Article

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Marx 200 years on

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Abstract

This year marks the 200th anniversary of the birth of Karl Marx, the last of the classical political economists. This article aims to mark the occasion by drawing attention to some of his key works in economics and to present some of his ideas in a way that will make sense to readers not familiar with or very much interested in the complexities of the labour theory of value. I begin with a brief biography and a summary of his main works in economics. I then explore in some detail ideas related to the economic surplus, unpaid labour and exploitation, and attempt to tease out the implications of his analysis for the determination of the wage share. While I argue that Marx has not succeeded in providing adequate theoretical support for his prediction that the wage share will fall as capital accumulates, he has nonetheless provided a very interesting and insightful collection of ideas by which we may, even today, approach a wide range of issues relating to production and distribution.

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Keywords

Capital accumulation, functional distribution of income, Marxian economics

Introduction

This year marks the 200th anniversary of the birth of Karl Marx, the last and the greatest of the classical political economists. My aim in this article is to mark the occasion by drawing attention to some of his key works in economics and to present some of his ideas in a way that will make sense to readers not familiar with or very much interested in the complexities of the labour theory of value (especially when that theory is thought of as a theory of relative prices). I begin with a brief biography and a summary of his main works in economics. I then explore in some detail ideas related to the economic surplus, unpaid labour and exploitation, and attempt to tease out the implications of his analysis

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for the determination of the wage share. I focus on the wage share despite this being only one of many possible topics for two reasons. First, there has been a resurgence of interest in the wage share of its own right – in part because of the attention given to functional income distribution in Piketty (2014); second, because I think it is one topic on which I may have something new to offer – at least in terms of a model of the wage share in the short run. I should stress at the outset that my approach to Marx is very much influenced by the works of Joan Robinson (1966) and especially the second edition of *An Essay on Marxian Economics*.

A brief biography of Marx and a summary of his key works in political economy

Karl Marx was born in 1818 in Trier, then in the Prussian Rhineland, now in Germany close to the border with Luxembourg. He studied law and philosophy at Bonn and Berlin, taking out his doctorate in 1841. He then moved to Cologne where he worked as a (radical) journalist and newspaper editor. Difficulties with the censors led to the suppression of the newspaper in late 1843 at which time Marx moved to Paris. It was in Paris that he embarked upon his quest to develop a 'scientific socialism' and began a serious (and what would turn out to be a lifelong) study of political economy. In early 1845, he was forced to leave France and moved to Brussels. In Brussels (and, to a lesser extent, earlier in Paris), he was actively involved with German emigres and other socialists and communists and it was in Brussels that he wrote (together with Engels[1]) the *Manifesto of the Communist Party*. In March 1848, Marx was expelled from Brussels and moved to Cologne. In June 1849, he returned to Paris following an order to leave Prussia. Expelled from Paris in August 1849, he moved to London where he resumed his study of political economy and further refined his own ideas. Apart from brief visits to the continent, he spent the rest of his life (in other words, the major part of his adult life) in London. During this period, he wrote and published a great deal. He was also very active in worker's associations and especially the International Workingmen's Association (aka the First International) founded in 1864. He died in London in 1883 and is buried in Highgate Cemetery.

From the point of view of political economy, his most important works include *Economic and Philosophic Manuscripts of 1844* (aka *The Paris Manuscripts*, written in 1844 but first published in 1932); *A Contribution to the Critique of Political Economy* (first published in 1859); a pamphlet *Wages, Price and Profit* (aka *Value, Price and Profit*, written in 1865 and first published in 1898); *Capital Volumes 1–3* (first published in 1867, 1885 and 1894, respectively); and *Theories of Surplus Value* (aka *Capital Volume 4* – this is actually made up of three related volumes, first published in 1905–1910). A brief note on each of these works follows.

Economic and Philosophic Manuscripts of 1844

These are best known for their argument that human beings are productive (creative) creatures who find fulfilment in the free exercise of their natural powers. The conditions of production and exchange in capitalist economies thwart that exercise, causing the alienation of workers from the product of their labour, from labour itself (i.e. people begin to resent working), from their human nature as workers/creators and from one another (because we see others as competitors for jobs and only interact with them via markets). The result is misery (or an absence of joy) due to our not being able to do what would truly fulfil us. Alienation and its consequences are a recurrent theme in Marx's writings about capitalist economies.

A Contribution to the Critique of Political Economy

The Preface gives a detailed exposition of one of Marx's key ideas: the economic (or 'materialist') interpretation of history. It contains the famous passage:

> In the social production of their life, men inevitably enter into definite relations that are indispensable and independent of their will, relations of production which correspond to a definite stage of development of their material productive forces. The sum total of these relations of production constitutes the economic structure of society, the real foundation, on which rises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the social, political and intellectual life process in general. It is not the consciousness of men that determines their being, but, on the contrary, their social being that determines their consciousness. At a certain stage of their development, the material productive forces of society come into conflict with the existing relations of production, or – what is but a legal expression for the same thing – with the property relations within which they have been at work hitherto. From forms of development of the productive forces these relations turn into their fetters. … Then begins an epoch of social revolution.

He goes on to say that the '… bourgeois relations of production are the last antagonistic form of the social process of production. But at the same time, the productive forces developing in the womb of bourgeois society create the material conditions for resolving this antagonism' (Marx, 1970: 20f).

In a lengthy Appendix 1 to this work, Marx (1970) argues (inter alia) that whenever we write about 'production', we should

> … always have in mind production at a definite stage of social development … All periods of production, however, have certain features in common: they have certain common categories. Production in general is an abstraction, but a sensible abstraction in so far as it actually emphasises and defines the common aspects and thus avoids repetition. [However, it] is necessary to distinguish those definitions which apply to production in general, in order not to overlook the essential differences existing despite … the very fact that the subject, mankind, and the object, nature, are the same. For instance, on [a] failure to perceive this fact depends the entire wisdom of modern economists who prove the eternity and harmony of existing social relations. For example, [production] … is not possible without past, accumulated labour … Capital is among other things also an instrument of production, and also past, materialised labour. Consequently, capital is a universal and eternal relation given by nature that is, *provided* one omits precisely those specific factors which turn the 'instrument of production' or 'accumulated labour' into capital. (p. 189f, my emphasis)

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*Wages, Price and Profit (*aka *Value, Price and Profit)*

This pamphlet is the text of an address delivered by Karl Marx to the General Council of the International Working Men's Association in 1865. One member of the General Council, John Weston, had argued that wage increases led to price increases and so did not benefit the workers and that trade unions must be viewed as having a harmful effect. In his response, Marx sets out his views on the relationship between money wage increases and price increases, and also on the role of trade unions. In order to do this, he sets out in a very brief and readable form the economic theories which appear in the much longer (and less digestible at times) work *Capital*. For example, we find in the pamphlet a very clear explanation of his labour theory of value, the concept of 'labour power'[2] (more on this shortly), 'surplus value' and the ways in which surplus value is decomposed into rent, interest and profit.

Capital Volume 1

This was first published (in German) in 1867 (in English in 1886) and was the only volume of *Capital* published in various editions in Marx's lifetime (and thus incorporating alterations and corrections made by Marx himself). The other two volumes were put together by Engels based on Marx's notes. While the other volumes, as we shall see, have topics in them of interest to an economist, the fundamental core of Marx's economic ideas is in Volume 1. This is a work of great scholarship. It covers a very wide range of ideas frequently supported by empirical evidence (much of the empirical support is taken from official statistics for Great Britain) and is subtitled 'A Critical Analysis of Capitalist Production'. The work is divided into a number of parts covering (inter alia) the nature of commodities and money, the idea that under capitalism labour itself becomes a commodity, the performance of 'unpaid labour' and the production of 'surplus value', the determination of the length of the working day, the nature of factory production and modern industry, the accumulation of capital, various historical processes by which capitalism evolved out of feudalism and the way in which capitalism was established in European colonies (with special attention being given to Australia – indeed, as we shall see, Marx argues that it is the Australian colonial experience that reveals the true nature of capitalism).

It is in *Capital Volume 1* that we find a comprehensive discussion of an important component of Marx's economics: namely, 'that we must distinguish between labour power – the capacity or potential to do useful labour in production – and labour itself – the actual expenditure of human energy with the aim of achieving a productive end' (Foley, 1986: 34). Marx (1954) writes, 'By labour-power or capacity for labour is to be understood the aggregate of those mental and physical capabilities existing in a human being, which he exercises whenever he produces a use-value of any description' (p. 164). In other words, workers do not sell 'themselves', instead, in return for a wage, they give their employer the right to control their productive effort for a given period of time. Marx (1954) goes on to say:

> 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

> special article. … Given the individual, the production of labour-power consists in his reproduction of himself or his maintenance. For his maintenance he requires a given quantity of the means of subsistence. Therefore the labour-time requisite for the production of labour-power reduces itself to that necessary for the production of those means of subsistence; in other words, the value of labour-power is the value of the means of subsistence necessary for the maintenance of the labourer. (p. 167)

The capitalist profits from the purchase of labour power because the labourer will be working more hours than are required to simply create the value of their labour power (the labour time necessary for the production of the means of subsistence for that worker). It is this excess labour time, over and above the 'necessary' labour time, which Marx calls surplus value. Some of the most important (and readable) chapters in *Capital Volume 1* deal with different ways in which the size of the surplus value may be increased (e.g. by increasing the length of the working day).

Capital Volume 2

Capital Volume 2 is subtitled 'The Process of Circulation of Capital' and is of interest to economists primarily because it is here that Marx explores the conditions for sustainable growth where there is net investment. He discusses the likelihood of effective demand failures and especially 'under-consumption'.[3] In his presentation of the relationships between various categories of output, income and expenditure in a two-sector model, Marx is also able to present in some detail the relationship between economic reproduction and the 'circular flow' on one hand and the reproduction of the class relations on the other.

Capital Volume 3

Capital Volume 3, subtitled 'The Process of Capitalist Production as a Whole', is where Marx discusses at some length the tendency of the rate of profit to fall and presents a comprehensive discussion of various influences which may act against the underlying tendency. The issue was important for Marx as a falling rate of profit was crucial to his explanation of the inevitability of the collapse of capitalism. Volume 3 also records Marx's attempt to find a general rule by which to transform the 'values' of commodities (based on their embodied labour content) into the competitive prices observed in the marketplace.

Theories of Surplus Value (aka *Capital Volume 4*)

Theories of Surplus Value (aka *Capital Volume 4*) is a lengthy and critical history of political economy and especially the ideas of Quesnay, Smith, Malthus and Ricardo. It is here that we see how Marx's own ideas arose and evolved from his engagement with the ideas of his predecessors. For example, in Part II of the *Theories of Surplus Value*, 'Marx acknowledged that his own theory of surplus value was developed as a critique of Ricardo's idea' (Eatwell, 1974: 282).

Clearly, even if we define economics rather narrowly, Marx wrote on a wide range of topics and they cannot all be given their proper treatment in a single journal article. Given the likely interests of readers of this journal in what follows, I will focus on the set of ideas which encompass the concepts of the economic surplus, unpaid labour and exploitation, and the relationship between income distribution and capital accumulation. I begin with the concept of 'surplus output' or 'surplus labour', an idea which is common to all the Classical Political Economists (including Marx).

The concept of an economic surplus

The key idea is that economic and social progress (and, in particular, the accumulation of capital) entails the employment of some workers to do things other than to produce the food and other 'necessaries' which make up the basket of goods and services which workers consume. However, for this to happen, the workers who produce the goods and services that workers consume (wage-goods) must produce more than they (the workers producing wage-goods) themselves consume. In other words, the workers in the wage-goods sector must produce 'a surplus' of wage-goods.

In what follows, I will call the excess of the output of wage-goods over the consumption of wage-goods by the workers in that sector, 'the economic surplus'. Two obvious questions are as follows: (1) what determines the size of the surplus, and (2) what might it be used for? We shall leave the second question until later, when we shall see that Marx's views on this are far more nuanced than many people think. We begin with the determination of the size of the surplus.

Since production is a 'flow' concept, we must begin by deciding the length of the time period we will use as the basis for our measures. Since it will link up with a very important element of Marx's ideas, I will, for the moment, measure things on a daily basis.

Measured in units of output, the surplus will be the difference between the (average) amount a worker in the wage-goods sector produces in a day (I will use A_{wg} as the symbol for this) and the worker's (average) daily consumption of wage-goods. Under the assumption that workers consume all their income and do not save, their daily consumption will equal their real wage per day (w_r). This means that each worker will, on average, be producing a surplus of $(A_{wg} - w_r)$ units of output each day and so the total surplus produced by all workers in the wage-goods sector each day will be $L_{wg}(A_{wg} - w_r)$, where L_{wg} is the number of workers in the wage-goods sector.

Thus far, we have measured the economic surplus in units of output, but it is possible to measure it in units of labour or 'labour time'. Let us go back to a single worker who is producing a surplus of $(A_{wg} - w_r)$ each day. If we divide this by the real wage, we will have a measure of the size of the surplus in units of labour, that is, a measure of the number of workers outside the wage-goods sector that the surplus originating in the wage-goods sector can sustain. A measure of the surplus in units of labour for a single worker employed in the wage-goods sector will be

$$\frac{\left(A_{wg} - w_r\right)}{w_r} = \frac{A_{wg}}{w_r} - 1 \tag{1}$$

In the next two sections of the article, we will see that the surplus is related to 'unpaid labour' and 'exploitation'.

Paid and unpaid labour time

In this section, I shall again confine myself to looking at that sector (that combination of industries) which produces wage-goods – the goods and services which workers consume. I shall assume that the sector is vertically integrated, and thus we can think of it producing its own raw materials.

Following Marx's lead, let us look at work taking place over a typical day. Let

a_{wg} be (average) output per hour worked in the wage-goods sector;

h be the number of hours workers in the wage-goods sector work in a day;[4]

w_r (again) be the real wage rate per day – this is the money wage paid per day – divided by the price of the things workers buy, that is, divided by the price of wage-goods.

We know that real profits per worker per day in the wage-goods sector (π_{wg}) will be the difference between real output per worker over the whole of the working day and the real daily wage. This is

$$\pi_{wg} = \left(a_{wg} \times h\right) - w_r$$

Notice that we can rewrite this as

$$\pi_{wg} = a_{wg}\left(h - \frac{w_r}{a_{wg}}\right)$$

Since a_{wg} is the amount a worker can produce in 1 hour, the ratio w_r / a_{wg} must be the number of hours a worker in the wage-goods sector would need to work to create a volume of output equal in value to the (daily) real wage. Marx refers to this number of hours as 'paid labour' or 'necessary labour hours'; I shall use the symbol h^* for this.

Since $h^* = (w_r / a_{wg})$, we can write the expression given above for (real) profits per worker in the wage-goods sector in terms of the gap between h and h^*

$$\pi_{wg} = a_{wg}\left(h - h^*\right) \tag{2}$$

Hence, Marx's (uncontroversial, I'd have thought) view that profits must be a reflection of 'unpaid labour time' or 'surplus labour'. He writes,

> The total working-day of the labourer is divided into two parts. One portion in which he [the worker] performs the amount of labour necessary to reproduce the value of his own means of subsistence; the paid portion of his total labour, the portion necessary for his own maintenance

> and reproduction. The entire remaining portion of the working-day, the entire excess quantity of labour performed above the value of the labour realised in his wages, is surplus-labour, unpaid labour, … which in turn is divided into differently named parts, into profit (profit of enterprise plus interest) and rent. (Marx, 1959a: 833f)

Unpaid labour and exploitation

An important element in Marx's view of history is the idea that by one means or another in the prehistory of capitalism, the mass of the people are dispossessed of any 'means of production' they own or have free access to, including land, raw materials and (especially) capital goods. He explains how it came about that means of production get to be privately owned by 'a few', and thus how the capitalists can find workers on the labour market ready and willing to work for them, in the last part of *Capital Volume 1* (Chapters 26–33). Among the examples he gives of this process (he refers to it as 'primitive accumulation') are the clearances and enclosures in Scotland and England. He also mentions Australia in this context (in Chapter 33) – indeed, he argues that the Australian colonial experience reveals the true nature of capitalism, namely, that 'capital is not a thing, but a social relation between persons'. This is explained with reference to Wakefield's theory of colonisation:

> Wakefield discovered that in the Colonies, property in money, means of subsistence, machines, and other means of production, does not as yet stamp a man as a capitalist if there be wanting the correlative – the wage-worker, the other man who is compelled to sell himself of his own free-will. He discovered that capital is not a thing, but a social relation between persons, established by the instrumentality of things. Mr. Peel, he moans, took with him from England to Swan River, West Australia, means of subsistence and of production to the amount of £50,000. Mr. Peel had the foresight to bring with him, besides, 3,000 persons of the working-class, men, women, and children. Once arrived at his destination, Mr. Peel was left without a servant to make his bed or fetch him water from the river. Unhappy Mr. Peel, who provided for everything except the export of English modes of production to Swan River! (Marx, 1954: 717)

Elsewhere, he writes,

> To the single individual distribution naturally appears as a social law, which determines his position within the framework of production, within which he produces; distribution thus being antecedent to production. An individual who has neither capital nor landed property of his own is dependent on wage-labour from his birth as a consequence of social distribution. But this dependence is itself the result of the existence of capital and landed property as independent factors of production. (Marx, 1970: 201)

It is the idea (fact?) that workers in a capitalist economy have no option but to work for others (because they do not own or control the 'means of production', including land) that leads Marx to describe unpaid labour or surplus labour as 'exploitation'. To him, this is an essential part of the nature of capitalism because 'Capital … is essentially the command over unpaid labour' (Marx, 1954: 500).

But, it is important to note that Marx explicitly rejects the 'moral' aspect of exploitation and restricts the concept to a 'factual' and 'scientific' description of labour relations under capitalism.

In his *Marginal Notes on Adolph Wagner*, Marx (1989) writes,

> … 'profit on capital' is in actual fact not 'a deduction from, or robbery of, the worker'. On the contrary, I depict the capitalist as the necessary functionary of capitalist production and demonstrate at great length that he not only 'deducts' or 'robs' but enforces the production of surplus value, thus first helping to create what is to be deducted; what is more, I demonstrate in detail that even if only equivalents were exchanged in the exchange of commodities, the capitalist – as soon as he pays the worker the real value of his labour-power – would have every right, i.e. such right as corresponds to this mode of production, to surplus-value. (p. 535)

He goes on to say,

> [Wagner] falsely attributes to me the view that 'the surplus-value produced by the workers alone remains, in an unwarranted manner, in the hands of the capitalist entrepreneurs'. In fact I say the exact opposite: that the production of commodities must necessarily become 'capitalist' production of commodities at a certain point, and that according to the law of value governing it, the 'surplus-value' rightfully belongs to the capitalist and not the worker. (Marx, 1989: 558)

Engels summed up the matter in his preface to the first German edition of Marx's (1963) work *The Poverty of Philosophy*:

> According to the laws of bourgeois economics, the greatest part of the product does not belong to the workers who have produced it. If we now say: that is unjust, that ought not to be so, then that has nothing immediately to do with economics. We are merely saying that this economic fact is in contradiction to our moral sentiment. Marx … never based his communist demands upon this … he says only that surplus value consists of unpaid labour, which is a simple fact. (p. 10f)

Time and again, Marx says that 'the equitable criterion of "exchange of equals" was honoured in the capitalist system' (Roncaglia, 2005: 255). Marx (1954) writes, for example, that

> This sphere … within whose boundaries the sale and purchase of labour-power goes on, is in fact a very Eden of the innate rights of man. There alone rule Freedom, Equality [and] Property … Freedom, because both buyer and seller of a commodity, say of labour-power, are constrained only by their own free will. They contract as free agents, and the agreement they come to, is but the form in which they give legal expression to their common will. Equality, because each enters into relation with the other, as with a simple owner of commodities, and they exchange equivalent for equivalent. Property, because each disposes only of what is his own. (p. 172)

Elsewhere, he writes,

> Upon the basis of the wages system the value of labouring power is settled like that of every other commodity … To clamour for … equitable retribution on the basis of the wages system is the same as to clamour for freedom on the basis of the slavery system. What you think just or equitable is out of the question. The question is: What is necessary and unavoidable with a given system of production? (Marx, 1947: 34)

But this ‘equality’ does not extend to the production process itself. There we see unpaid labour time, masked by the appearance that workers are paid for *all* of their labour time. Marx thus stresses the difference between nominal, money or ‘apparent’ magnitudes and real magnitudes. In this context, he repeatedly points out that in a ‘wages system’, all hours of work appear to be paid (after all workers receive payment in the form of money for every hour they work). He writes, for example, ‘On the basis of the wages system even the unpaid labour seems to be paid labour’ (Marx, 1947: 37). The amount of money

> … by which a part only of the working-day – i.e. 6 hours’ labour is paid for, appears as the … price of the whole working-day of 12 hours, which thus includes 6 hours unpaid for. The wage form thus extinguishes every trace of the division of the working-day into necessary labour and surplus-labour, into paid and unpaid labour. All labour appears as paid labour. (Marx, 1954: 505)

We turn now to look at the relationship between unpaid labour and the functional distribution of income.

The (functional) distribution of income

Given equation (2) and given also our definition of h^*, it must be the case that the ratio of profits to wages in the wage-goods sector will be

$$\frac{\pi_{wg}}{w_r} = \frac{\pi_{wg} / a_{wg}}{w_r / a_{wg}} = \frac{h - h^*}{h^*} = \frac{h}{h^*} - 1 \tag{3}$$

We can use this expression as the foundation for a first look at one of the key concepts in *Capital*, namely, ‘the rate of surplus value’ or ‘rate of exploitation’. Marx (1954) writes, ‘Capital … compels the working-class to do more work than the narrow round of its own life-wants prescribes’ (p. 293) and ‘the rate of surplus-value is … an exact expression for the degree of exploitation of labour-power by capital, or of the labourer by the capitalist’ (p. 209). Elsewhere, he writes,

> [t]he rate of surplus value, all other circumstances remaining the same, will depend … on the ratio in which the working day is prolonged over and above that extent, by working which the working man would only reproduce the value of his labouring power, or replace his wages. (Marx, 1947: 36)

Notice that there is an intimate connection between the size of the economic surplus discussed above and the rate of surplus value. We can see this by comparing equation (1) with equation (3). Taken together, they imply that

$$\frac{\left(A_{wg} - w_r\right)}{w_r} = \frac{A_{wg}}{w_r} - 1 = \frac{a_{wg} h}{a_{wg} h^*} - 1 = \frac{h}{h^*} - 1 = \frac{h - h^*}{h^*} = \frac{\pi_{wg}}{w_r} \tag{4}$$

Among other things, this tells us that there is a one-to-one mapping between the size of the economic surplus, the extent of any unpaid labour and (the functional) income distribution.

It is easy to show that the ratio of profits to wages (see equation (4)) and the rate of surplus value are related to the 'wage share' – that is, the ratio of the real wage per worker to real output per worker (in the wage-goods sector):[5]

The wage share (S_{wg}) will equal

$$S_{wg} = \frac{w_r}{A_{wg}} = \frac{w_r}{a_{wg} \times h}$$

Since the ratio w_r / a_{wg} is the number of hours a worker in the wage-goods sector would need to work to create a volume of output equal in value to the real wage – that is, h^* – we can write our expression for the wage share as

$$S_{wg} = \frac{w_r}{A_{wg}} = \frac{h^*}{h} \tag{5}$$

For future reference, note that a fall in the wage share will be associated with a fall in h^* / h and thus a rise in the ratio of unpaid to paid labour, that is, a rise in the rate of exploitation (see equation (3)). This means that those things which determine the behaviour of the wage share over time are also determining the behaviour of the rate of exploitation (and vice versa).

Of particular interest to Marx (and the other classical economists) is understanding the relationships between the size of the economic surplus of wage-goods, the rate of capital accumulation in an economy and the wage share in the wage-goods sector – and thus the ratio between paid and total about hours and the rate of exploitation. We will look at this in the next section of the article.

The real wage, the wage share and capital accumulation

Again, following Marx, let there be two sectors, one sector produces wage-goods – the goods and services which workers consume (it will continue to be denoted by the subscript '*wg*') – while the other sector produces new capital goods (to be denoted by the subscript '*cg*'). Assume each sector is vertically integrated and thus each one produces its own raw materials.

To begin with, we focus on the supply and demand for wage-goods in any period. This is a useful step towards identifying the relationship between the real wage and the wage share in the wage-goods sector on one hand and the rate of capital accumulation (i.e. the level of investment) on the other.[6]

What can we say about the total supply of wage-goods in any period? Let us approach it this way. The average product of labour in the wage-goods sector (A_{wg}) will be the ratio of output to labour input

$$A_{wg} = \frac{C_{wg}}{L_{wg}}$$

where C_{wg} is the supply of wage-goods in real terms.

This implies that the output of wage-goods (I am assuming that this is equal to the quantity of wage-goods supplied to the market) in any period will be

$$C_{wg} = A_{wg} L_{wg}$$

What can we say about the demand for wage-goods? Let w be the money wage per worker (all workers are assumed to be identical so both sectors pay the same money wage to their workers) and p_{wg} be the price of wage-goods (assume all workers consume an identical 'basket' of wage-goods). So the 'real wage' (measured from the point of view of the worker) is defined as w / p_{wg} and this is the same for all workers.

Now we know that the total money amount spent on wage-goods in this model (total demand for wage-goods) is the total wages bill for the economy (by assumption workers do not save and capitalists do not buy wage-goods), so

$$p_{wg} C_{wg} = wL$$

If the market for wage-goods is in competitive equilibrium,[7] it must be the case that

$$p_{wg} C_{wg} = p_{wg} A_{wg} L_{wg} = wL$$

Rearranging the above gives an expression for the size of the real wage (w / p_{wg} – to reduce the amount of notation, I will again write w_r for the real wage) as

$$w_r = \frac{w}{p_{wg}} = A_{wg}\left(\frac{L_{wg}}{L}\right) \tag{6}$$

In other words, the real wage reflects the *average* product of labour in the wage-goods sector and the relative size of that sector, as measured by the proportion of the total number of workers who are employed in the sector producing wage-goods.[8]

Now, since total employment will be the sum of employment in the two sectors so that $L = L_{wg} + L_{cg}$, we can write equation (6) as

$$w_r = A_{wg}\left(\frac{L_{wg}}{L}\right) = A_{wg}\left(1 - \frac{L_{cg}}{L}\right) \tag{7}$$

In other words, the real wage reflects the average product of labour in the wage-goods sector and the proportion of the total number of workers who are employed in the sector producing new capital goods.

Notice in passing that equation (7) can be rearranged to yield

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$$\frac{A_{wg}}{w_r} - 1 = \frac{L}{L - L_{cg}} - 1 = \frac{L_{cg}}{L - L_{cg}} = \frac{L_{cg}}{L_{wg}} \tag{8}$$

The relationship given in equation (5) implies that

$$\frac{A_{wg}}{w_r} - 1 = \frac{h - h^*}{h^*}$$

Inserting this into equation (8) gives

$$\frac{h - h^*}{h^*} = \frac{L_{cg}}{L_{wg}}$$

which is to say that in competitive equilibrium – and thus when profits are being realised – the extent of unpaid labour in the wage-goods sector (and the rate of exploitation) is related to the relative size (as measured by the number employed) of the capital-goods sector.

Equation (7) can also be manipulated to give an expression for the wage share (in the wage-goods sector)

$$S_{wg} = \frac{w_r}{A_{wg}} = 1 - \frac{L_{cg}}{L} = \frac{h^*}{h} \tag{9}$$

We now introduce the rate of accumulation. The number employed in the capital-goods sector will depend upon the level of output of that sector (I) and labour productivity in that sector (A_{cg}), such that

$$L_{cg} = \frac{I}{A_{cg}}$$

Then, equation (7) becomes

$$w_r = A_{wg}\left[1 - \left(\frac{1}{A_{cg}}\right)\left(\frac{I}{L}\right)\right] \tag{10}$$

So the real wage depends upon the average product of labour in the wage-goods sector, the average product of labour in the capital-goods sector *and* the rate of capital formation per worker in the economy as a whole.

Given the technology in use, the higher the rate of capital formation relative to total employment, the greater will be the proportion of the workforce employed in the capital-goods sector, the lower the proportion of the total workforce employed in the wage-goods sector and thus the lower the output of wage-goods relative to the total number of workers in the economy. The lower, therefore, will be the real wage.

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The expression for the real wage (equation (10)) also has implications for the determination of the wage share (aka labour's share) at least in the wage-goods sector. (I focus on the wage-goods sector because, as we have seen above, it is related to an unambiguous measure of the size of the economic surplus, the rate of exploitation and unpaid labour.) Dividing both sides of equation (10) by the average product of labour in the wage-goods sector (A_{wg}) gives

$$\frac{w_r}{A_{wg}} = S_{wg} = \left[1 - \left(\frac{1}{A_{cg}}\right)\left(\frac{I}{L}\right)\right] \tag{11}$$

This shows that the wage share in the wage-goods sector and, given equation (5) together with equation (4), the rate of exploitation depends upon two things: first, the pace of accumulation in the economy, specifically (I/L), and second, the average product of labour (i.e. the technique in use) in the capital-goods sector (A_{cg}).

It is important to note, at least in passing, that in this model, a change in the average product of labour in the wage-goods sector (i.e. technical change in that sector) *by itself* will not change the wage share or the ratio of 'paid' hours to total hours. Essentially, this is because as A_{wg} changes, the real wage would have to rise in the same proportion (whether as a result of a rise in the money wage and/or a fall in prices) to ensure that the additional output is sold (we are assuming competition – perfectly flexible money wages and/or prices – and market clearing). This is at odds with some sections in Volume 1 of Marx's (1954) *Capital* (and especially Chapters 12 and 24), where he typically assumes that 'real wages … never rise proportionally to the productive power of labour' (p. 566). If this were the case and the average product of labour in the wage-goods sector were to rise (cet. Par.), the ratio of paid to total hours would fall and the ratio of unpaid to paid hours and thus the rate of exploitation in that sector would rise. This is of some relevance to Australia today, in that unless there is a marked rise in the rate of accumulation at the same time as the real wage is not keeping pace with productivity growth, there will be an excess supply of wage-goods, resulting in falling sales but likely also a fall in orders for stocks and new capital goods, which would contribute to the development of an economic crisis. The reason I am working with a model in which the change in the average product of labour in the wage-goods sector (cet. Par.) is accompanied by a change in the real wage in the same proportion is simply that I am taking Marx seriously when he insists that we must start out by providing an explanation for (the rate of) exploitation consistent with an economy where competition rules *and* profits are realised (see Note 8).[9]

The evolution of the wage share and the rate of exploitation over time

One of the most important chapters in all three volumes of *Capital* is the chapter titled 'The General Law of Capitalist Accumulation' – this is Chapter 25 of Volume 1. Among the many consequences of capitalist economic growth which he identifies in that chapter, there are two trends that we will consider here: (1) a rise in the ratio of fixed capital to labour and, as a result of this, (2) a fall in the wage share. In this section of the article, we shall use the ideas presented in previous sections to investigate the argument that a fall in the wage share is a necessary consequence of a trend increase in the capital-labour ratio.

Consistent with Marx (1954), I shall assume that the level of investment (i.e. the rate of capital accumulation) is exogenous: 'To put it mathematically: the rate of accumulation is the independent, not the dependent, variable; the rate of wages, the dependent, not the independent, variable' (p. 581).

Equation (11) shows that the wage share in the wage-goods sector is negatively related to the rate of accumulation (specifically, I/L) and is positively related to the rate of technical change in the capital-goods sector (i.e. changes in A_{cg}). We shall discuss the role of each variable in turn.

What can we say about the behaviour of I/L over time? As mentioned above, a key idea to be found in Marx's *Capital* is that the capital-labour ratio[10] (K/L) in the economy as a whole will be tending to rise over time. Given this, it is convenient to begin by asking, what must be the behaviour of I/L over time if K/L is rising over time?

For the ratio K/L to rise, the rate of growth of K must exceed the rate of growth of L. In symbols

$$\frac{\Delta K}{K} > n$$

where n is the rate of growth of total employment, that is, $n = \Delta L/L$.[11]

Neglecting depreciation, the change in the capital stock (ΔK) will equal the 'value' (or number) of new capital goods produced in any period, that is, the level of (gross) investment (I). This means we can write the above as

$$\frac{I}{K} > n$$

which implies that

$$\frac{I}{L} > n\frac{K}{L}$$

Clearly, given n, if K/L is rising over time, then I/L must be rising over time. As Marx (1959a) puts it, 'the progress of capital accumulation … goes hand in hand with accelerated accumulation' (p. 240).[12]

A rising level of I/L implies (given labour productivity in the capital-goods sector) that the wage share in the wage-goods sector would be falling – see equation (11) – and the rate of exploitation would be rising – see equations (4) and (5). However, equation (11) tells us that the wage share does not solely depend on the pace of accumulation (I/L) but also on the average product of labour in the capital-goods sector (A_{cg}). Mark Blaug (1960) has pointed out that Marx's work is notable for its '*persistent* emphasis upon technical change as an inherent feature of capital accumulation …' (p. 495, my emphasis). Given this, it would be unwise for us to neglect technical change and specifically a change (typically for our purposes, a rise) in the average product of labour in the capital-goods sector.

Throughout the discussion which follows, I shall assume throughout that I/L is rising over time and that, at the same time, technical change is going on and A_{cg} is rising. Equation (11) tells us that the impact of these changes on the wage share will depend upon how large is the rise in A_{cg} (and thus the fall in $1/A_{cg}$) relative to the rise in I/L.

There are three possibilities.

1. The first possibility is where A_{cg} is rising, but not as fast as I/L is rising. In this case, the term $(1/A_{cg})$ will be falling but at a slower rate than I/L is rising and, as a result, the term $(1/A_{cg}) \times (I/L)$ will be becoming larger over time. This will lead to a rise in the proportion of the employees who are employed in the capital-goods sector and this in turn leads to a fall in the wage share and a rise in the rate of exploitation (see equations (4), (5) and (11)).

In their excellent book titled *The Political Economy of Marx*, Michael Howard and John King (1985) have drawn attention to two things that Marx believed would occur as a capitalist economy experienced economic growth: first that 'the path of the economy … is one in which Department 1 [the name given by Marx to the sector which produces new capital goods] produces an increasing proportion of total output' and second that 'technical change … acts to raise the rate of exploitation …' (p. 194). This is consistent with the scenario presented in the previous paragraph (where A_{cg} is rising but not as fast as I/L is rising). However, we cannot rule out a priori either the possibility that A_{cg} is rising at the same rate as I/L is rising or that it is rising at a faster rate than I/L is rising. We shall look at these two additional possibilities, beginning with the latter case.

2. A second possibility is that A_{cg} is rising at exactly the same rate as I/L is rising. In this case, the term $(1/A_{cg})$ will be falling at the same rate as I/L is rising. This means that will be constant over time and so we can predict that the wage share will be unchanged (see equation (11)). What is the explanation for this? If $(1/A_{cg})$ is falling at the same rate as I/L is rising, the proportion of workers employed in the capital-goods industry will be constant over time and so L_{wg}/L will also be constant. It follows from equations (11), (5) and (4) that the wage share (and the rate of exploitation) will also be constant.
3. A third possibility is that that A_{cg} is rising faster than I/L is rising. In this case, the term $(1/A_{cg})$ will be falling but at a faster rate than I/L is rising and, as a result, the term will be falling over time. In this case, the ratio will be falling over time – as the same output can be produced with fewer workers. This will lead to a rise in the wage share and a fall in the rate of exploitation (again, see equations (4), (5) and (11)).

Notice that for Marx's prediction – that at the same time as K/L is rising, the wage share will be falling – to hold, we need to assume either that there is no technical change in the capital-goods sector (not a very wise assumption) or that, although there is technical change going on such that A_{cg} is rising, it is rising at a slower rate than I/L

is rising. Only under these assumptions will capital accumulation (specifically, the production of additional capital goods per worker) result in a fall in the wage share – and thus a fall in the ratio between paid and unpaid labour and a rise in the rate of exploitation. However, a priori, I do not see that we can rule out any of the other possibilities but then nor does Marx. In *Capital Volume 3*, Marx himself recognises that there are various possible outcomes. Considering various things which might offset the tendency for the rate of profit to fall, he writes of the 'cheapening of elements of constant capital', by which he means

> that the value of the constant capital does not increase in the same proportion as its material volume. For instance, the quantity of cotton worked up by a single European spinner in a modern factory has grown tremendously compared to the quantity formerly worked up by a European spinner with a spinning-wheel. Yet the value of the worked-up cotton has not grown in the same proportion as its mass. The same applies to machinery and other fixed capital. In short, the same development which increases the mass of the constant capital in relation to the variable reduces the value of its elements as a result of the increased productivity of labour, and therefore prevents the value of constant capital, although it continually increases, from increasing at the same rate as its material volume, i.e., the material volume of the means of production set in motion by the same amount of labour-power. In isolated cases the mass of the elements of constant capital may even increase, while its value remains the same, or falls. (Marx, 1959a: 236)

If we may view the value (i.e. value in terms of labour embodied) of capital goods as being indicated by the ratio (I / A_{cg}) – that is, the labour hours required to produce one unit of capital – he is here quite expressly allowing for this ratio to fall or remain unchanged as growth takes place.

Concluding remarks

In this article, I have explored in some detail Marx's ideas related to the economic surplus, unpaid labour and exploitation. I have attempted to tease out the implications of his analysis for the determination of the wage share.

While I have argued that Marx has not succeeded in providing adequate theoretical support for his prediction in *Capital Volume 1* as to the likely behaviour of the wage share as capital accumulates, I hope that I have demonstrated that he has nonetheless provided a very interesting and insightful collection of ideas by which we may, even today, approach a wide range of issues relating to production and distribution.

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Notes

1. Friedrich Engels (1820–1895) was a close friend of Marx. His influential book *The Condition of the Working Class in England* was published in 1845. He co-authored many works with Marx and he supported Marx financially. After Marx's death, Engels edited and saw through to publication (inter alia) the second and third volumes of *Capital*.
2. As we will see, labour power is the capacity of a worker to do work, to provide productive services for a given period of time under the direction of an employer. Its price we would say is the real wage, Marx (holding to an 'embodied labour' theory of value – he was greatly influenced by Ricardo) would say that its price/value is the amount of labour embodied in the necessaries required to produce, develop, maintain and perpetuate labour power.
3. In his excellent commentary on *Capital Volume 2*, David Harvey (2013) draws attention to the contradictions in capitalism revealed by the material in *Capital Volume 1* and *Capital Volume 2*. He writes,

   Capitalism as a social formation is perpetually caught in this contradiction. It can either maximise the conditions for the production of surplus value, and thereby threaten the capacity to realise surplus value in the market; or keep effective demand strong in the market by empowering workers, and thereby threaten the ability to create surplus value in production. (Harvey, 2013: 3, emphasis in original)

4. Along with Marx, I am going to assume that the length of the working day is the same in all sectors (industries) of the economy and so I will not apply any sectoral subscripts to h.
5. For an exposition related to the wage share in the economy as a whole, see Dixon (1981a, 1981b).
6. A neat discussion of this approach may be found in Robinson (1960: 23–25, 1965: 73–75).
7. Marx argued that as a first step, it was important to view markets as competitive. He wrote,

   To explain the general nature of profits, you must start from the theorem that on average, commodities are sold at their real values, and that profits are derived from selling them at their values, that is, in proportion to the quantity of labour realised in them. If you cannot explain profit upon this supposition you cannot explain it at all. (Marx, 1947: 31)

   He means by this that he wants to explain it without reference to monopoly elements.
8. I am taking the real wage as being determined – at least in part, and specifically in relation to the price of wage-goods – in competitive markets and in the sense as 'market determined'. It might be argued that it is more common for Marx to see the balance of power between labour and capital playing a role. As I see it, the model presented in the text above (which relies on competitive price determination) is consistent with Marx's 'balance of power' approach provide we remember that workers and employers bargain over the money wage (which I am taking as given) and not the real wage.
9. I should also stress that in what follows the analysis is 'short-run' two senses: first, I will focus on the consequences of producing new machines, rather than using them. Second, I do not consider the effect of any disturbances on the rate of return to capital in the two sectors.
10. I use the term 'capital-labour ratio' in its common 'modern' sense of a 'technical' relationship and I am assuming that difficulties identified in the 'Cambridge Controversies' (see Cohen and Harcourt, 2003; Harcourt, 1972) can be put to one side to allow us to focus on the logic of Marx's ideas.

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11. For the purposes of this article, we take *n* as an exogenous constant. This means that I am not going to talk about the business cycle, itself an important component of Marx's analysis in Chapter 25 of Volume 1 of *Capital*.
12. I put to one side in this article the possibility that demand will not rise to match the growth in productive capacity. Marx discusses this in *Capital Volume 2*.

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Appendix 1

The use of the economic surplus in a post-capitalist society: Marx's Critique of the Gotha Programme

In the text above, we have focused on the economic surplus and related economic variables in a capitalist two-sector economy. It would be remiss of me not to draw attention to Marx's discussion of the use to be made of the economic surplus in a socialist society. This is to be found in his *Critique of the 'Gotha Program'* (written in 1875 and first published in 1891). The 'program' was a proposed platform to be put before a meeting of 'left' political parties, which took place in the town of Gotha in Germany in 1875. Marx criticised various planks in the platform in a letter sent to some of the participants. Of particular interest here is his response to the third of the proposals in the draft programme which read, '3. The emancipation of labour demands … a fair distribution of the proceeds of labour'. Marx comments on this proposal as follows:

> What is 'a fair distribution'? Let us take, first of all, the words 'proceeds of labour' in the sense of the product of labour; then the … proceeds of labour are the total social product. From this must now be deducted: First, cover for replacement of the means of production used up. Second, additional portion for expansion of production. Third, reserve or insurance funds to provide against accidents, dislocations caused by natural calamities, etc. These deductions from the 'undiminished' proceeds of labour are an economic necessity, and their magnitude is to be determined according to available means and forces, and partly by computation of probabilities, but they are in no way calculable by equity.
>
> There remains the other part of the total product, intended to serve as means of consumption. Before this is divided among the individuals, there has to be deducted again, from it: First, the general costs of administration not belonging to production. This part will, from the outset, be very considerably restricted in comparison with present-day society, and it diminishes in proportion as the new society develops. Second, that which is intended for the common satisfaction of needs, such as schools, health services, etc. From the outset, this part grows considerably in comparison with present-day society, and it grows in proportion as the new society develops. Third, funds for those unable to work, etc., in short, for what is included under so-called official poor relief today. Only now do we come to … that part of the means of consumption which is divided among the individual producers.
>
> The 'undiminished' proceeds of labour have already unnoticeably become converted into the 'diminished' proceeds, although what the producer is deprived of in his capacity as a private individual benefits him directly or indirectly in his capacity as a member of society. (Marx, 1959b: 17–20)