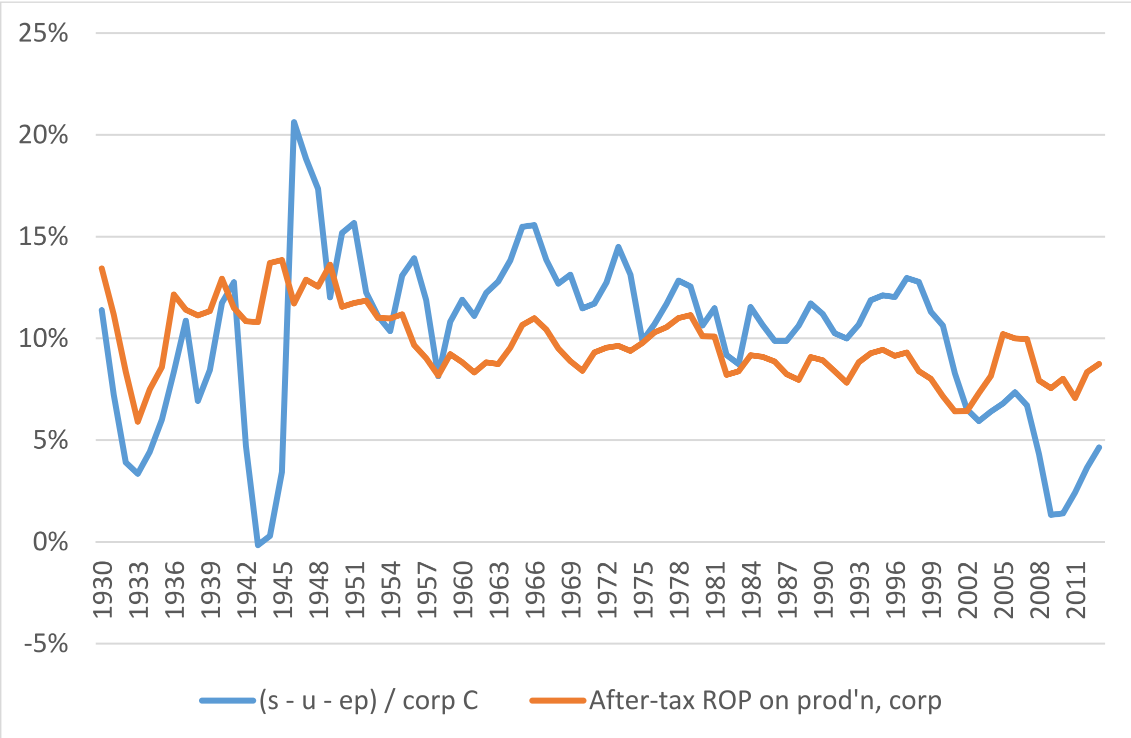
Figure 19: Rates of profit on production, all businesses



Finally, if we assume no change in the ratio of inventories to fixed assets from 1930-1946, we can extend our estimates of the rate of profit back to 1930. This is graphed in Figure 20 for the corporate sector defined in terms of $s - u$ and in terms of profits from production after-tax. As we would expect, there is a steep decline in both measures during the Great Depression, followed by a large recovery from 1933 until the end of WWII. The $s - u$ measure also falls dramatically but temporarily during the war, because much more surplus value is spent unproductively by the state, funded partly by borrowing. From 1943-44 it falls below zero, suggesting so much surplus value is spent unproductively that more than the entire value of output is spent on consumption for proprietors and wage earners and consumption and investment by the state. This does not imply there was zero (or less than zero) consumption and investment by capitalists, since this can also be funded by transfers of profit and borrowing from overseas.

Most importantly, these measures show rates of profit that reach comparable lows during the Great Recession and the Great Depression, helping to explain why these were economic crises of comparable severity.

Figure 20: Rates of profit since 1930, based on estimated inventories from 1930-46



These results strongly support the hypothesis that the rate of profit tends to fall in the lead up to major economic crises. This is arguably the most important aspect of Marx's LTFRP, since the main purpose of Marx's law is to explain crises. Measures of the rate of profit used by other

Marxists do not generally give the result that the rate of profit actually *fell* in the lead up the Great Recession, or that it fell to levels as low as those reached in the Great Depression.

The Rate of Profit, the Rate of Accumulation and the Rate of Growth

Another reason to measure the rate of profit is to see if it can explain movements in other economic aggregates that interest us, such as the rate of growth of output. Chapter 2 hypothesised that the rate of profit would influence the rate of growth through its influence on the rate of accumulation. The idea was that a falling rate of profit would provide less surplus value to invest (relative to the existing stock of capital), and hence slow the rate of accumulation. The slowing rate of accumulation would reduce the rate of growth of the capacity to produce real output, which in turn would reduce the actual rate of growth of output. Chapter 4 argued this was most likely to apply when the numerator of the rate of profit is defined as $s - u$.

This applies to trends over the medium- to long-term. In the shorter-term, the rate of growth of output can vary considerably as the rate of capacity utilisation changes. When economic conditions worsen, companies lay off workers, and so produce less real output using the existing stock of fixed assets and other capital. This causes a fall in the rate of growth independent of any decline in the rate of accumulation (though a decline in the rate of accumulation is also likely). Then, when conditions recover, growth can bounce back rapidly, even without any investment in new fixed assets, as companies re-hire workers and bring capacity utilisation back up to a higher level. If there is a sustained depression, then there might be a sustained period over which movements in the rate of accumulation are not similar to movements in the rate of growth.

First we will look at the relationship between the rate of accumulation and the rate of profit. Figure 21 does this for the corporate sector, and Figure 22 below it for all businesses.

Figure 21: Rate of accumulation vs rate of profit, corporations

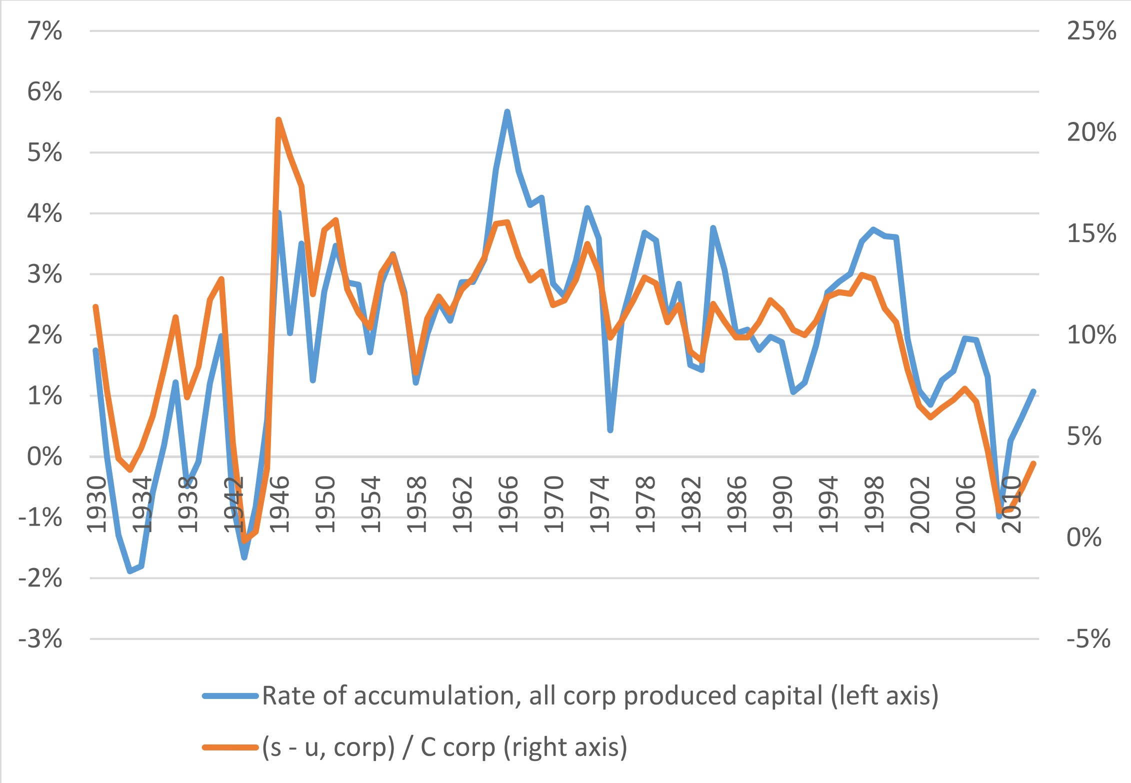
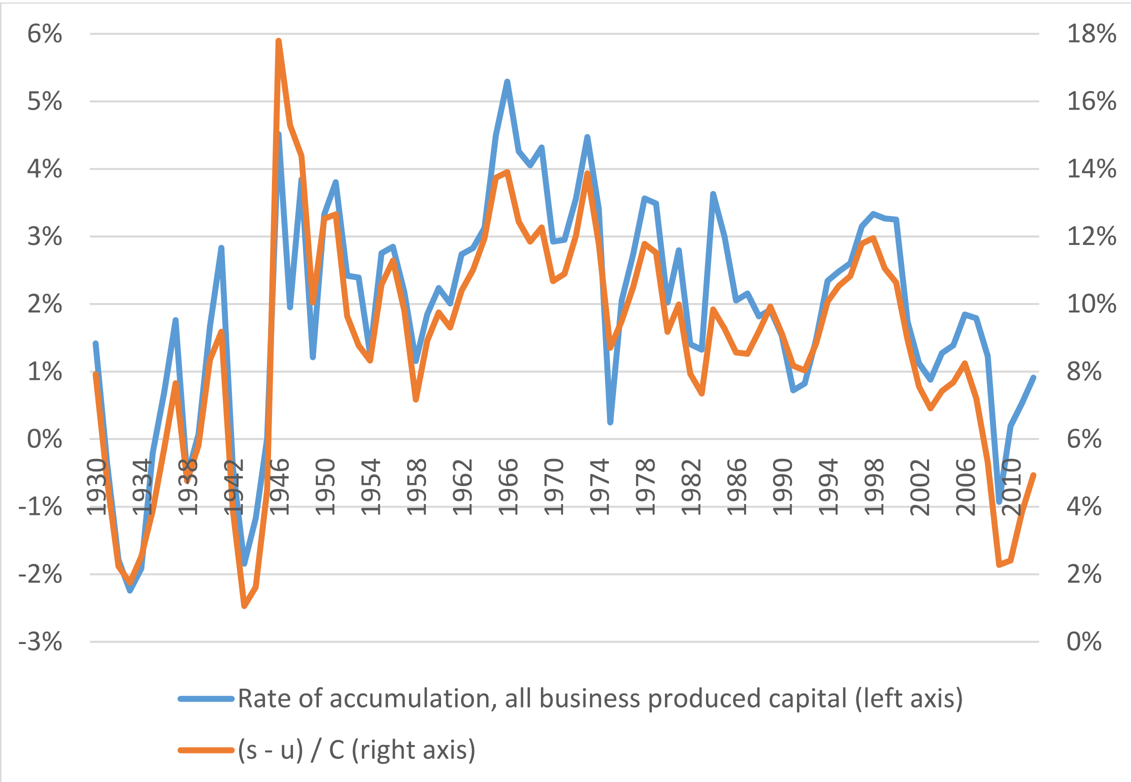


Figure 22: Rate of accumulation vs rate of profit, all businesses



Both relationships are quite close. The R squared coefficient of correlation between the rate of profit and the rate of accumulation for the corporate sector is 0.67, and for the business sector as a whole it is 0.85. Unlike standard measures of the rate of profit, these measures strongly indicate that the decline in the rate of accumulation after 2000 was due to the decline in the rate of profit from 1998 onwards. There is no evidence of a change in the 'willingness' of capitalists to invest the surplus value that was available for investment or for their personal consumption.

As mentioned, the relationship between the rate of accumulation and rate of growth of output is likely to be less close over the short-term. Figure 23 and Figure 24 below graph the rates of accumulation for the corporate and business sectors against growth in real revised output for the corporate sector and in general.

Figure 23: Rate of accumulation vs growth rate, all business

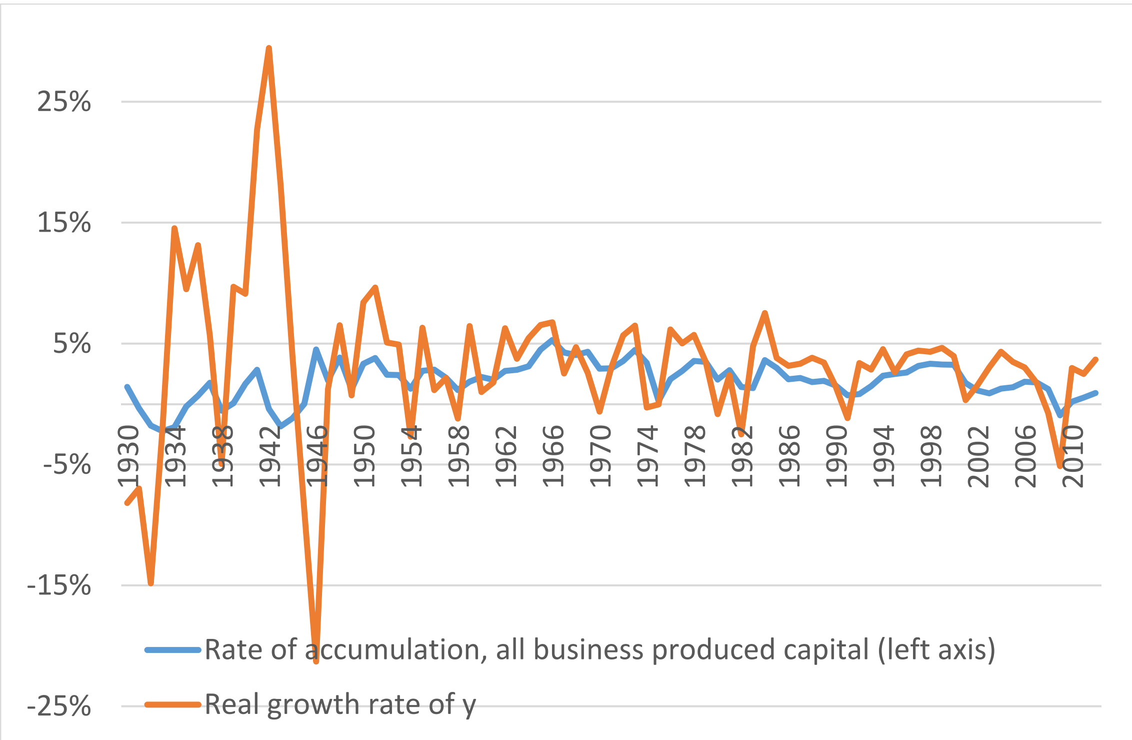
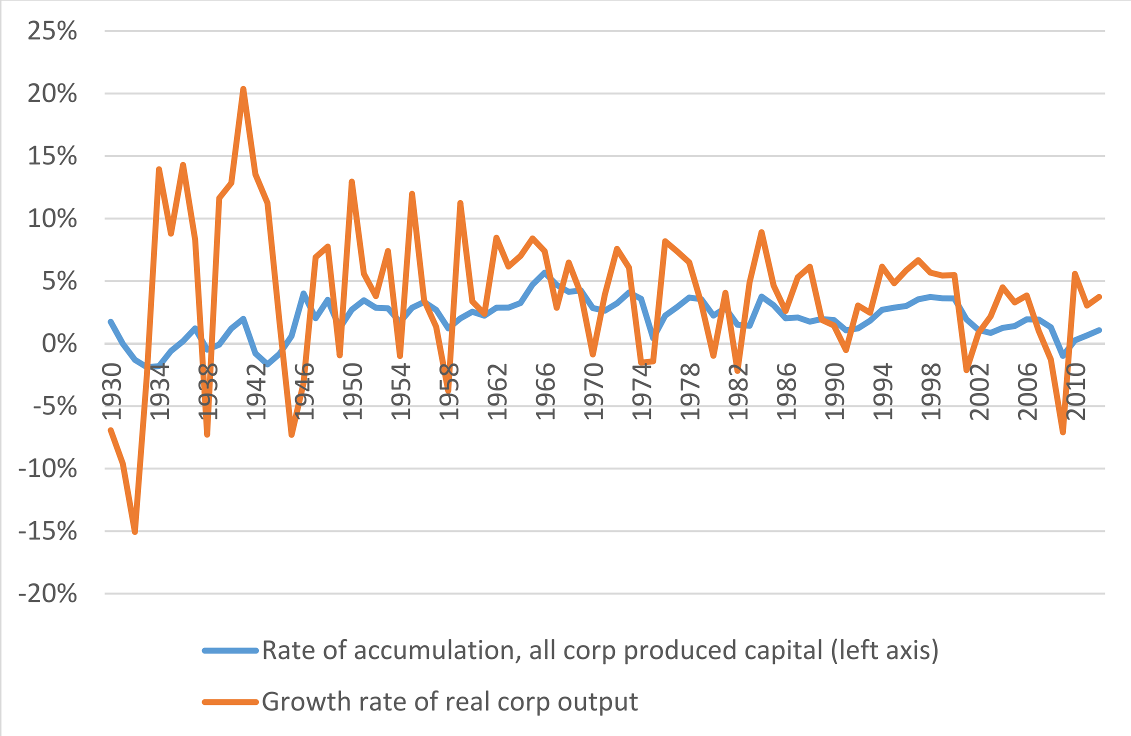


Figure 24: Rate of accumulation vs growth rate, corporations



In both cases the R squared coefficients are near zero, because the rates of accumulation are much less volatile than the rates of growth. However, the rates of accumulation do give reasonable indications of trends in the rates of growth, as we can see more clearly by comparing them with the rates of growth after applying an HP filter (with a smoothing value of 100, as used throughout).

Figure 25: Rate of accumulation vs filtered growth rate, all business

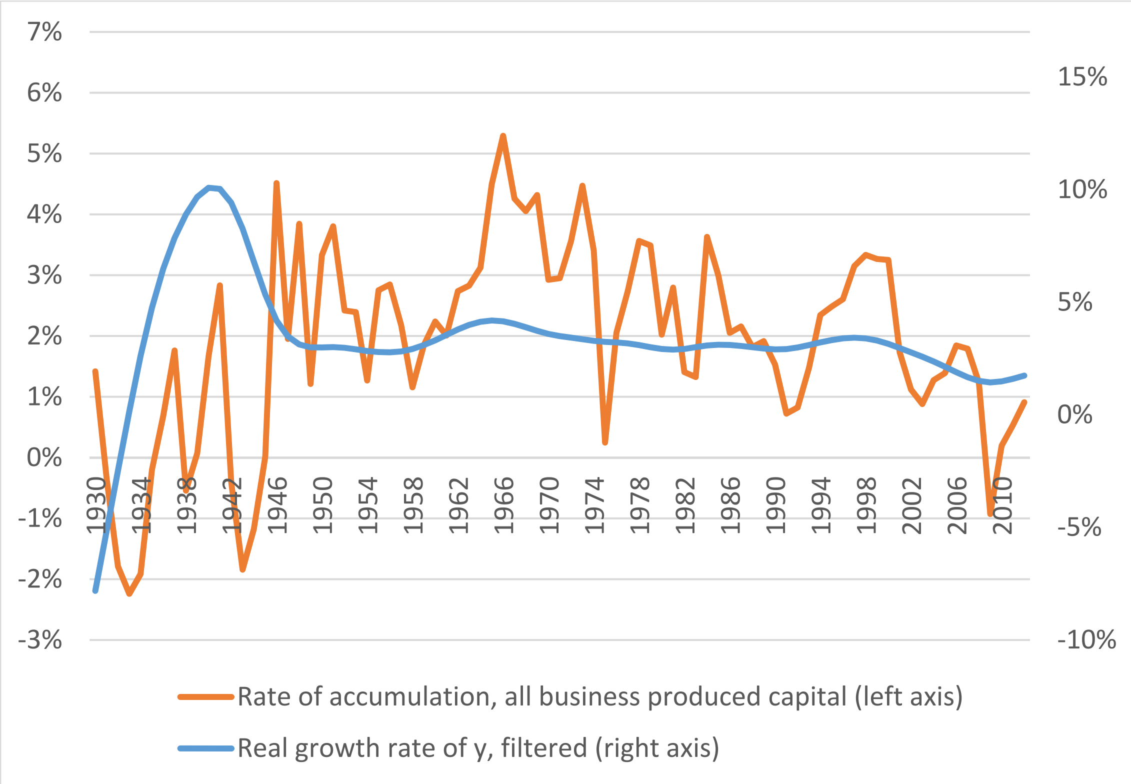
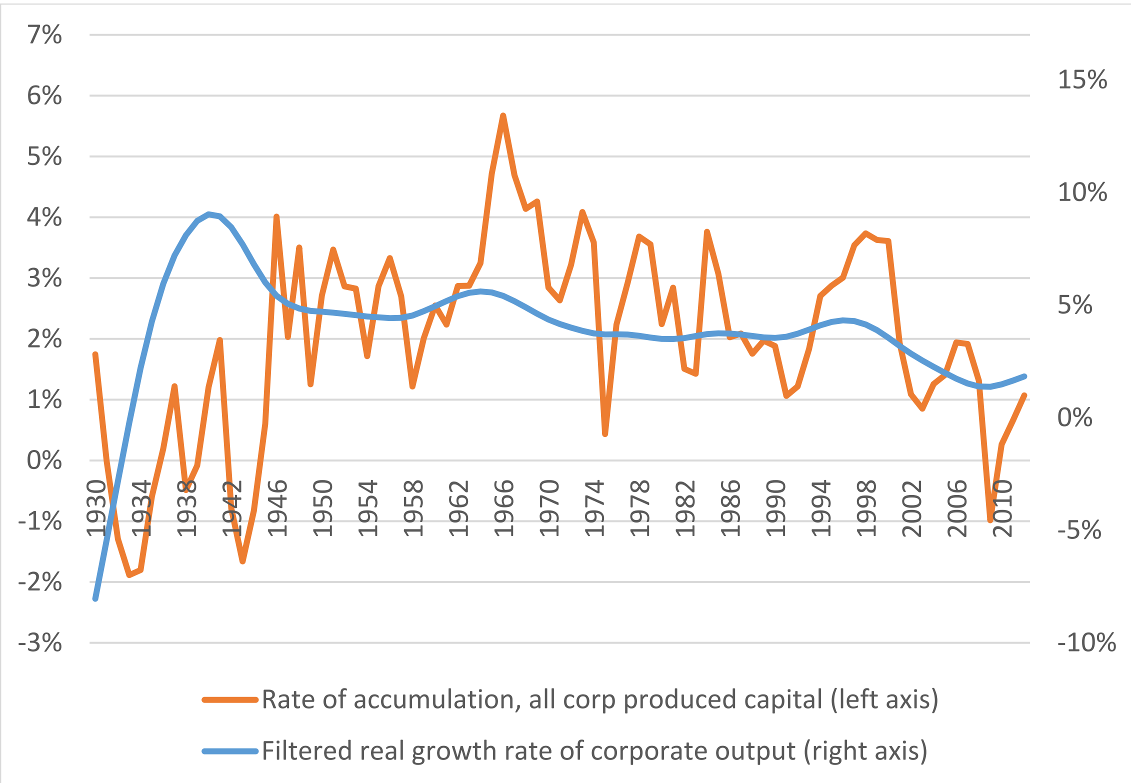


Figure 26: Rate of accumulation vs rate of growth, corporations



From the mid-1960s onwards the relationship between the two series is reasonably close, but before then, and especially before the end of WWII, the trends are quite different. It is likely that the Great Depression caused a very large fall in capacity utilisation, and so, during the recovery of the mid- to late-1930s, capacity utilisation increased by a correspondingly large amount back towards more 'normal' levels. This would account for the combination of a high rate of growth and a low rate of accumulation: the rate of growth was high, because there was so much idle capacity to be taken up, which also meant that firms could expand output without investing a great deal in new fixed assets.

So the hypothesis that the rate of accumulation and rate of growth have the same trend holds up reasonably well, except when there is significant unused capacity. One problem with the hypothesis is determining the direction of causation: is it that changes in the rate of accumulation lead to changes in the rate of growth, or *vice versa*? It is likely that to some extent there is a reciprocal relationship between the two; and, in the short-term, the results above suggest that changes in the rate of growth might 'lead' changes in the rate of accumulation.

Overall, we can say that the rate of profit defined in terms of $s – u$ eliminates the 'mystery' surrounding the relationship between the rate of profit, the rate of accumulation and the rate of growth of output. All three have similar downward trajectories over the post-war period, and leading up to the two major crises (the crises of the 1970s and the 2000s). The rate of profit on production also declines over the post-war period, though does increase sharply between 2002 and 2005.

The evidence therefore confirms a falling rate of profit explanation for the Great Recession. But does it fit with *Marx's* explanation for the falling rate of profit: i.e., *his* LTFRP? To answer this question, we need to look at *why* the rate of profit fell.

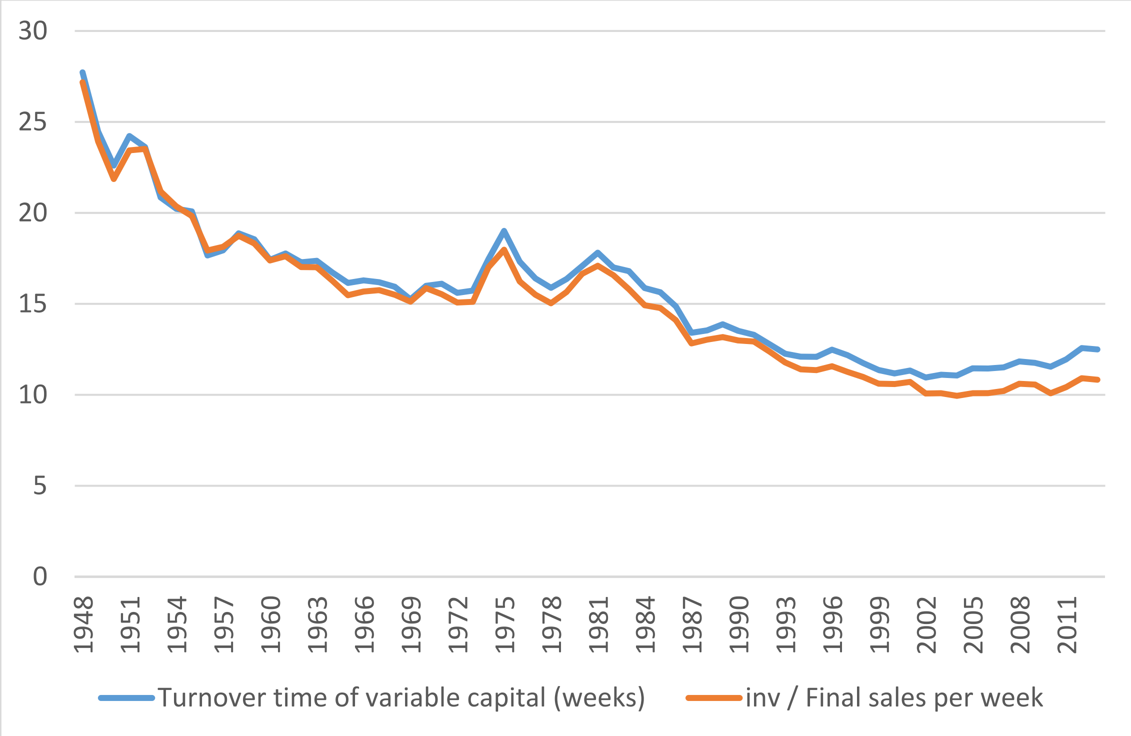
Why the Rate of Profit Fell

We have seen that the fall in the rate of profit was certainly *not* due to a fall in the rate of surplus value, which rises throughout the post-war period, and more than doubles from 1929 to 2013. On the other hand, this increased exploitation did not necessarily translate into profits, because spending on unproductive inputs also tended to increase. Marx's law does not focus on these issues. For him, the decisive influence on the rate of profit is the rising organic composition of capital. Was this the case in reality?

Turnover Time, the OCC and the VCC

As argued in Chapter 3, we cannot measure the OCC or its influence on the rate of profit without first trying to estimate the turnover time of variable capital. That chapter gave a method for estimating this, and argued the method should give similar results to dividing inventories by final sales. Figure 27 below gives estimates for the average turnover time of variable capital each year using both methods.

Figure 27: Turnover time

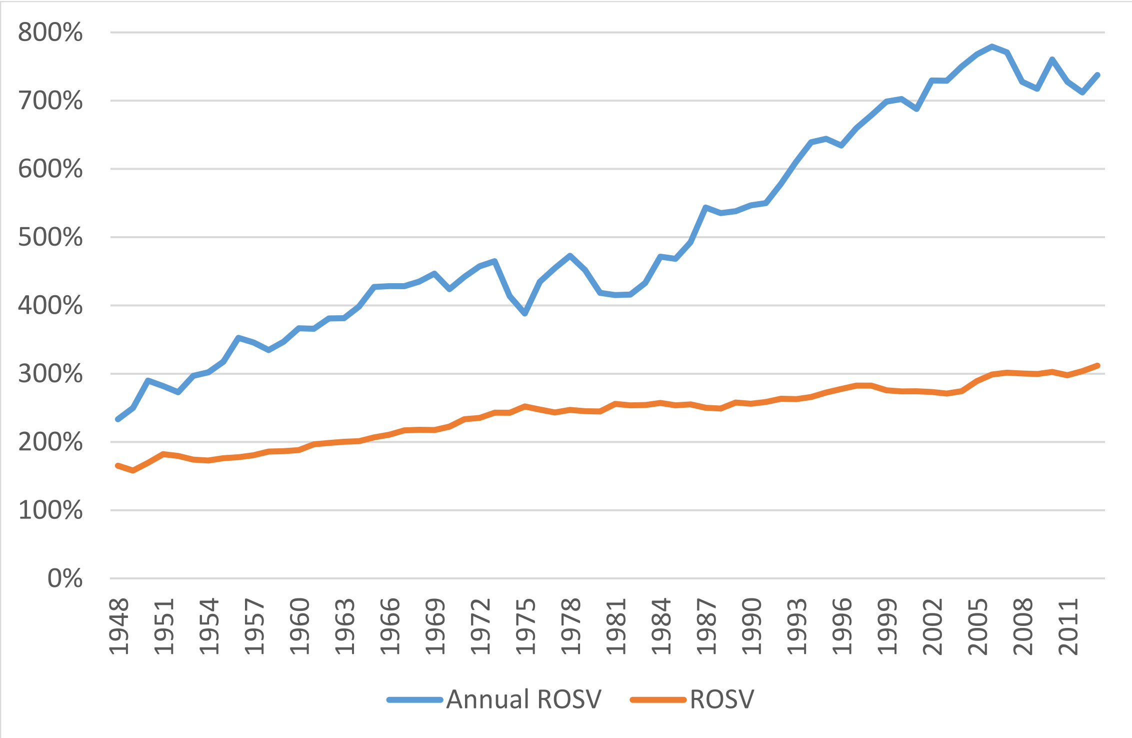


Four phases are evident: a phase in which turnover time shortened from 1948 to 1969; a period of volatility from 1969 to 1984; another shortening phase from around 1980 to 2004; and then a period in which turnover time increased a little until 2013. As we might expect, improvements in turnover time are associated with periods of expansion, when there is more investment in improving production and distribution techniques. During crises, turnover time also tends to increase due to the build-up of inventories. Importantly, across the post-war period as a whole, average turnover time declines by more than half, which fits with Marx and Engels' hypothesis that it tends to fall with the development of the forces of production.

Calculating turnover time also involves calculating the stock of variable capital 'tied up' in capital advanced, *v*, at the beginning of each year. First we will use this to calculate the *annual* rate of surplus value – the ratio of surplus value produced in the year, *s*, to the *stock* of variable capital, *v*.

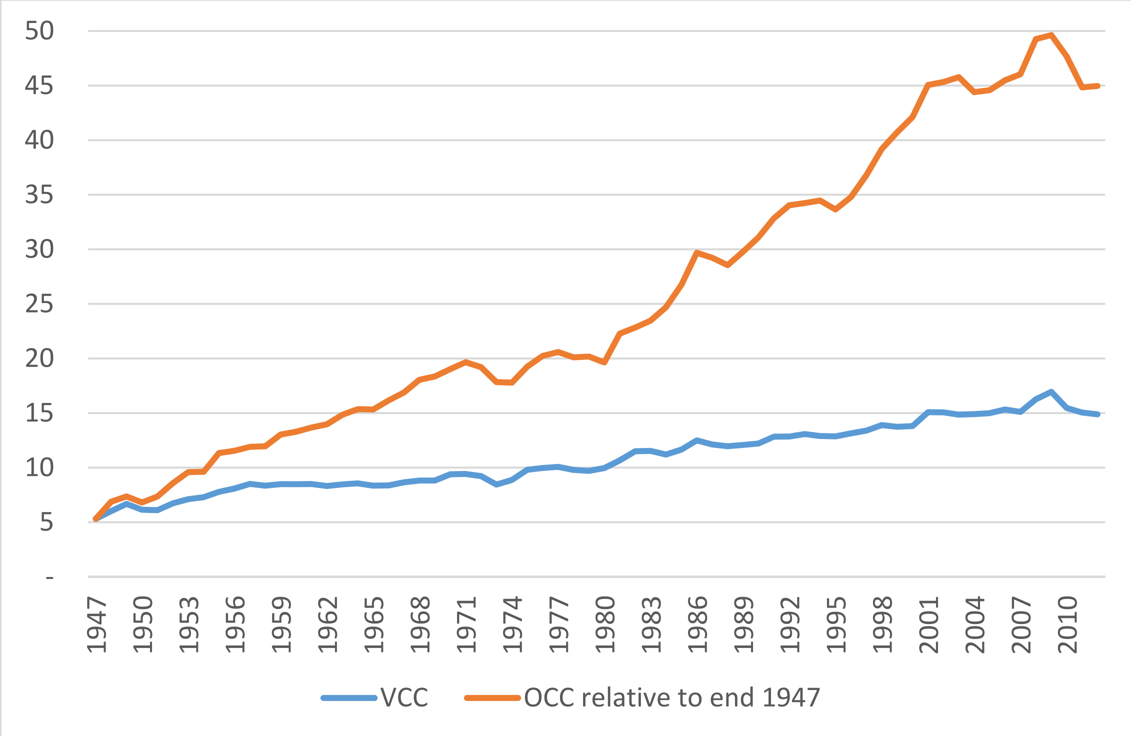
We can see from the graph below that the only significant periods during which the annual ROSV did not increase were associated with crises: 1969-82 and from 2007. It generally increased significantly faster than the actual rate of surplus value.

Figure 28: Annual rate of surplus value



Now to the value composition of capital (VCC) and the organic composition of capital (OCC). The VCC is the ratio of the stocks of constant to variable capital; the OCC is the VCC assuming no changes in prices. The OCC needs to be measured relative to a base year: here this is 1947.

Figure 29: The value and the organic compositions of capital

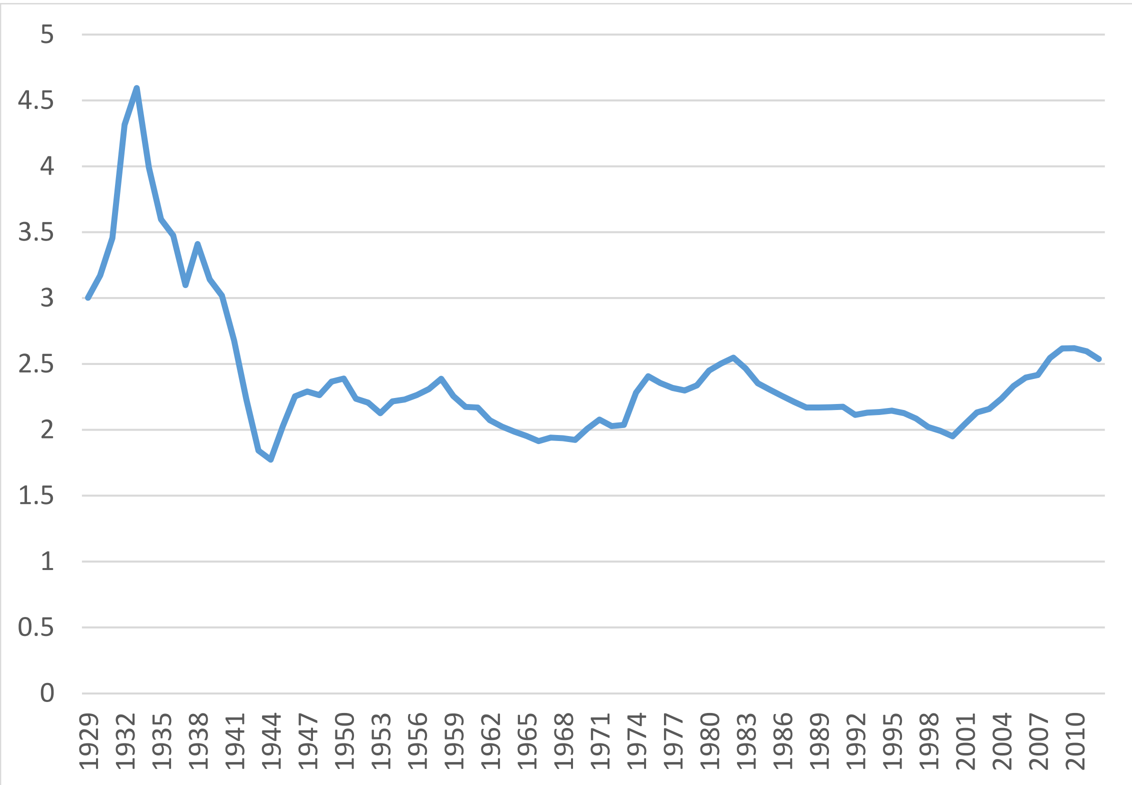


The results indicate strong tendencies for both the VCC and the OCC to rise. They both increase less rapidly during the post-war boom than during the 1980s and 1990s, which may help to explain the boom's longevity. However, during the two periods of crisis both were stagnant. Before the Great Recession, the VCC starts to stagnate from 2001, and the OCC from as early as 1999. This is around the time the $s - u$ rate of profit and the rate of accumulation fall dramatically, which makes sense: the decline in investment meant a slower growth in the ratio of dead labour to living labour.

As we would expect, the OCC rises faster than the VCC, reflecting the tendency for constant capital to be cheapened over time with improvements in productivity. Bear in mind however that, as discussed in Chapter 3, the method used here to estimate the OCC tends to over-estimate this difference, because when measuring the OCC it does not increase depreciation to account for the fact that the OCC excludes the effect of devaluation on the stock of constant capital.

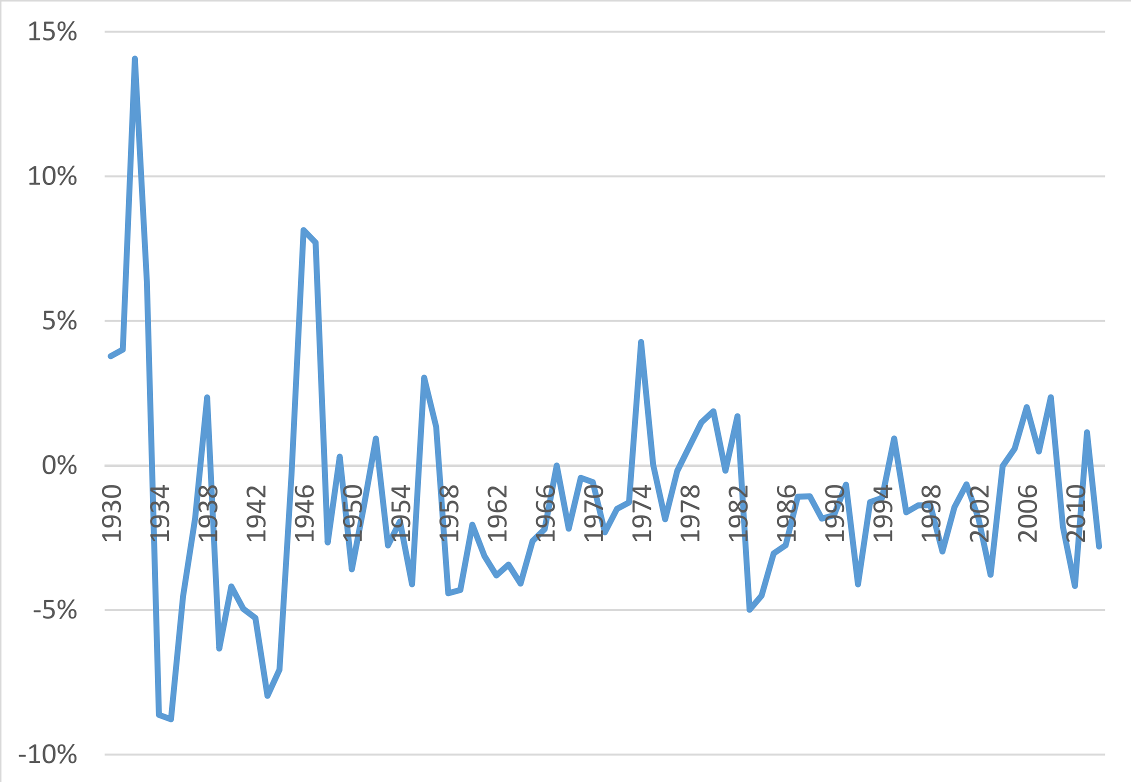
Compare this with a measure of the 'VCC' or 'OCC' as the ratio of corporate fixed assets to corporate compensation of employees. Here only the faintest trace of an increasing 'OCC' is evident over the post-war period, combined with long periods in which this 'OCC' actually declines. It also appears as though the 'OCC' was dramatically higher before WWII than for the entire period afterwards. If this were a true measure of the OCC or the VCC it would refute Marx's hypothesis that the OCC and VCC tend to increase as the forces of production develop (at least for the US) and hence Marx's LTFRP.

Figure 30: Corporate fixed assets / compensation of corporate employees



Let us now look at devaluation and revaluation directly. The graph below takes revaluation of productive fixed assets, as defined in Chapter 2, and divides it by productive fixed assets excluding that year's revaluation. So it is the percentage of the value of productive fixed assets that is gained through revaluation (or, if negative, lost through devaluation).

Figure 31: Revaluation of business fixed assets / business fixed assets before revaluation



First, we can see here the exceptionally high rate of devaluation from 1934-44 which, combined with disinvestment in net terms, lays the basis for the post-war boom. We can also see that there was a relatively high rate of devaluation in the early phase of the post-war boom, suggesting significant 'moral' depreciation through productivity improvements.

Also notice that when there is *re*valuation (i.e., when the graph is positive), this tends to be associated with recessions, and often precedes them. The spike in revaluation in 1930-32 occurs during the Great Depression; the spike in 1938 occurs during the recession of 1937-8; the spike from 1945-7 precedes the recession of 1949; the spike in 1956-57 precedes the recession of 1958; the spike in 1974 occurs during the recession of 1973-5; again the 1978-80 spike precedes the recession of 1980; there is revaluation during the 'tech wreck' of 2000-01; and there is an extended period of revaluation in 2004-08 before the Great Recession. This is likely to be registering the asset price bubbles which tend to occur before recessions.

On the other hand, larger than usual devaluation tends to occur immediately after or during recessions (with the exception of the high rate of devaluation during the post-war boom). When the devaluation is large, it tends to lead to periods of recovery. So after the recession of 1973-75, there was some devaluation in 1975-6, but not a large amount, and a recovery did not follow. However, after the early 1980s recession, there was a sharp devaluation of fixed assets in 1983-86, followed by a period of expansion. There was also devaluation in 2009-10, but not enough to make a great deal of difference to the value of the stock of fixed assets. The cumulative effect of revaluation from 2004 to 2012 was -2.4%, at an average of -0.3% per year. This is significantly less devaluation than the average rate of revaluation over the period as a whole (-1.1%), which helps to explain why the recovery from the Great Recession has been so sluggish.

Full Decomposition

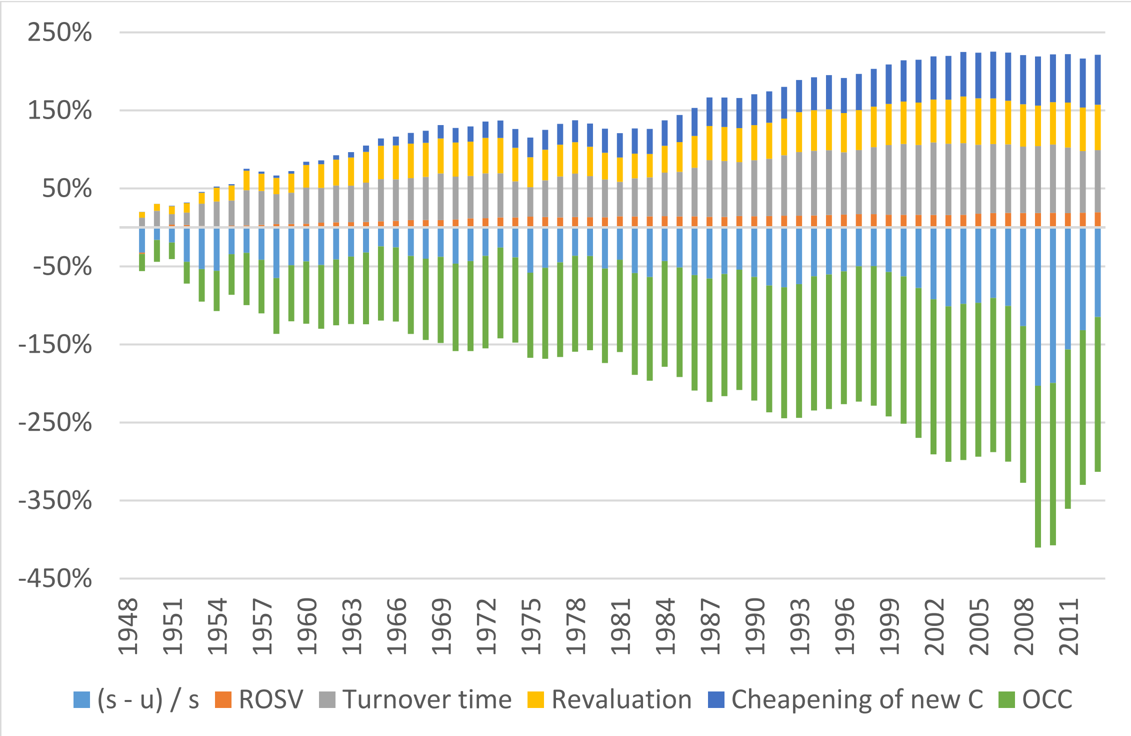
Now we are in the situation Marx reaches at the end of his chapter called 'The Law of the Tendential Fall in the Rate of Profit'. We have shown there has been a substantial, long-term tendency for the OCC and the VCC to increase; and so, as Marx puts it:

> If we consider the enormous development in the productive power of social labour… and particularly if we consider the enormous mass of fixed capital involved in the overall process of social production quite apart from machinery proper, then instead of the problem that occupied previous economists, the problem of explaining the fall in the profit rate, we have the opposite problem of explaining why this fall is not greater or faster. Counteracting influences must be at work, checking and cancelling the effect of

> the general law and giving it simply the character of a tendency, which is why we have described the fall in the general rate of profit as a tendential fall.[279]

Chapters 3 and 4 gave a method for separating out six influences on changes in the *s – u* measure of the rate of profit: the ratio of surplus value after unproductive expenditures to surplus value; the rate of surplus value; the turnover time of variable capital; revaluation of existing capital; the cheapening of newly produced capital; and the OCC. Figure 32 graphs the cumulative effect of each on *(s – u) / C* for the business sector as a whole.

Figure 32: Influences on (s – u) / C



The long-term effect of each on the rate of profit is as we would expect from Marx's theory. The OCC has the largest effect on the rate of profit, pulling the rate of profit down as it rises. The ratio of *(s – u)* to s also pulls the rate of profit down over time as it declines, as a result of increasing unproductive expenditures of surplus value, especially from 1997 onwards (as we

279 Marx, *Capital III*, 1981, 3:339.

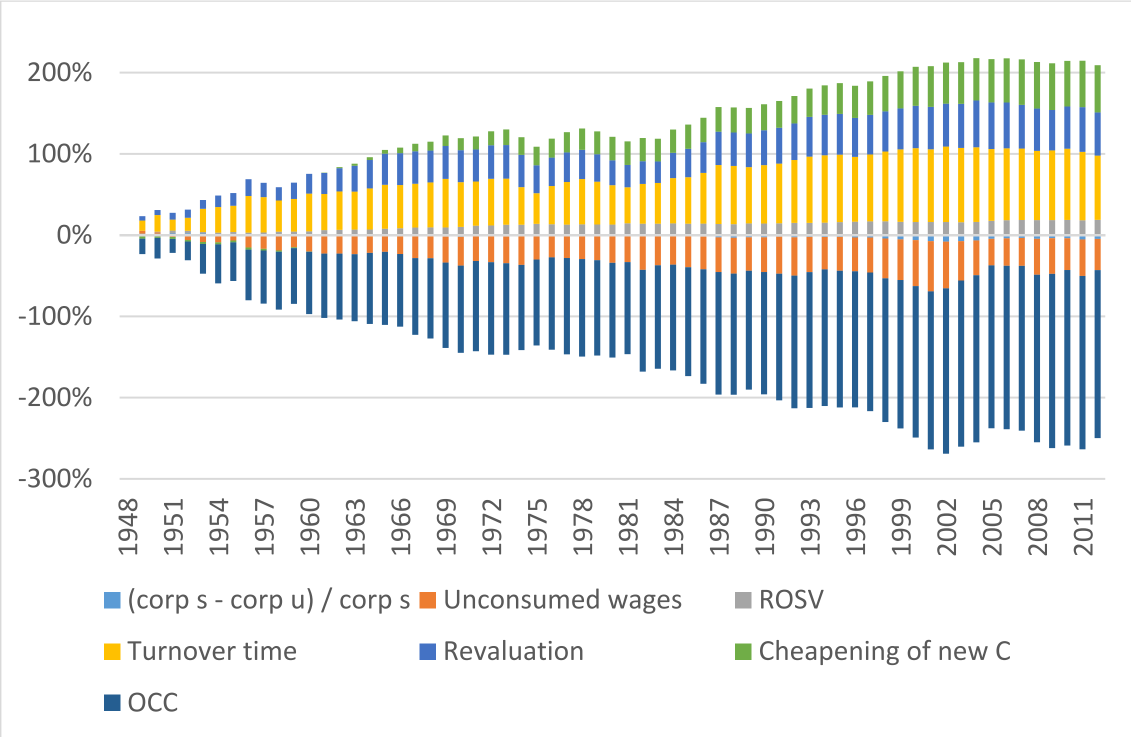
found earlier). On the other hand, the rising rate of surplus value, shortening turnover time, and the devaluation and cheapening of constant capital all tend to be counteracting factors to the falling rate of profit.

Overall, this fits remarkably well with Marx's hypotheses in *Capital*. First, there is a clear tendency for the organic composition of capital to rise, and this is the largest influence on the rate of profit. Second, there is also a clear tendency for the rate of surplus value to rise, but its effect on the rate of profit is much smaller than the rising OCC. Third, the other potential counteracting factors considered here do in fact tend to exert upward pressure on the rate of profit. Fourth, these counteracting factors operate in the way Marx describes them, in that they do not eliminate the tendency for the rate of profit to fall, but counteract it to some extent.

The only aspect of this analysis which Marx does not identify so clearly is the tendency for $(s - u) / s$ to decline over time. These results suggest the decline of this ratio from 1997 due to higher unproductive outlays was the most important *immediate* cause of the fall in the rate of profit leading up to the Great Recession. But over the longer-term the rising OCC has been the most important reason for the fall in the $s - u$ measure of the rate of profit.

Let us see if we get similar results from decomposing movements in the corporate before-tax rate of profit on production. This is graphed in Figure 33 below.

Figure 33: Influences on the corporate pre-tax rate of profit on production



Here the effect of the rising OCC on the falling rate of profit is even clearer. We can also see that the reason for the increase in the rate of profit in the early 2000s was mainly due to a fall in the difference between wages paid to productive workers and the value of their labour power; i.e., an increase in the proportion of wages spent on consumption. As we saw above, this was mainly due to the effect of the Bush tax cuts on disposable personal income. In so far as these tax cuts affected compensation for employees of non-financial corporations, they made it possible for these employees' after-tax pay to increase without winning raises from their bosses.[280] This explains around 72% of the 5.5 percentage point increase in the pre-tax corporate rate of profit on production between 2002 and 2006. The tax cuts therefore had roughly their intended result:

[280] However, as mentioned above, the Bush tax cuts disproportionately benefited people on higher incomes. This makes no difference to our results for the pre-tax corporate rate of profit on production, since that is based on subtracting *pre*-tax employee compensation, not after-tax compensation. But it is likely to make a difference to the extent to which we attribute the increase in the rate of profit from 2002 to the effect of a change in the difference between the price and value of labour power and the extent to which we attribute it to an increase in the rate of surplus value (however there is also the difference between the true and the estimated rates of employees' saving to consider).

even insofar as the *incidence* of the tax cuts applied to workers' incomes, their *effect* appears to have helped business and the rich generally, and possibly helped to delay the onset of recession, by allowing pre-tax wages to stagnate.[281] But since the tax cuts mostly did not correspond to reductions in government unproductive expenditures, and were instead deficit-financed, they contributed to the general build-up of fictitious capital relative to genuine capital in the lead up to the recession, as we will see further below. That is, the boost they gave to profits from production through government borrowing was fictitious.

The Rate of Profit and Financial Rates of Return

Chapter 7 theorised the relationship between the rate of profit and financial rates of return. The main idea was that the net stock of financial assets (or 'fictitious capital') owned by individuals is generally larger than the stock of produced capital over which it is a claim. This means that the average non-fictitious rate of return on financial assets is generally lower than the s - u rate of profit. The difference between the stock of fictitious and genuine capital is the result of the past accumulation of fictitious profit; and if enough fictitious profit is produced, then the actual rate of return on financial assets can be higher than the non-fictitious rate. The production of fictitious profits is essentially the result of share market traders and property investors bidding up prices of financial assets and land, but government borrowing can also push after-tax profits on production above non-fictitious profits and create additional fictitious capital.

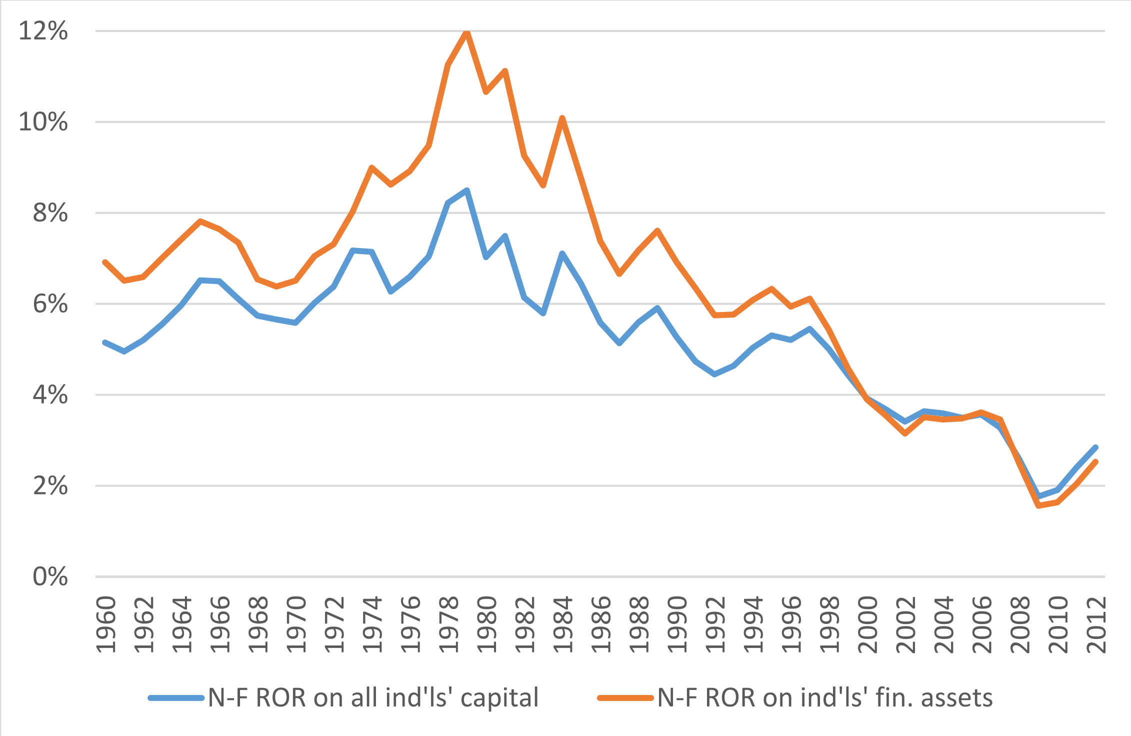
This is an inherently unstable process. Even assuming $(s – u) / C$ remains constant, as fictitious profits accumulate the non-fictitious rate of return declines. If the accumulation of fictitious profit leads yields to fall far enough, this may trigger investors to sell financial assets at lower prices. Alternatively, a sell-off may be triggered by a falling underlying rate of profit and the

[281] This does not mean workers would have been better off without the tax cuts that applied to them, since it is possible that without them their after-tax real wages would have fallen.

effect this has on earnings. Either way, this puts the process into reverse: average rates of return on financial assets fall (though yields may rise), and potentially plummet, as investors sell their financial assets at lower prices. Real investment may also collapse, and to a lesser extent consumption spending, as investors and consumers hoard 'cash' to try to protect their savings. The fictitious losses this creates destroy fictitious capital, which may lead to a recovery in yields and in the non-fictitious rate of return once businesses are able to sell enough of their output. However, if the non-fictitious rate of profit is low, and the crisis does not lead to enough devaluation of actual capital for the rate of profit to recover, then the recovery will be long and drawn out.

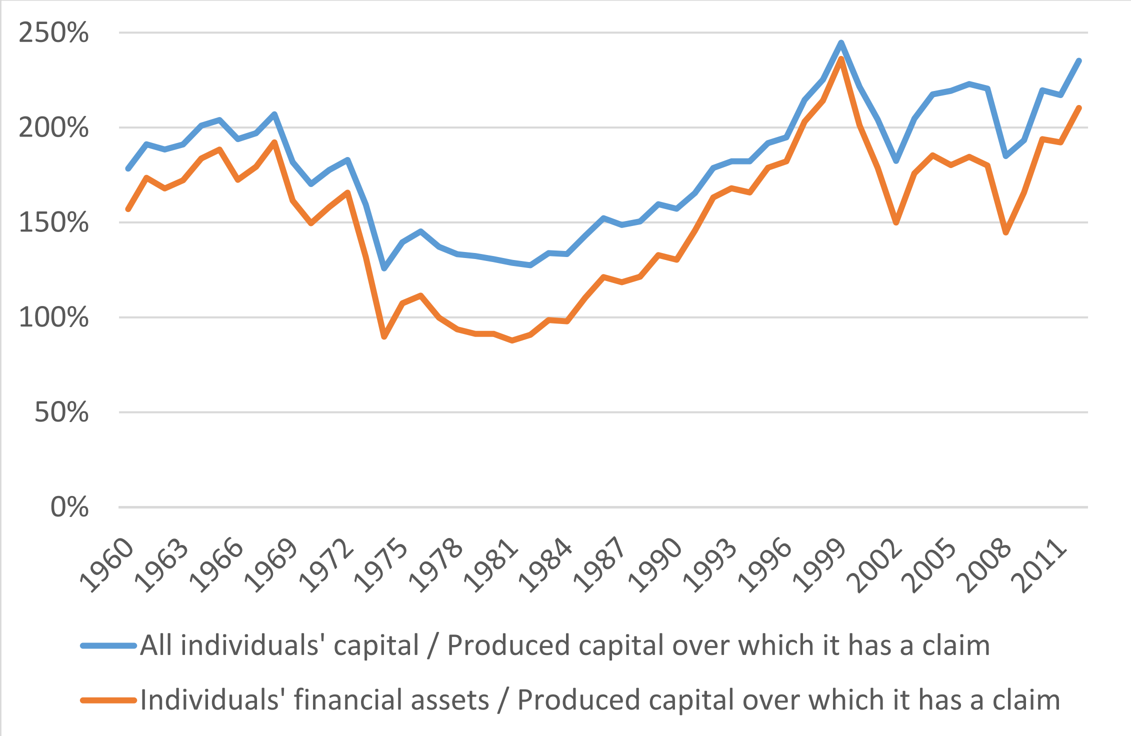
How well do the data fit this theory? The data we need (the Integrated Macroeconomic Accounts) only stretch back to 1960, but fortunately this covers the two major crises of the post-war period. The first graph below gives two measures of the average non-fictitious rate of return on individuals' capital, one including equity in the non-corporate sector (which includes investments in rental housing) and one excluding it. These are the non-fictitious rates of return on all individuals' capital and on individuals' financial assets respectively.

Figure 34: Non-fictitious rates of return on individuals' capital



We can see here one major difference between trends in these rates of return and the non-fictitious measures of the rate of profit: after the 1970s, there is a major recovery in the rate of return on individuals' fictitious capital, whereas the underlying rate of profit continues to fall. This is because, as Figure 35 shows, the crises of the 1970s destroyed a large chunk of fictitious capital, without any major devaluation or destruction of genuine capital (i.e., the ratio of individuals' capital to produced capital declined). A more significant devaluation of genuine capital did occur in the early 1980s (leading to an increase in the ratios), but it was never enough to allow the non-fictitious rate of profit to recover.

Figure 35: Ratios of produced capital to fictitious capital



In 1974 and 1981, the ratio of individuals' capital to actual capital briefly approaches one: i.e., the value of the total claims on produced capital (and land) comes close to the current market value of the produced capital over which it is a claim. The ratio of financial assets to produced capital over which they are a claim falls below one. Note that this does not mean that the value of financial assets is below the value of *all* the assets over which it is a claim, because businesses own many assets which are not produced capital, such as land. The fall in these ratios was due to the considerable destruction of fictitious capital which occurred over 1973 and 1974. In nominal terms, this devaluation was not large: by the end of 1974 the nominal value of individuals' capital was only 1% smaller than at the end of 1972. But due to inflation, in MELT-adjusted terms it fell by 16%. This inflation had the opposite effect on the value of produced capital, in MELT-adjusted terms: there was a sharp upwards revaluation, and its value *increased* by 16%. This is probably because the high rate of inflation created an incentive to hold produced assets directly, since their prices tend to increase with the general rate of inflation. On the other hand, financial assets, especially those which are claims over debt, tend to be devalued in real terms by inflation because it reduces the value of debt in real terms. The relatively low ratio of individuals' capital to produced capital persists until the 'Volcker shock' brings down the rate of inflation through very high interest rates.

There follows a long period during which the non-fictitious rate of return declines, due to a build-up of fictitious capital relative to produced capital. This happens despite the gradual increase in the underlying rate of profit from its low in 1983. This process of the production of fictitious profit becomes significantly more rapid after 1996, and the ratio of fictitious to real capital peaks at the end of 1999. The 'dot com' crash which follows involves a sharp devaluation of fictitious capital, comparable to the devaluation of the early 1970s. But this does not go far enough to allow the non-fictitious rate of return to recover. It remains stable and low until the Great Recession. During the recession itself it falls even further, before recovering a little with the beginning of the recovery.

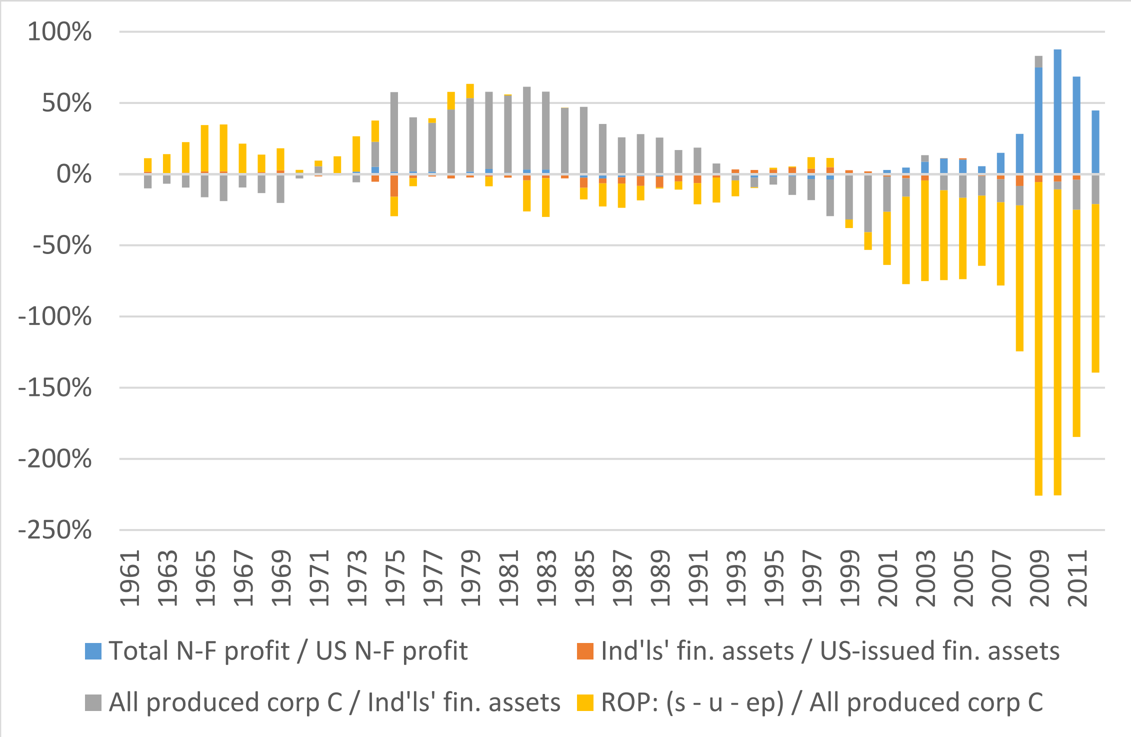
Interestingly, the ratio of fictitious to real capital falls less far during the Great Recession than during the early 1970s and the dot com crash. This is not explained by the fact that the property market fell by a large amount relative to the fall in the stock market, since the ratio of individuals' capital to produced capital incorporates the value of rental property. If the primary cause of the Great Recession was the financial and property market crisis, then why did financial and property markets not fall further? And when financial markets had recovered by 2011, why was the recovery in growth that accompanied it so sluggish? The financial and property market crash was clearly a *catalyst* for the Great Recession, but the fall in the underlying rate of profit is a much more plausible explanation for the recession, the crisis that triggered it, and the slow recovery afterwards.

In general, movements in the rate of profit defined in terms of $s - u$ give some indication of devaluations in fictitious capital relative to genuine capital. The three major devaluations since 1960 start in 1973, 2000 and 2008. In all cases these came during periods in which the underlying rate of profit had already begun to decline. However, they were not all *triggered* by declines in profitability: at least, not so far as we can tell using annual data. In particular, most measures of the rate of profit reach a small local maximum in 1973, though as part of what is clearly a broader downward trend. Nor is the devaluation of fictitious capital necessarily associated with a prior decline in the non-fictitious rate of return, which also increases between 1972 and 1973. Even the Great Recession was not *immediately* preceded by a significant fall in any measures of the rate of profit; the largest falls preceding it occurred between 1998 and 2003.

This is probably partly, perhaps mostly, explained by the Federal Reserve's conscious decision to keep interest rates 'artificially' low, and the effect of the Bush tax cuts, which together increased the incentive for investors to buy property and other riskier assets, and made more income available to the rich. These policies were responses to the underlying weakness in the rate of growth and in particular in investment, which was a result of the low rate of profit. If rates of investment and growth had returned to more 'normal' levels, no doubt the Fed would have allowed the interest rate to rise.

Finally, the decomposition below makes clear that the overwhelming reason for the decline in the non-fictitious rate of return after 1998 is the decline in the underlying rate of profit. Also note that after 2006 net foreign transfer payments (and in particular net foreign-sourced income) become an increasingly important source of non-fictitious profit. This is probably because, with the decline in the mass of non-fictitious profit produced domestically due to the Great Recession, financial profit appropriated from other countries becomes relatively more important. Net foreign sourced income also grows considerably in absolute terms. This may be worth investigating further in other work.

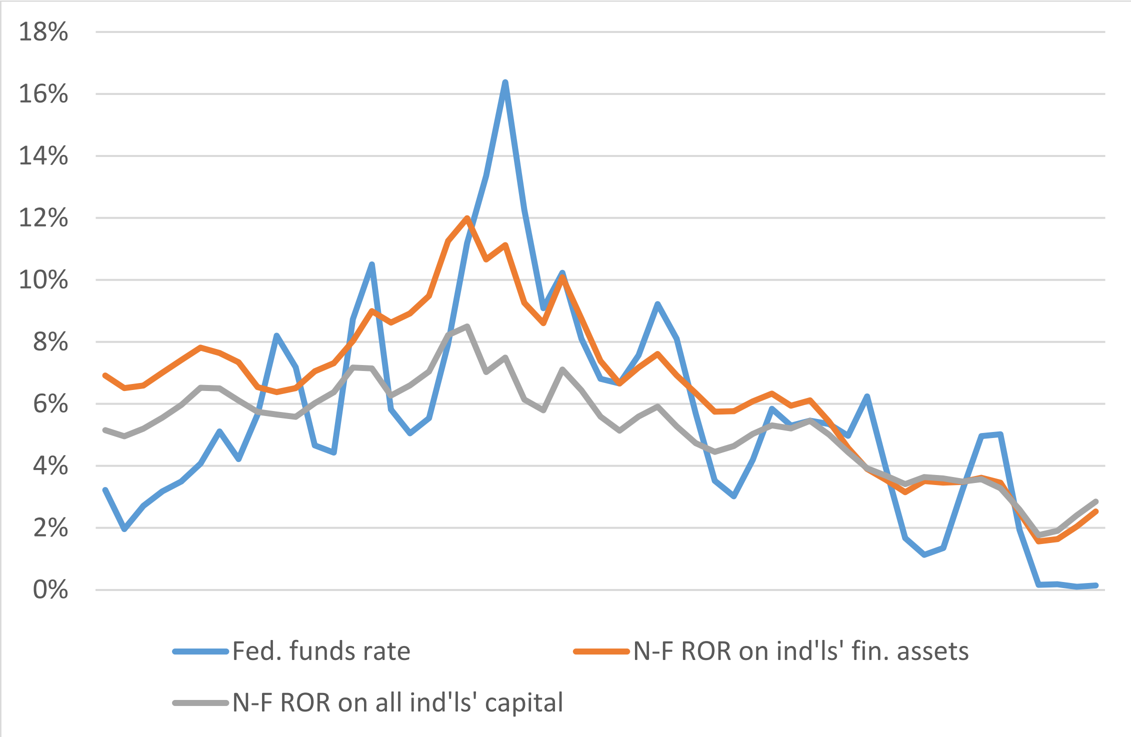
Figure 36: Influences on the non-fictitious rate of return on individuals' financial assets



Interest Rates and Financial Rates of Return

Chapters 5 and 6 also explored Marx's views on the dynamics of the interest rate, and hypothesised its movements would be related to movements in the non-fictitious rate of return on financial assets. As Figure 37 shows, there is quite a close relationship between trends in both measures of the non-fictitious rate of return and the Federal Funds Rate (the rate of interest paid on Treasury bonds). The R squared measure of correlation with the non-fictitious rate of return on all individuals' capital is 0.55, and with the non-fictitious rate of return on individuals' financial assets it is 0.63.

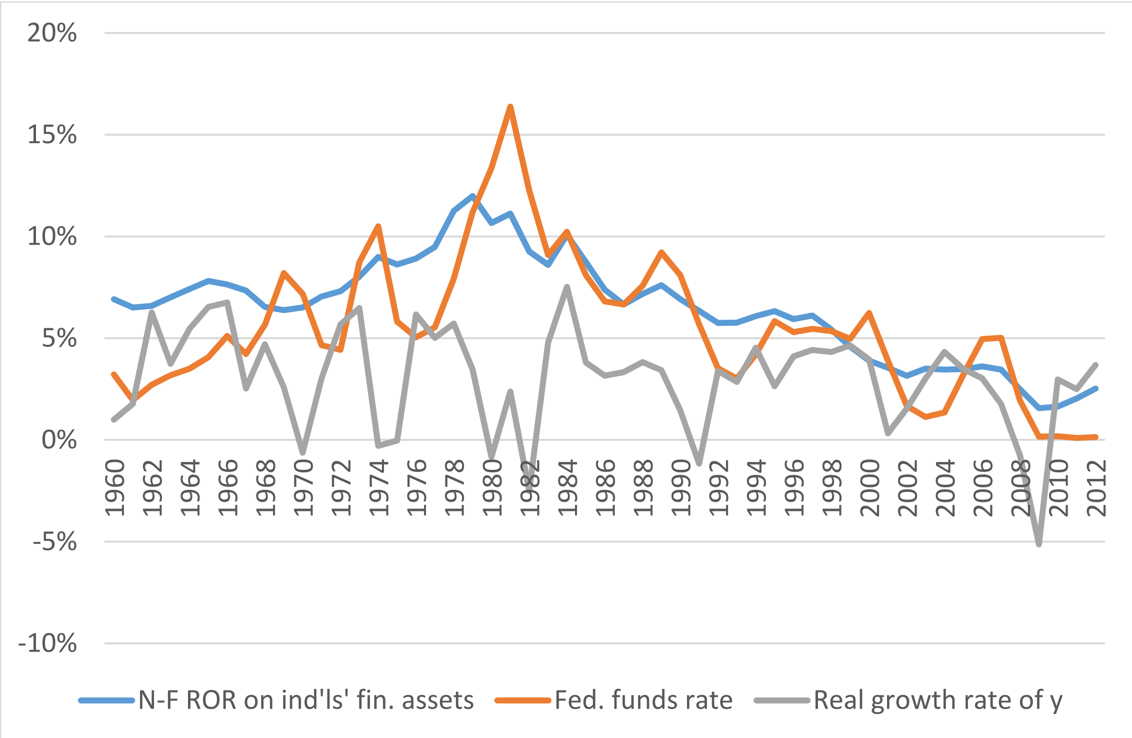
Figure 37: Non-fictitious rates of return and the interest rate



It is worth saying more about how we might explain this relationship. In general, if the non-fictitious rate of return is high, we would expect the dividend yield on stocks to also be high, because higher non-fictitious profit means more funds are available to pay dividends. A high dividend yield encourages investors into stocks and away from bonds, which pushes up the interest rate. There is also likely to be causation in the opposite direction: if, for example, the Federal Reserve 'artificially' cuts interest rates, this should temporarily increase the 'risk premium' on offer for holding stocks and property, leading investors to bid up land and share prices, increasing the total stock of fictitious capital and pushing down the non-fictitious rate of return.

However, there is also a more cyclical movement in the interest rate which only appears to affect the non-fictitious rate of return to a smaller degree. Chapter 5 noted that Marx observed a tendency for the rate of interest to be at a local minimum at the 'height' of the business cycle, when activity is highest, then to rise between "prosperity and its collapse", and finally to reach a maximum "up to extreme usury" with the onset of crisis.[282] To test this, the graph below includes the Federal Funds Rate, the non-fictitious rate of return on individuals' financial assets, and the real rate of growth of output.[283]

Figure 38: The non-fictitious rate of return, the interest rate and the rate of growth of output

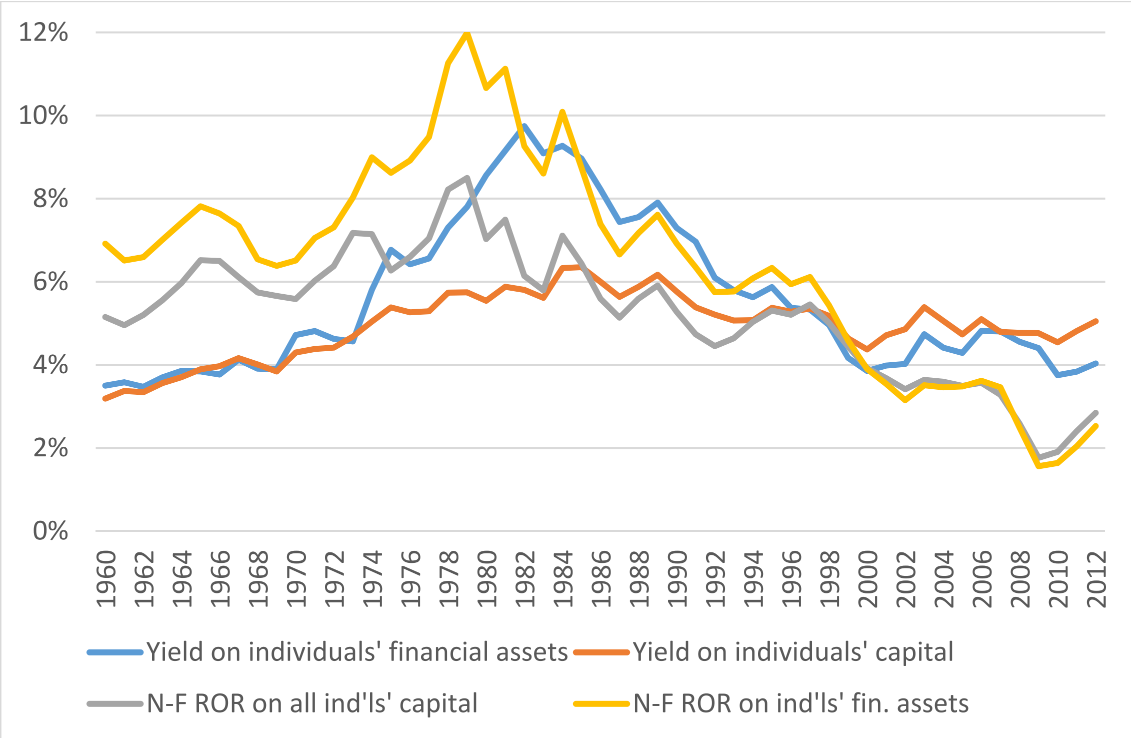


Marx's hypothesised inverse relationship between the interest rate and the level of economic activity in the short-term does seem to be present: troughs in growth are generally near peaks in the interest rate, and *vice versa*. It is possible that troughs in growth tend to come just after peaks in the interest rate. Although there are hints of the same short-term dynamic in the non-fictitious rate of return, it is much less variable over the short-term.

[282] Marx, *Capital III*, 1981, 3:482.
[283] Ideally this would be based on quarterly data; this task is left for future work.

The other financial results we want to investigate are the actual rates of return on fictitious capital: both rates of return incorporating capital gains, and dividend and interest yields. First we will look at the yields compared to the non-fictitious rates of return:

Figure 39: Non-fictitious rates of return and yield on individuals' capital



As we expected, there is some similarity in the trends, though the yield on financial assets is more variable than the yield including non-corporate equity. The R squared between the non-fictitious rate of return on financial assets and the yield on financial assets is 0.43. The gap between these two series before 1982 is probably explained by corporations' higher propensity to finance investment by retaining their profits, instead of issuing new financial capital, leaving less profit to pay out as dividends.

Next, below are the total rates of return, i.e., incorporating capital gains as well as dividends, interest and withdrawals from non-corporate businesses (after subtracting proprietors' 'wages'). Figure 40 graphs this in nominal terms and then Figure 41 adjusts for inflation:

Figure 40: Total rates of return on individuals' capital, nominal

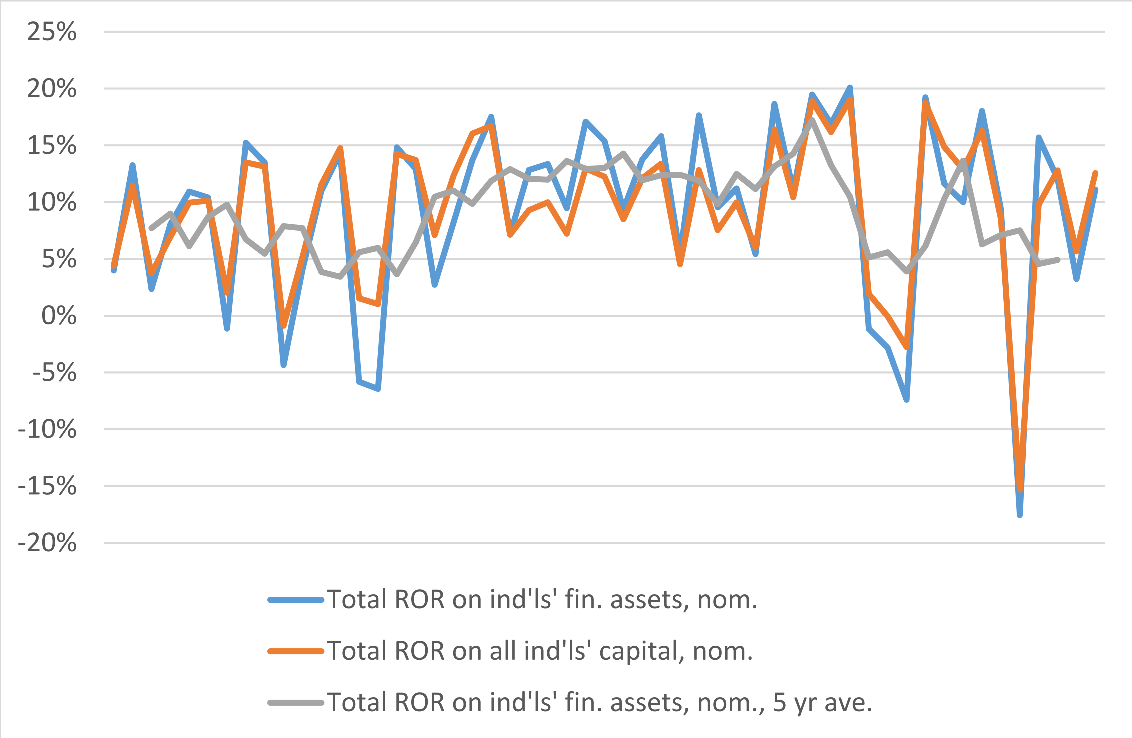
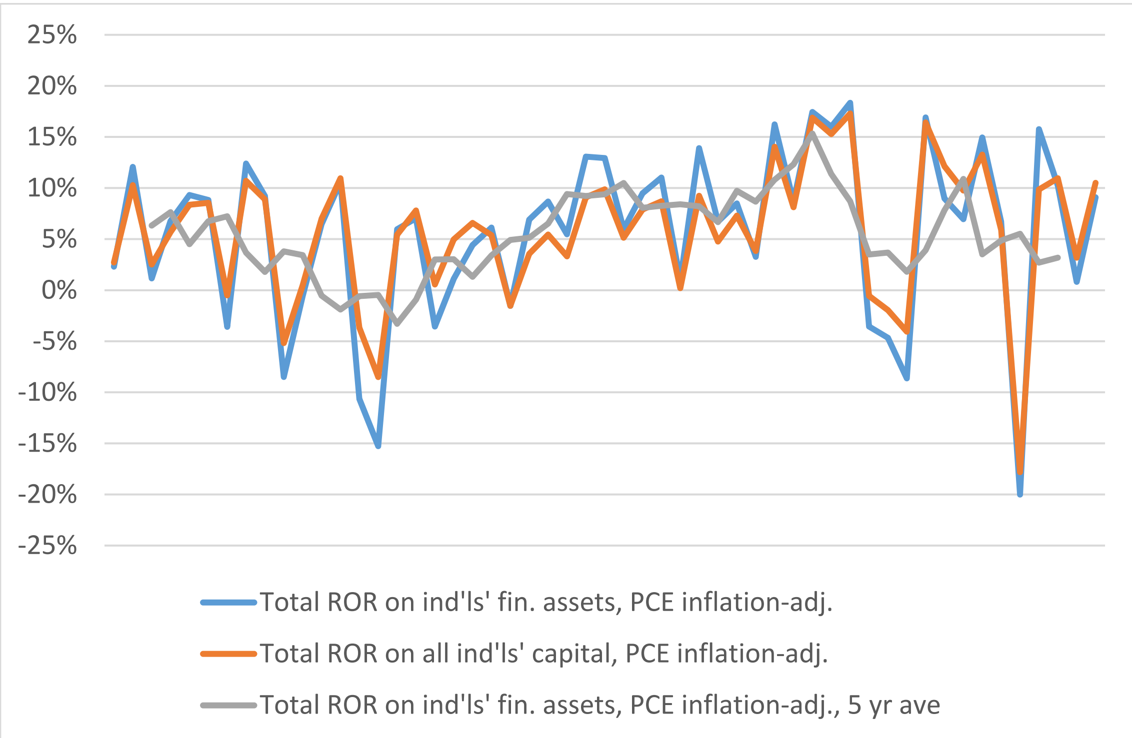
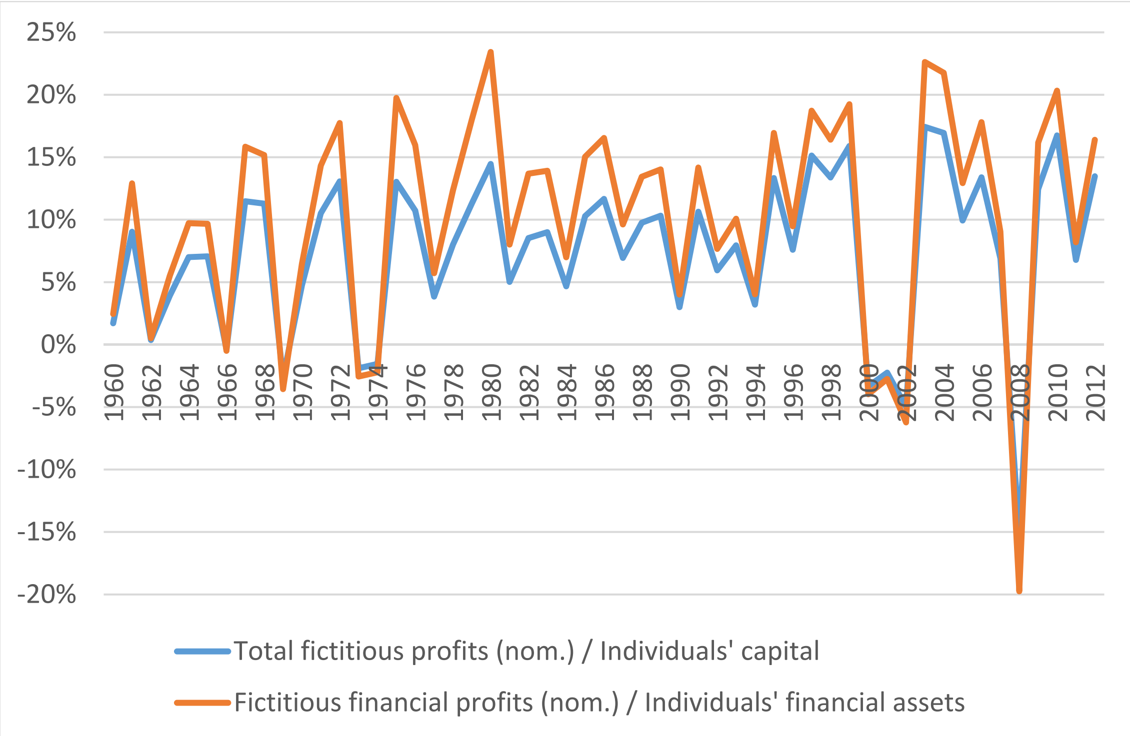


Figure 41: Total rates of return on individuals' capital, real



The most profitable time for individuals to own capital was after the crises of the 1970s, but before the dot com crash. Despite the low rate of profit relative to the 1960s, the total rate of return was relatively high because of the build-up of fictitious capital relative to actual capital, and the fictitious profits produced as a result. Another way of seeing this same result is to calculate these fictitious profits directly, using the method outlined in Chapter 6. Below this is calculated in nominal terms and expressed as a percentage of individuals' financial assets and capital:

Figure 42: Fictitious components of nominal rates of return

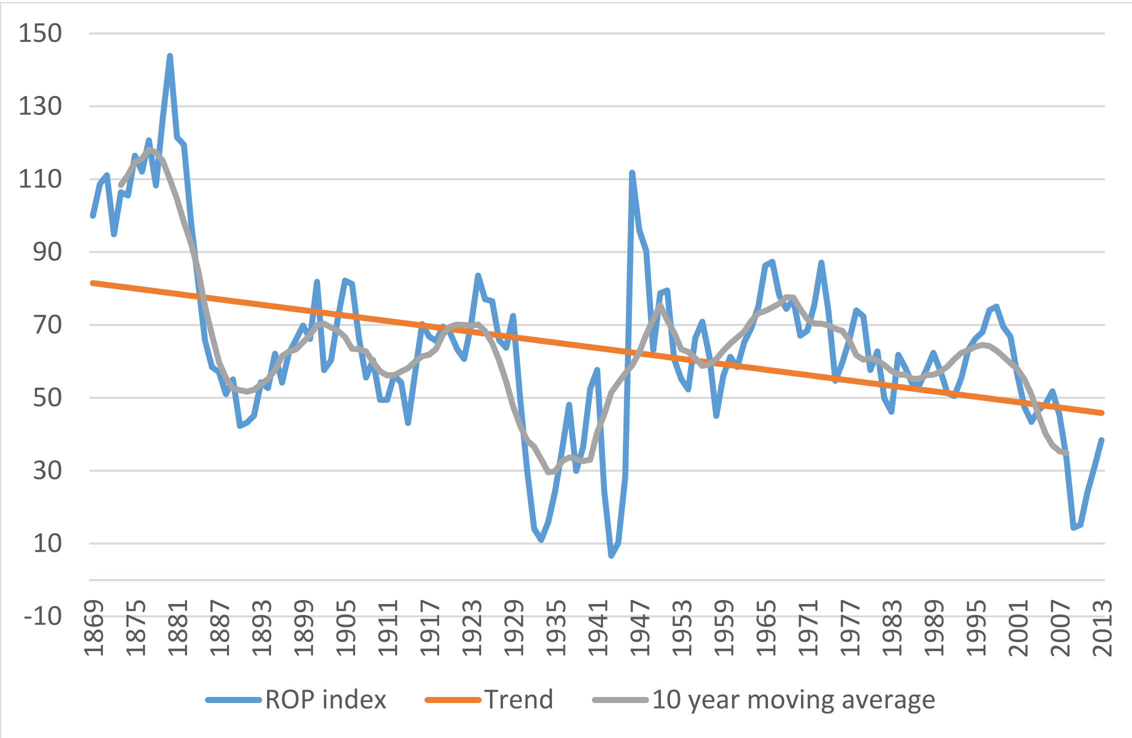


The Rate of Profit and the Interest Rate over the Long Term

Finally, we will turn to Marx's claims that there is a long-run tendency for the rate of profit to fall and that this leads to a long-run tendency for the interest rate to fall. It is difficult to get any reliable measure of the rate of profit in the US stretching back before 1929 (because this is when data collection for the most important national accounting aggregates commences), and it is probably not possible to measure the rate of profit defined in terms of *s* – *u* or profits from production at all.

Duménil and Lévy have constructed estimates for the US rate of profit since 1869 using a more basic measure.[284] They define the rate of profit as net national product after wages (including an imputation for 'wages' of petty bourgeois producers) divided by the stock of fixed assets. The graph below calculates an index measure of the rate of profit by taking their estimates for the rate of profit from 1869 until 1930, and then using changes in the *s* – *u* measure of the rate of profit for the corporate sector from 1930-2013:

Figure 43: Long term rate of profit index



The results fit well with Marx's hypothesis of long term tendency for the rate of profit to fall, despite the large increase in the rate of profit associated with the devaluation and disaccumulation of capital associated with the Great Depression and WWII. The R squared with

[284] Duménil and Lévy, "The U.S. Economy Since the Civil War: Sources and Construction of the Series"; Duménil and Lévy, "The U.S. Economy since the Civil War: Database."

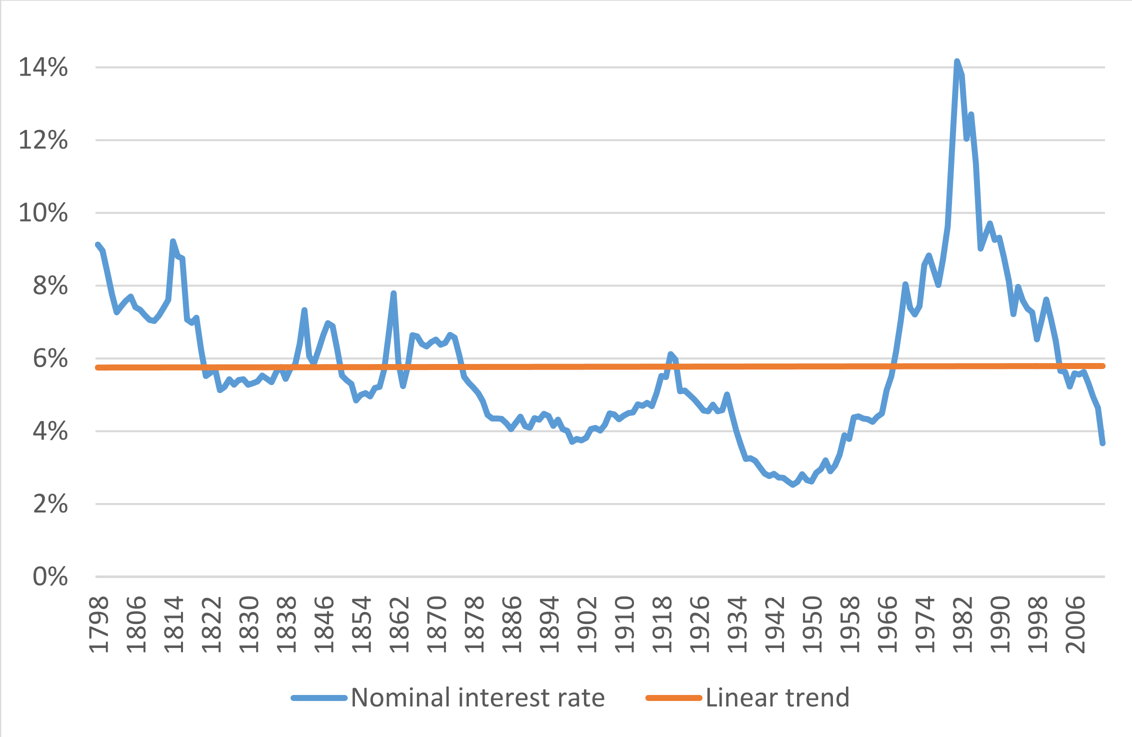
the linear trend is negligibly small, but given the effect of the increase in the rate of profit after WWII this is not surprising. It is perhaps not ideal that we start with what looks to be a peak in the rate of profit in the 1870s after the destruction of the Civil War, and end with a trough after the Great Recession, but this is the period over which we have data. It is also not clear to what extent the US rate of profit before the Civil War would have been subject to Marx's law, given the existence of slavery in the South. In any case, as we will see below, if the rate of interest is a reasonable proxy for the rate of profit over the long term, there is no evidence that starting the series earlier would give a significantly different trend.

The data available for the interest rate are more reliable, since they can be obtained by looking at quotations of interest rates actually offered by banks. The *MeasuringWorth* website established by Officer and Williamson publishes estimates of economic time series from the 1790s onwards, including the US interest rate.[285]

First, below is a graph of their series for the US interest rate in nominal terms starting in 1798. Across the period as a whole, the linear trend is virtually completely flat, appearing to disconfirm Marx's hypothesis.

[285] Officer, "What Was the Interest Rate Then?"; Williamson, "What Was the U.S. GDP Then?"; Officer and Williamson, "Annual Inflation Rate in the United States, 1775 - 2013, and United Kingdom, 1265 - 2013."

Figure 44: Long term nominal rate of profit



It looks as though the main reason the series has no linear trend is because at the end of the post-war boom and especially during the crisis after it there is a large increase in the rate of inflation. Up until then the downward trend is clear. For this reason, it would be a mistake to rule out Marx's hypothesis without also looking at trends in the rate of interest after adjusting for inflation. Indeed, it is more reasonable to interpret Marx's hypothesis as a claim concerning the interest rate after inflation, since this is the cost that is relevant to a capitalist who borrows in order to invest in productive assets (because the price of these assets and the output they are used to produce also tend to increase with inflation), and since the LTFRP also applies to the rate of profit in inflation-adjusted terms.

The *MeasuringWorth* site also gives two estimates of inflation over the same period: one using a GDP deflator and the other using a consumer price index (CPI). For this purpose the GDP deflator is a better measure because it estimates the rate of inflation for all goods and services that make up GDP (including the cost of new investments) and not only the prices of goods and services purchased by consumers. Ideally, however, we would use the increases in the MELT as our measure of inflation. Without national accounts data we cannot estimate the MELT directly, but we can get a very crude estimate if we use the percentage increase in nominal GDP per capita (by making the assumptions that the ratio of population to socially necessary labour time remains constant, that the value of depreciation is zero, and that GDP is equal to output of commodities).

Figure 44, Figure 45 and Figure 46 graph the estimates of the real interest rate obtained using each approach.

Figure 45: Long term real interest rate, CPI-adjusted

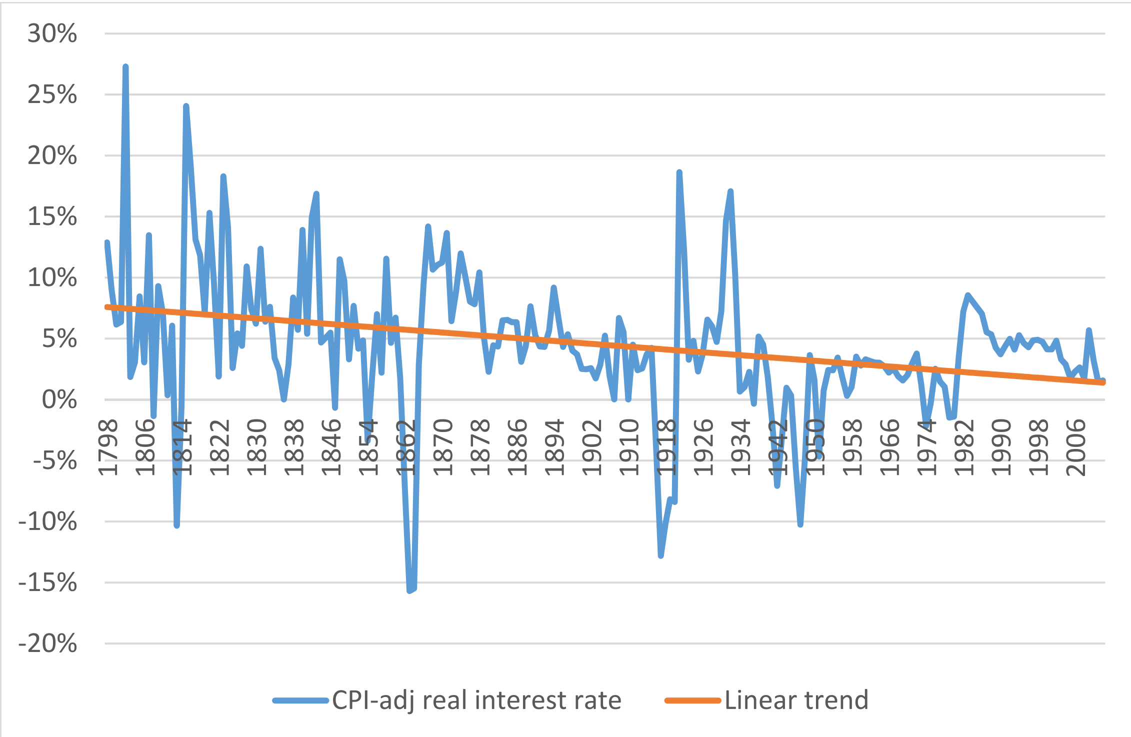


Figure 46: Long term real interest rate, GDP-deflator adjusted

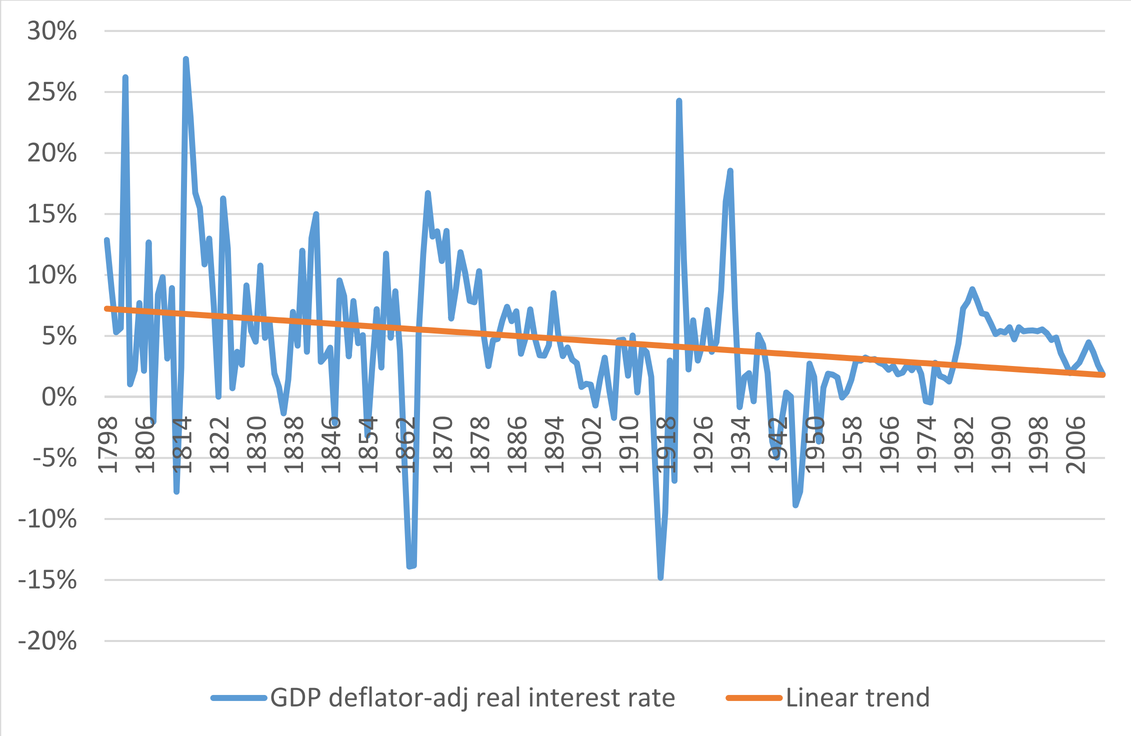
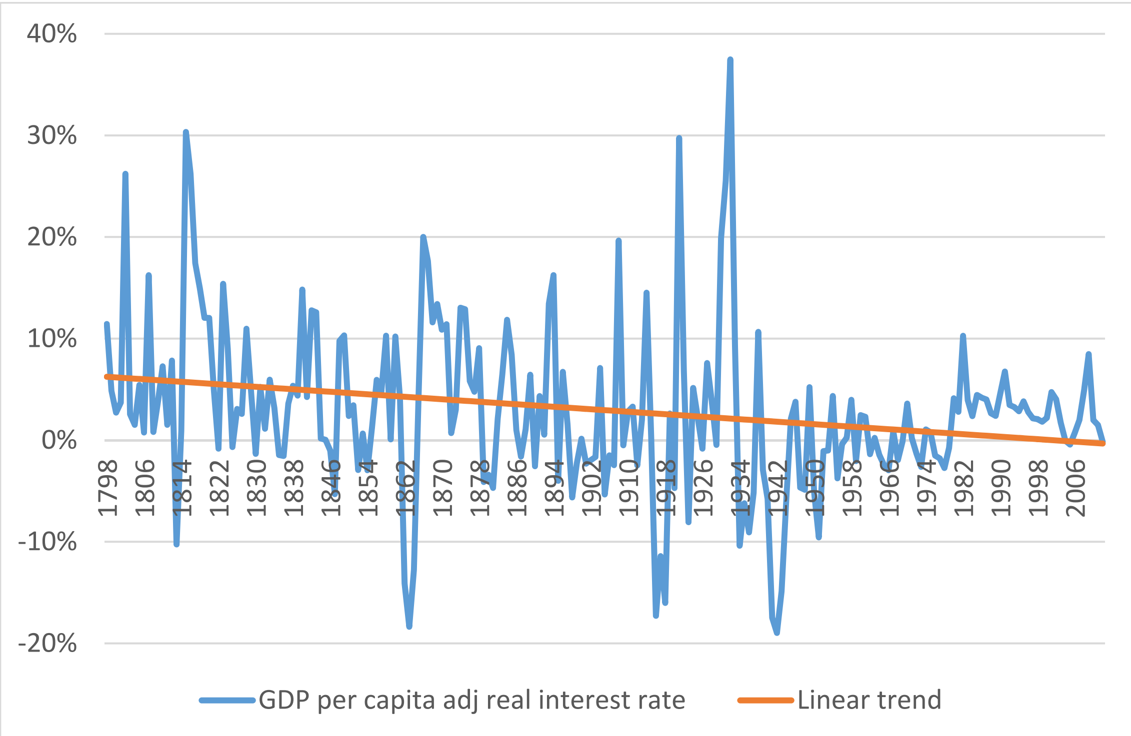
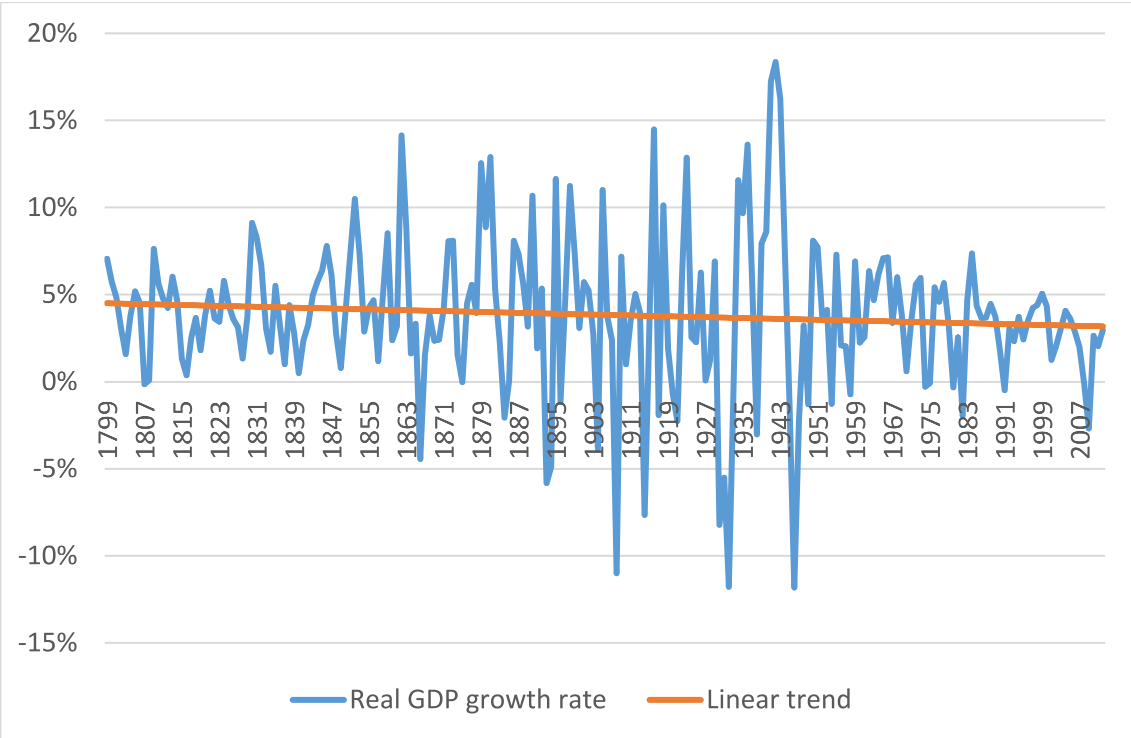


Figure 47: Long term real interest rate, per capita GDP-adjusted



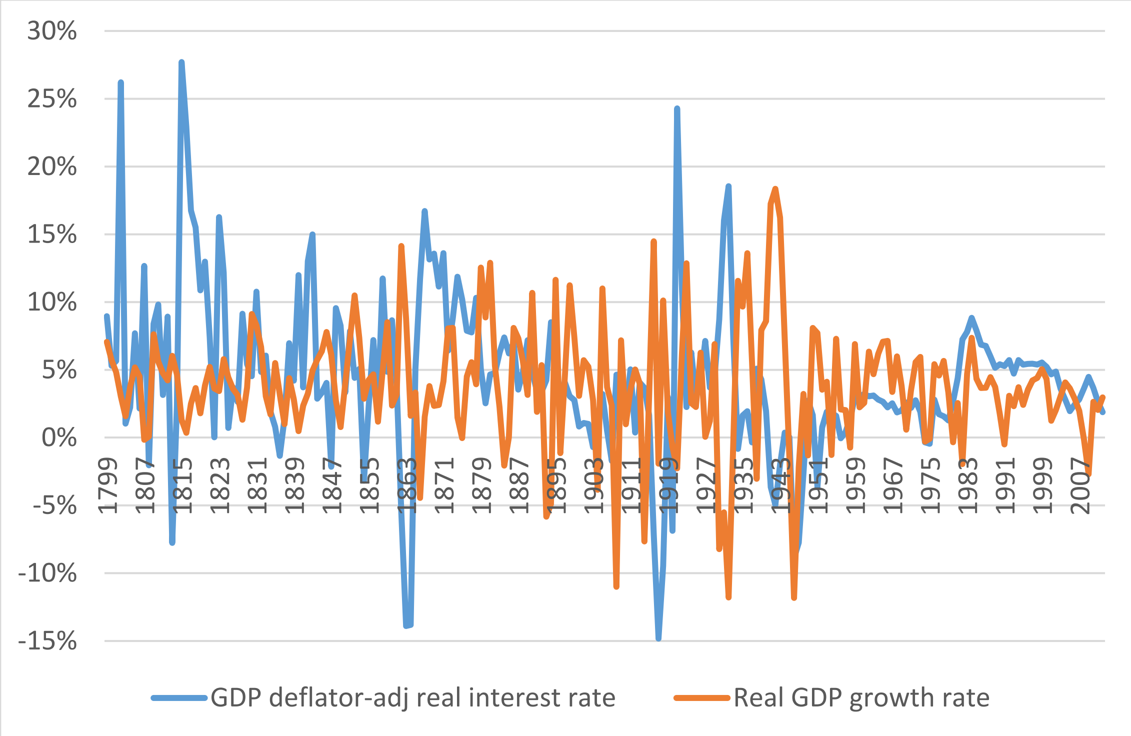
Using all three measures, the real interest rate has a downward trend over the long-term, punctuated by sharp increases associated with crises. Note also there is evidence of a weaker downward trend in the real rate of GDP growth:

Figure 48: Long-term real GDP growth rate



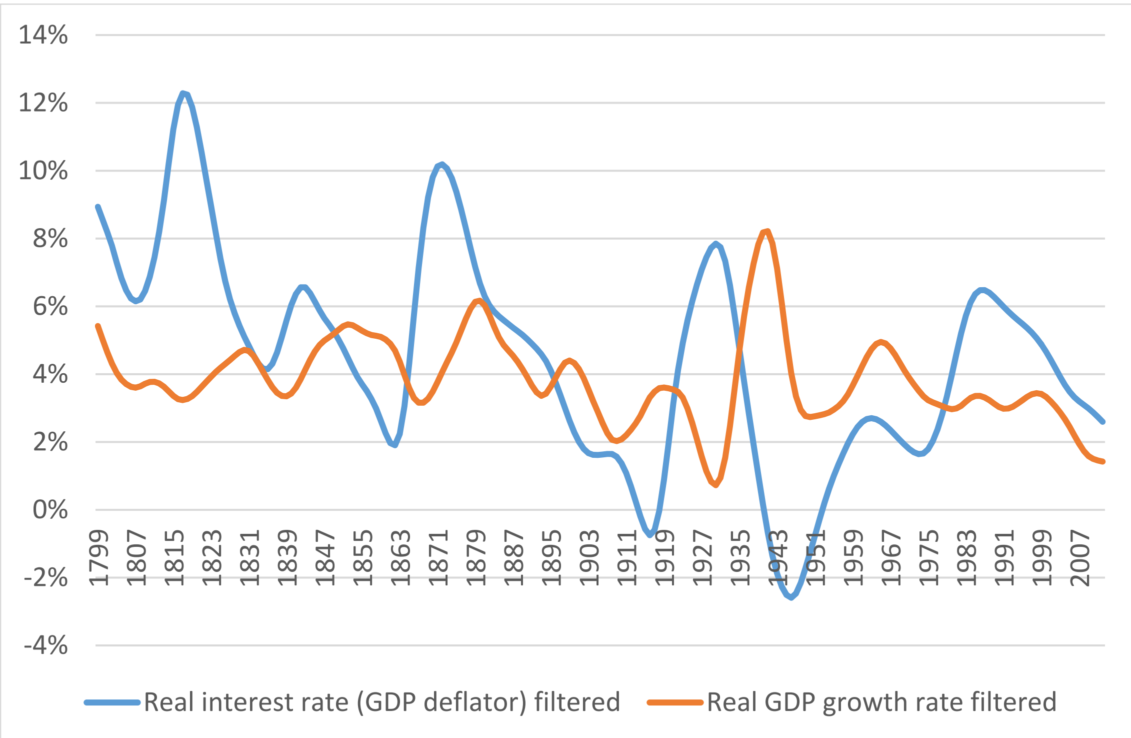
This data set also allows us to better test Marx's hypothesis that the interest rate tends to mirror the level of economic activity over the short-term (i.e. it tends to be high when activity is low and low when activity is high). Figure 49 is a graph of the real GDP growth rate and the real interest rate, adjusted for inflation in the GDP deflator. Because of the volatility in both series it is hard to say much based on comparing the two series visually.

Figure 49: Real interest rate vs real growth rate, long-term



After applying the HP filter to both series we get a clearer picture:

Figure 50: Filtered real interest rate vs filtered real growth rate, long-term



First, we can see that "maximum interest up to extreme usury corresponds to a period of crisis".[286] The largest peaks in the real interest rate using the GDP deflator occur in 1802, 1815, 1843, 1858, 1867, 1921, 1932 and 1984. Except for 1984, these were all recession years.[287] 1984 is an anomaly, probably because the high interest rate was the result of aggressive intervention by the Federal Reserve. In any case, the peak in the interest rate in 1984 can be seen as marking the end of the crisis beginning in the mid-1970s. There was also a smaller peak in the real interest rate in 2009, associated with the fall in inflation during the Great Recession (which does not register after applying the filter).

Second, until around 1830 the real interest rate is much higher than the rate of growth. Here a comment of Marx's concerning the determination of the interest rate before capitalism has formally subsumed labour is relevant:

> When comparison is made between countries at different levels of development, and particularly between countries of developed capitalist production and those where labour is not yet formally subsumed by capital although in reality the worker is already exploited by the capitalist (in India, for example, where the ryot operates as an independent peasant farmer, and his production is not yet subsumed under capital, although the money-lender may well extort from him in the form of interest not only his entire surplus labour, but even - to put it in capitalist terms - a part of his wages), it would be quite wrong to seek to measure the national rate of profit by the level of the national rate of interest. Interest here includes both the entire profit and more than the profit, whereas in countries where capitalist production is developed it simply expresses an aliquot part of the surplus-value or profit produced. Moreover, in the former case the rate of interest is predominantly determined by factors such as the level of advances by money-lenders to the big landowners who are the recipients of ground-rent, which

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[286] Marx, *Capital III*, 1981, 3:482.
[287] The National Bureau of Economic Research provides dates for recessions in the US from 1854 onwards (NBER, "US Business Cycle Expansions and Contractions."). Before 1854, the best resource for dating recessions are the *Business Annals* compiled by the NBER in 1926 (Thorp and Thorp, "The Annals of the United States of America."), which Moore and Narnowitz compile into a table with dates of economic cycles and provide useful commentary. Moore and Narnowitz, "The Development and Role of the National Bureau of Economic Research's Business Cycle Chronologies," 743–748.

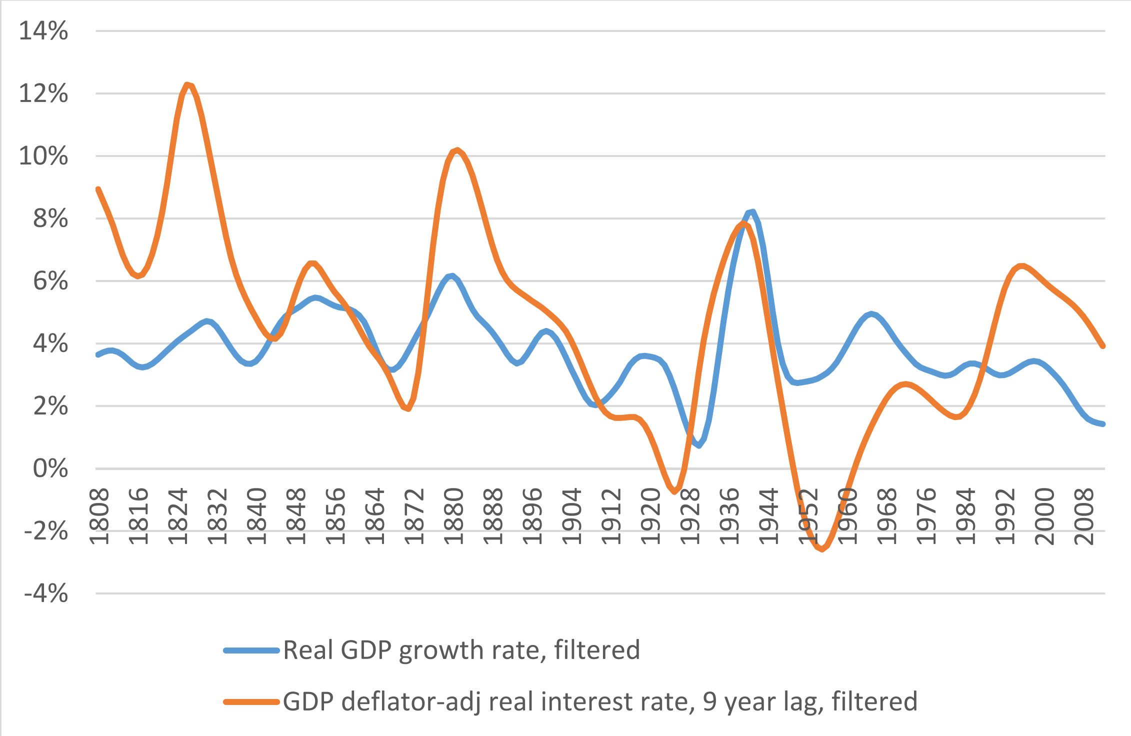
> have nothing at all to do with profit but rather express the extent to which the money-lender himself appropriates this ground-rent.[288]

In the South before the Civil War slave labour *was* formally subsumed by capital, since the slave owners produced their crop to sell at a profit, but this was arguably not a *real* subsumption, since it seems likely that these profits were overwhelmingly not invested in improving the means of production and re-organising production. So there was no basis for a tendency for the organic composition of capital to rise. It also seems likely that the interest rate would have been significantly influenced by the extent to which money-lenders appropriated the ground-rent from the plantations.

Third, and most importantly, it looks as though movements in the interest rate share a similar pattern to movements in real GDP growth, but that they are out of phase. We can see this more clearly still by taking the filtered series and applying a 9 year lag to the interest rate:

[288] Marx, *Capital III*, 1981, 3:321.

Figure 51: Filtered real interest rate with 9 year lag vs filtered real growth rate, long-term



While the match is far from perfect, the cyclical movements in the two series do appear to roughly match up after applying the lag. As we would expect, the interest rate is generally more volatile than the rate of growth. It looks as though the appropriate lag is not fixed at 9 years: in the 19th century it looks more like 7 years while in the 20th century it seems to extend to around 11 years. If we assume the interest rate is out of phase with the growth rate by half a cycle, as per Marx's hypothesis, then a lag of 7 to 11 years would correspond to business cycles of between 14 and 22 years.

In any case, Marx's two hypotheses concerning movements in the interest rate hold up well, if we interpret them as referring to the real interest rate. For the US, there does indeed appear to be a downward trend in the real interest rate over the long term, and a tendency for the interest rate to move between 7 to 11 years out of phase with movements in the business cycle. The long term downward trend in the interest rate also fits with the evidence we have for a long term downward trend in the rate of profit.

Chapter 8: Conclusions

The rate of profit and the Great Recession

The results strongly support the hypothesis that the Great Recession was the result of a prior decline in the rate of profit. By 2002, based on the more reliable measures, the rate of profit had declined over the long term, since its large increase after WWII, since its level immediately before the crises of the 1970s, and since its moderate recovery during the 1980s and 1990s, whether measured in terms of $s - u$, before-tax profits from production or after-tax profits from production.

But we do need to explain why, from 2003-2005, rates of profit *on production* increased sharply, even though the rates of profit defined in terms of $s - u$ and rates of accumulation did not. This was overwhelmingly due to a stagnation in before-tax wages, which may have been compensated for to some extent by the Bush tax cuts. These tax cuts and low interest rates brought about an increase in the proportion of income spent on consumption, and may also have meant that although *wages* stagnated, the value of labour power did not. The tax cuts and low interest rates themselves were related to the falling rate of profit; specifically, they were responses to the weak economic conditions after the dot com crash, which was preceded by declines in all measures of rates of profit. Insofar as only the *gap* between the price and the value of labour power was narrowed, without actually driving down the value of labour power itself, this made no difference to the surplus value available for capitalists' consumption and investment; it improved the rate of profit on production that *appears* to capitalists, but not the rate of profit defined in terms of the actual *value* available to them. The general increase in the propensity to consume explains why the increase in rates of profit on production did not lead to a recovery in rates of accumulation. This analysis does not indicate that Bush and Greenspan were 'bad economic managers' but that, because their policies could not bring about a recovery in the rate of profit defined in terms of value, the boost their policies gave to the rate of profit on production could not indefinitely rescue US and world capitalism from a major crisis and recession.

Another consequence of the regime of low interest rates was to encourage the production of fictitious profit on property and financial markets, further creating the appearance of healthier economic conditions while driving down future rates of return on financial assets and property. These bubbles were therefore *symptoms* of the low underlying rate of profit. Compared to other bubbles, valuations in the property and financial markets relative to produced assets were not unusually high. Eventually these bubbles burst in the form of a property market crash combined with a credit crisis.

The results do not support the view that these financial and credit crises were the *underlying* cause of the Great Recession. The decline in the underlying rates of profit before 2007 is evidence against this explanation. Moreover, if the underlying cause of the Great Recession was the financial and credit crisis, then why did growth and employment not return to more 'normal' levels when financial and credit markets recovered? By 2010, the ratios of fictitious to genuine capital, for example, had recovered to around the same levels as before the financial crisis, indicating that investors' reluctance to buy shares and lend money had been overcome. Yet rates of employment and accumulation remained, and still remain, extremely low compared to other periods. While there has been a small recovery in measures of the rate of profit from their depths during the crisis, capital has not been destroyed or devalued on a large enough scale to return rates of growth or employment to anywhere near 'normal' levels. The lack of devaluation of capital is a much more plausible explanation for the continuation of weak economic conditions than a financial and credit crisis which was severe but ended several years ago.

Capital and Marx's value theory

More importantly, what does the thesis establish concerning the usefulness and accuracy of Marx's analyses in *Capital*? Even some of Marx's most sympathetic critics regard *Capital* as at best a starting point from which to develop a superior or more complete theory. Mage, for example, who makes an early and perceptive critique of the Bortkiewicz-Sweezy non-solution to the transformation problem, completes his study of the falling rate of profit this way:

> It is plain, despite the scope, power, and basic clarity of his thought, that Marx left his system of economic analysis in a crude and unfinished form, that many vital concepts were poorly defined, and that essential parts of his model were not developed beyond the stage of artificial and unrealistic schemata. The endeavour to make an empirical test of one of the major "laws" of this model, therefore, required the clarification and reformulation of these aspects of Marx's doctrine…
>
> The data developed through this test… show clearly that Marx was no infallible prophet, that certain of his predictions proved to be invalid. But they also confirm that Marx was correct on the issues he regarded as decisive: the rising tendency of the organic composition of capital and the falling tendency of the rate of profit.
>
> Confirmation on this vital score is not in any sense "confirmation" of the Marxian economic theory as a whole – something which is in any case conceivable only through the integration of vast amounts of post-Marxian theory into the Marxian structure. What this study has shown is not that Marx is "right" or "wrong" – the point is, *that he is relevant*.[289]

We can of course agree that *Capital* is not perfect, and that Marx was not an infallible prophet. No one has ever sanely argued otherwise. Can we agree, however, that Marx 'left his system of economic analysis in a crude and unfinished form'? This impression seems largely the result of Marx's 'failure' to translate all of his system into mathematical language. Marx touches on this issue when describing how his approach differs from that of classical political economy:

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[289] Mage, "The 'Law of the Falling Tendency of the Rate of Profit': Its Place in the Marxian Theoretical System and Relevance to the US Economy," 231–232.

> Political economy has indeed analysed value and its magnitude, however incompletely, and has uncovered the content concealed within these forms. But it has never once asked the question why this content has assumed that particular form, that is to say, why labour is expressed in value, and why the measurement of labour by its duration is expressed in the magnitude of the value of the product. These formulas, which bear the unmistakable stamp of belonging to a social formation in which the process of production has mastery over man, instead of the opposite, appear to the political economists' bourgeois consciousness to be as much a self-evident and nature-imposed necessity as productive labour itself.[290]

Like Mage, this thesis has focused on Marx's development of the classicals' incomplete analysis of value and its magnitude. Marx does not 'complete' this analysis in the sense of developing a complete description of all of his concepts in mathematical language. Such a translation would have been useful. But mathematics is only a means through which arguments *might be* expressed more clearly. It is also possible to express arguments and concepts clearly through ordinary language, or through more technical language which is non-mathematical. Where arguments or concepts refer to relationships between quantifiable concepts (e.g. value, surplus value, price, profit), it *should* be possible to express aspects of them mathematically, even if Marx himself does not do so, and this *can be* a more precise form in which to test the internal consistency of arguments.

On the other hand, too heavy a reliance on mathematical language or its misuse can reinforce the way in which the exchange of things makes capitalism appear natural or impossible to change; and it can obscure the fact that labour under capitalism has a *dual* nature, both abstract *and* concrete; that is, it can obscure the fact that capital is a *social relation*. Neoclassical economics harnesses this fetish-inducing power of mathematical language very effectively, in a way that takes it many steps backwards from the categories of bourgeois economics developed

[290] Marx, *Capital I*, 173–175.

by the classicals. Ultimately, the point of Marx's value theory is to show that our domination by capital, the law of value and the LTFRP can be understood and can also *be changed*. Doubts about whether Marx's value theory really 'adds up' have held some Marxists back from embracing it, and this thesis has focused on exploring whether those doubts are justified. This should stimulate further study and concretisation of Marx's value theory *as a whole*, and *not only* its quantitative aspects.

The 'incomplete' nature of Marx's quantitative analysis may also be related to the limited statistics he had with which to analyse value. If better statistics *had* been available, he or Engels may well have gone further with the task of expressing their arguments in mathematical form, as Engels' following comment suggests:

> Since there are certainly only a few capitalists who make calculations of such a kind about their businesses, statistical material is almost completely absent on the ratio of the constant part of the total social capital to the variable part. Only the US Census gives what is possible under present-day conditions, the sum of the wages paid in each branch and the profits made. Dubious as these data are, owing to the way they rely on the unchecked information of the industrialists themselves, they are none the less extremely valuable and the only data that we have on the subject. In Europe we are far too kind-hearted to expect such revelations on the part of our great industrialists.[291]

If it is valid, the interpretation offered in this thesis has shown that the most important quantitative aspects of Marx's value theory indeed *can be* expressed in mathematical language, without needing to make major 'corrections'. It has gone further than existing interpretations by showing:

1. how cost-reducing technological change can lead to a falling rate of profit *and* how this can be reversed by devaluation;

[291] Marx, *Capital III*, 1981, 3:169.

2. how the main influences Marx identifies on the rate of profit can be represented mathematically; and
3. how Marx's incomplete work on finance can be extended to explain the relationship between the rate of profit, rates of return on financial assets and the interest rate.

It has also shown that this interpretation is compatible with US national accounting statistics, which have allowed us to test important predictions of Marx's theory. Specifically, the results support Marx's hypotheses that, over the long term, as the forces of production develop:

1. the production of relative surplus value tends to increase the rate of surplus value;
2. the turnover time of variable capital tends to shorten;
3. the organic composition of capital tends to rise;
4. the value composition of capital tends to rise;
5. moral depreciation tends to devalue constant capital;
6. the rate of profit tends to fall; and
7. the (real) interest rate tends to fall.

In addition, over shorter time periods, the results support the hypotheses that:

8. the real interest rate tends to move in the opposite direction to the business cycle; and, most importantly
9. the rate of profit tends to fall in the lead up to major crises, and rise if and when they destroy or devalue sufficient capital.

This impressive list of accurate predictions is not evidence that Marx was clairvoyant, or that he made lucky guesses. In the cases of hypotheses 2 – 5, once they are formulated correctly, it is clear why Marx would have thought they were very likely to be consequences of the development of the forces of production. The hypothesis that the rate of surplus value tends to increase is perhaps a little bolder, but also strongly suggested by the history of capitalist development Marx had witnessed. The hypothesis that the rate of profit tends to fall over the long term was similarly consistent with the evidence Marx had available and, moreover, a consensus among classical political economists.

Yet without a better explanation of *why* the rate of profit tends to fall than that provided by the classicals, it would have been a mistake for Marx to make it such a central part of his theory of historical materialism. *Capital* provides this explanation by showing how the other hypotheses listed above make it likely that the rate of profit will fall over time and, crucially, how this will lead to recurrent economic crises while the capitalist mode of production remains. Marx's explanation of how crises devalue capital and can allow the rate of profit to recover also departs from classical political economy, by generalising from his experience and his dialectical conception of change. The remaining two hypotheses concerning the interest rate are also both generalisations from experience, and related to Marx's LTFRP. The success of Marx's analysis is therefore not an accident, but the result of years of careful intellectual labour.

The interpretation of Marx's system in this thesis may help to answer other questions about the nature of contemporary (or 'neoliberal') capitalism. For example, the results above suggest that, whatever 'neoliberal' capitalism is, it has not involved major *breaks* in the main tendencies mentioned above. Its symptoms are more likely to be a result of the continuation of these tendencies. One task that this thesis has not attempted is to give a concrete explanation of the link between these tendencies and the symptoms of 'neoliberalism'.

More generally, a more concrete explanation of the structure of contemporary capitalism, grounded in value theory, would be an important weapon and guide for socialists. Like any social change, creating socialism depends on human beings making history "under circumstances existing already, given and transmitted from the past"; unlike most other social change, it requires a high degree of consciousness of those circumstances and how to change them.[292] In *The Civil War in France*, Marx is enthusiastic about the Paris Commune, despite its inevitable political defeat, because he sees it as "the political form at last discovered under which to work out the economical emancipation of labour".[293] At high points in struggle workers have since created an even more promising form of democratic political power: workers' councils. If workers create such political forms in future, we will not only need to confront the problem of the armed power of the existing state; we will also need to work out our economic emancipation. If we use its insights properly, *Capital* may have a great deal to teach us about doing that.

[292] Marx, *The Eighteenth Brumaire of Louis Bonaparte*, chap. I.
[293] Marx, *The Civil War in France*, chap. 5.

Bibliography

Akinci, Umit, and Yigit Karahanogullari. "Convergence of Monetary Equivalent of Labour Times (MELTs) in Two Marxian Interpretations." *Cambridge Journal of Economics*, March 14, 2014. http://cje.oxfordjournals.org/content/early/2014/03/14/cje.beu004.

Basu, Deepankar, and Ramaa Vasudevan. "Technology, Distribution and the Rate of Profit in the US Economy: Understanding the Current Crisis." *Cambridge Journal of Economics*, October 4, 2012. http://cje.oxfordjournals.org/content/early/2012/09/25/cje.bes035.short?rss=1.

US Bureau of Economic Analysis. "BEA Depreciation Estimates." Bureau of Economic Anaylsis, 2013. http://www.bea.gov/national/pdf/fixed%20assets/BEA_depreciation_2013.pdf.

Bortkiewicz, Landislaus. "Value and Price in the Marxian System." Translated by J Kahane. *International Economic Papers* 2 (1907 1952): 5–60.

Carchedi, Guglielmo. "Behind and Beyond the Crisis." *International Socialism*, no. 132 (October 2011). http://www.isj.org.uk/index.php4?id=761&issue=132.

———. "From Okishio to Marx through Dialectics." *Capital & Class* 99 (Autumn 2009): 59–79.

———. *Frontiers of Political Economy*. London: Verso, 1991.

———. "The Logic of Prices as Values." *Economy and Society* 13, no. 4 (1984): 431–55.

Carchedi, Guglielmo, and Michael Roberts. "A Critique of Heinrich's, 'Crisis Theory, the Law of the Tendency of the Profit Rate to Fall, and Marx's Studies in the 1870s'." *Monthly Review Website*, January 12, 2013. http://monthlyreview.org/commentary/critique-heinrichs-crisis-theory-law-tendency-profit-rate-fall-marxs-studies-1870s.

Day, Richard B. *The Crisis and the Crash: Soviet Studies of the West (1917-1939)*. London: New Left Books, 1981.

De Brunhoff, Suzanne. *Marx on Money*. Translated by Maurice Goldbloom. New York: Urizen Books, 1973.

Desai, Meghnad. *Marxian Economics*. Oxford: Basil Blackwell, 1979.

Duménil, Gérard. "Beyond the Transformation Riddle: A Labor Theory of Value." *Science & Society* 47, no. 4 (December 1, 1983): 427–50.

Duménil, Gérard, and Dominique Lévy. *The Crisis of Neoliberalism*. Cambridge, Mass.: Harvard University Press, 2011. http://site.ebrary.com/id/10456085.

———. "The Field of Capital Mobility and the Gravitation of Profit Rates." *Review of Radical Political Economics*, no. 34 (2002): 417–36.

———. "The U.S. Economy since the Civil War: Database," 2013. http://www.jourdan.ens.fr/levy/uslt4x.txt.

———. "The U.S. Economy Since the Civil War: Sources and Construction of the Series," 1994. http://www.jourdan.ens.fr/levy/dle1994e.pdf.

Ernst, John. "Simultaneous Valuation Extirpated: A Contribution to the Critique of the Neo-Ricardian Concept of Value." *Review of Radical Political Economics* 14, no. 2 (June 1, 1982): 85–94.

Farjoun, Emmanuel, and Moshe Machover. *Laws of Chaos: A Probabilistic Approach to Political Economy*. London: Verso, 1983.

Fichtenbaum, Rudy. "'Business Cycles', Turnover and the Rate of Profit: An Empirical Test of Marxian Crisis Theory." *Eastern Economic Journal* 14, no. 3 (1988): 221–28.

Fine, Ben, and Laurence Harris. *Rereading Capital*. New York: Columbia University Press, 1979.

Foley, Duncan. "The Value of Money the Value of Labor Power and the Marxian Transformation Problem." *Review of Radical Political Economics* 14, no. 2 (June 1, 1982): 37–47.

Freeman, Alan. “Marxism without Marx: A Note towards a Critique.” *Capital & Class* 34, no. 1 (February 2010): 84–97.
———. “Price, Value and Profit - A Continuous, General, Treatment.” In *Marx and Non-Equilibrium Economics*, edited by Alan Freeman and Guglielmo Carchedi. Cheltenham, UK; Brookfield, US: Edward Elgar, 1996.
———. “The Limits of Ricardian Value: Law, Contingency and Motion in Economics.” *Unpublished*, March 1999. http://mpra.ub.uni-muenchen.de/2574/.
———. “The Profit Rate in the Presence of Financial Markets: A Necessary Correction.” *Journal of Australian Political Economy*, no. 70 (2012): 167–92.
———. “The Profit Rate in the Presence of Financial Markets: A Necessary Correction.” *Journal of Australian Political Economy*, no. 70 (2012): 167–92.
———. “Time, The Value of Money and the Quantification of Value.” *Unpublished*, 1998. http://mpra.ub.uni-muenchen.de/2217/.
———. “Trends in Value Theory since 1881.” *World Review of Political Economy* 4, no. 1 (2010): 567–605.
Freeman, Alan, and Guglielmo Carchedi, eds. *Marx and Non-Equilibrium Economics*. Edward Elgar, 1996.
Freeman, Alan, and Andrew Kliman. “Two Concepts of Value, Two Rates of Profit, Two Laws of Motion.” *Research in Political Economy* 18 (2000).
Friedman, Milton. “The Methodology of Positive Economics.” In *Essays in Positive Economics*, 3–42. University of Chicago Press, 1966.
Gillman, Joseph. *The Falling Rate of Profit*. London: Dennis Dobson, 1957.
Giussani, Paolo. “The Determination of Prices of Production.” *International Journal of Political Economy* 21, no. 4 (1991): 67–86.
Grossman, Henryk. *Law of the Accumulation and Breakdown*. Translated by Jairus Banaji. marxists.org, 2005. http://www.marxists.org/archive/grossman/1929/breakdown/index.htm.
Harman, Chris. *Zombie Capitalism*. Bookmarks, 2009.
Heinrich, Michael. “Crisis Theory, the Law of the Tendency of the Profit Rate to Fall, and Marx’s Studies in the 1870s.” *Monthly Review* 64, no. 11 (April 2013). http://monthlyreview.org/2013/04/01/crisis-theory-the-law-of-the-tendency-of-the-profit-rate-to-fall-and-marxs-studies-in-the-1870s.
Hodrick, Robert J., and Edward C. Prescott. “Postwar U.S. Business Cycles: An Empirical Investigation.” *Journal of Money, Credit and Banking* 29, no. 1 (February 1, 1997): 1–16.
Horngren, Charles T., ed. *Accounting*. 7th adaptation ed. Frenchs Forest, N.S.W: Pearson Australia, 2013.
Keynes, John Maynard. *General Theory of Employment, Interest and Money*. Harcourt, 1936.
Kliman, Andrew. *Reclaiming Marx’s Capital: A Refutation of the Myth of Inconsistency*. Lanham, MD: Lexington Books, 2007.
———. *The Failure of Capitalist Production: Underlying Causes of the Great Recession*. Pluto Press, 2011.
———. *The Persistent Fall in Profitability Underlying the Current Crisis: New Temporalist Evidence*. New York: Marxist-Humanist Initiative, 2010.
———. “The Whiggish Foundations of Marxian and Sraffian Economics.” *Cambridge Journal of Economics* 38, no. 3 (May 1, 2014): 643–61.
Kliman, Andrew, and Alan Freeman. “The Truthiness of Veneziani’s Critique of Marx and the TSSI.” *Marxism 21* 6, no. 2 (2009): 277–300.

Kliman, Andrew, Alan Freeman, Nick Potts, Alexey Gusev, and Brendan Cooney. “The Unmaking of Marx’s Capital: Heinrich’s Attempt to Eliminate Marx’s Crisis Theory.” MPRA Paper, July 22, 2013. http://mpra.ub.uni-muenchen.de/48535/.

Kliman, Andrew. “Marx’s Concept of Intrinsic Value.” *Historical Materialism* 6, no. 1 (January 1, 2000): 89–114.

Kliman, Andrew J. “The Profit Rate Under Continuous Technological Change.” *Review of Radical Political Economics* 20, no. 2–3 (June 1, 1988): 283–89.

Kliman, Andrew, and Ted McGlone. “A Temporal Single-System Interpretation of Marx’s Value Theory.” *Review of Political Economy* 11, no. 1 (1999): 33–59.

———. “The Transformation Non-Problem and the Non-Transformation Problem.” *Capital & Class* 12, no. 2 (June 1, 1988): 56–84.

Lakatos, Imre. “Criticism and the Methodology of Scientific Research Programmes.” *Proceedings of the Aristotelian Society*, New Series, 69 (January 1, 1968): 149–86.

Lapavitsas, Costas. “Money and the Analysis of Capitalism: The Significance of Commodity Money.” *Review of Radical Political Economics* 32, no. 4 (2000): 631–56.

Lapavitsas, Costas, and Iren Levina. “Financial Profit: Profit from Production and Profit upon Alienation.” *Research on Money and Finance Discussion Paper*, no. 24 (May 2011).

Lapides, Kenneth. “Henryk Grossmann on Marx’s Wage Theory and the ‘Increasing Misery’ Controversy.” *History of Political Economy* 26, no. 2 (June 20, 1994): 239–66.

Lavoie, Don. “Marx, the Quantity Theory, and the Theory of Value.” *History of Political Economy* 18, no. 1 (1986): 155–70.

Lee, Chai-on. “Marx’s Labour Theory of Value Revisited.” *Cambridge Journal of Economics* 17, no. 4 (December 1, 1993): 463–78.

Lenin, Vladimir Ilylich. *The State and Revolution*. marxists.org, 1999. http://www.marxists.org/archive/lenin/works/1917/staterev/.

Mage, Shane. “The ‘Law of the Falling Tendency of the Rate of Profit’: Its Place in the Marxian Theoretical System and Relevance to the US Economy.” Columbia University, 1963.

Marx, Karl. *Capital I*. Translated by Ben Fowkes. London [etc]: Penguin, 1976.

———. *Capital II*. Translated by David Fernbach. London [etc.]: Penguin, 1978.

———. *Capital II*. Translated by David Fernbach. London [etc.]: Penguin, 1978.

———. *Capital III*. Translated by David Fernbach. London [etc.]: Penguin, 1981.

———. *Capital III*. Translated by David Fernbach. Vol. 3. London [etc.]: Penguin, 1981.

———. *Grundrisse: Foundations of the Critique of Political Economy (Rough Draft)*. Harmondsworth, Eng: Penguin Books, 1973.

———. *The Civil War in France*. marxists.org, 2009. https://www.marxists.org/archive/marx/works/1871/civil-war-france/index.htm.

———. *The Eighteenth Brumaire of Louis Bonaparte*. marxists.org, 1995. https://www.marxists.org/archive/marx/works/1852/18th-brumaire/.

———. *Theories of Surplus Value*. Edited by Karl Kautsky. Translated by G. A. Bonner and Emile Burns. London: Lawrence & Wishart, 1951.

———. *Theories of Surplus-Value (volume IV of Capital)*. Moscow: Progress Publishers, 1963.

———. “Value, Price and Profit.” Edited by Eleanor Marx Aveling. marxists.org, 1865 1995. http://www.marxists.org/archive/marx/works/1865/value-price-profit/.

Marx, Karl, and Friedrich Engels. *Karl Marx Friedrich Engels Gesamtausgabe II (MEGA II)*. Edited by Manfred Müller, Jürgen Jungnickel, Barbara Lietz, Christel Sander, and Artur Schnickmann. Vol. II, 4.2. Berlin: Internationales Institut für Sozialgeschichte Amsterdam, 1992.

———. *Manifesto of the Communist Party*. Translated by Moore, Samuel and Engels, Friedrich. marxists.org, 1987. http://www.marxists.org/archive/marx/works/1848/communist-manifesto/.

Mill, John Stuart. *Principles of Political Economy*. Edited by Ashley, W. J. Longmans, Green, and Co., 1909.

Mohun, Simon. “Aggregate Capital Productivity in the US Economy, 1964-2001.” *Cambridge Journal of Economics* 33, no. 5 (2009): 1023.

———. “Distributive Shares in the US Economy, 1964-2001.” *Cambridge Journal of Economics*, no. 30 (2006): 347–70.

Moore, Geoffrey H., and Victor Narnowitz. “The Development and Role of the National Bureau of Economic Research’s Business Cycle Chronologies.” In *The American Business Cycle: Continuity and Change*, edited by Robert J. Gordon, 735–80. UMI, 1986. http://www.nber.org/chapters/c10035.pdf.

Moseley, Fred. “Marx’s Logical Method and the ‘Transformation Problem.’” In *Marx’s Method in Capital: A Re-Examination*. Humanities Press, 1993.

———. *Marx’s Theory of Money: Modern Appraisals*. New York: Palgrave Macmillan, 2005.

NBER. “US Business Cycle Expansions and Contractions.” National Bureau of Economic Research, September 20, 2010. http://www.nber.org/cycles/cyclesmain.html.

Officer, Lawrence. “What Was the Interest Rate Then?” *MeasuringWorth*, 2014. http://www.measuringworth.com/interestrates/.

Officer, Lawrence, and Samuel Williamson. “Annual Inflation Rate in the United States, 1775 - 2013, and United Kingdom, 1265 - 2013.” *MeasuringWorth*, 2013. http://www.measuringworth.com/inflation/.

Okishio, Nobuo. “Technical Changes and the Rate of Profit.” *Kobe University Economic Review* 7 (1961): 85–99.

Passarella, Marco, and Hervé Baron. “Capital’s Pons Ansinorum: The Rate of Turnover in Karl Marx’s Analysis of Capitalist Valorisation.” *MPRA Paper No. 48306*, 2013. http://mpra.ub.uni-muenchen.de/48306/1/MPRA_paper_48306.pdf.

Ramos, Alejandro. “Labour, Money, Labour-Saving Innovation and the Falling Rate of Profit.” Edited by Alan Freeman, Andrew Kliman, and Julian Wells. *The New Value Controversy and the Foundation of Economics*, 2004.

Reuten, Geert, and Peter Thomas. “From the ‘Fall of the Rate of Profit’ in the Grundrisse to the Cyclical Development of the Profit Rate in Capital.” *Science & Society* 75, no. 1 (January 2011): 74–90.

Ricardo, David. *The Principles of Political Economy and Taxation*. London and New York: Everyman’s Library, 1973.

Roberts, Michael. “A World Rate of Profit.” *Paper Presented at the IIPPEE / AHE / FAPE Conference*, 2012. http://thenextrecession.files.wordpress.com/2012/09/a-world-rate-of-profit.pdf.

———. *The Great Recession*, 2009. http://archive.org/details/TheGreatRecession.ProfitCyclesEconomicCrisisAMarxistView.

Shaikh, Anwar. “The Falling Rate of Profit as the Cause of Long Waves: Theory and Empirical Evidence.” In *New Findings in Long Wave Research*, edited by Alfred Kleinknecht, Ernest Mandel, and Wallerstein, Immanuel. London: Macmillan Press, 1992.

Shaikh, Anwar, and Ertuğrul Ahmet Tonak. *Measuring the Wealth of Nations: The Political Economy of National Accounts*. Cambridge: Cambridge University Press, 1994.

Smith, Adam. *An Inquiry into the Nature and Causes of the Wealth of Nations*. Edited by R. H. Campbell, A. S. Skinner, and W. B. Todd. Vol. 1. Clarendon Press, 1976.

Sweezy, Paul. “Editor’s Introduction.” In *Karl Marx and the Close of His System*. New York: A. M. Kelley, 1949.

———. *The Theory of Capitalist Development*. London: Dobson, 1949.

Thorp, Willard Long, and Hildegarde E. Thorp. “The Annals of the United States of America.” In *Business Annals*, 107–45. NBER, 1926. http://www.nber.org/chapters/c4638.pdf.

Tobin, James, and Brainard, William C. “Asset Markets and the Cost of Capital.” *Cowles Foundation Discussion Papers*, no. 427 (1976). http://econpapers.repec.org/paper/cwlcwldpp/427.htm.

US Bureau of Economic Analysis. *Concepts and Methods of the U.S. National Income and Product Accounts*, 2011. http://www.bea.gov/national/pdf/chapters1-4.pdf.

———. “Fixed Assets Accounts,” 2014. http://www.bea.gov/iTable/index_FA.cfm.

———. “GDP-by-Industry Accounts,” 2014. http://www.bea.gov/iTable/index_industry_gdpIndy.cfm.

———. “National Income and Product Accounts Tables,” 2014. http://www.bea.gov/iTable/index_nipa.cfm.

Veneziani, Roberto. “The Temporal Single-System Interpretation of Marx’s Economics: A Critical Evaluation.” *Metroeconomica* 55, no. 1 (February 1, 2004): 96–114.

Webber, M. J., and D. L. Rigby. “The Rate of Profit in Canadian Manufacturing, 1950-1981.” *Review of Radical Political Economics* 18, no. 33 (1986).

Weisskopf, Thomas E. “Marxian Crisis Theory and the Rate of Profit in the Postwar U.S. Economy.” *Cambridge Journal of Economics* 3, no. 4 (December 1, 1979): 341–78.

Wells, Julian. “The Rate of Profit as a Random Variable.” PhD Thesis, The Open University, 2007. http://staffnet.kingston.ac.uk/~ku32530/phdindex.html.

Williamson, Samuel. “What Was the U.S. GDP Then?” *MeasuringWorth*, 2014. http://www.measuringworth.com/usgdp/.

Wolff, Richard D., Bruce Roberts, and Antonino Callari. “Marx’s (not Ricardo’s) ‘Transformation Problem’: A Radical Reconceptualization.” *History of Political Economy* 14, no. 4 (December 21, 1982): 564–82.