GREENWICH UNIVERSITY

An Empirical Investigation Into The UK Profit Rate, 1949-2003

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I would like to say that the views expressed and errors committed are entirely my own responsibility and do not necessarily related to anyone above.

Abstract

This thesis argues for the importance of the Marxian concept of economic crisis and counteracting forces to the tendency of the rate of profit to fall in contemporary capitalism through empirical research on the UK economy. Mergers and acquisitions, government expenditure, capital goods export, capital goods imports (EU as the main partner of the UK trade) emerged from this investigation as influenced by the rate of profit. Mergers and acquisitions and government expenditure have not previously been considered as counteracting forces within the Marx's approach.

This study comprises the first use of VARs time series analysis with Granger causality tests on an analysis of the UK economy using Marxian variables. There was an early attempt by Glyn and Sutcliffe (1972) discussing about the profit squeeze, and using different measures for the rate of profit, but this did not contain any substantial econometric analysis or estimating any counteracting forces. A major obstacle in any estimation of Marxian variables is data availability and a lack of clarity and consistency in HMSO publications, and the work in this study to present consistent data in these terms will be valuable for any future research in this area.

The significance of government expenditure as a counteracting force to the tendency of the rate of profit to fall highlights the importance of unproductive capital in Marxian analysis of crisis. Government expenditure is mainly a form of unproductive capital, and therefore growth of government expenditure affects the productivity of the economy. Unproductive labour has been the focus of a lot of analysis and literature amongst the Marxist economists but not enough emphasise has been put on the role of unproductive capital.

In estimating the variables concerning the rate of profit variables and counteracting forces, I have used the money expression of value, or money terms in current prices. To justify this, I use Morishima and Seton's "inverse transformation" scheme to address the "transformation problem", using input-output tables for values and prices of production, following Wolff's (1975) approach. The ratio of values to the prices of production was $1.02 \approx 1$ for the production industries. On the basis of this approach, I then developed a computer programme by *Mathematica* that enabling the calculation of values and prices of production for the UK.

The study supports the view that capitalist production is a dynamic process in which the tendency of the rate of profit to fall as a form of economic crisis could find some counteracting forces to offset this tendency for a short period of time and bring about a relative stability; however, this stability does not persist forever, and crisis prevails repeatedly. This demonstrates that Marxian theory provides important insights which can address both economic crisis and growth in its theory of 'the law of the tendency of the rate of profit to fall' and counteracting influences. If we forget this dialectical relationship in the Marxian theory, by over emphasising on one aspect of the argument or the other, the result is likely to be a dogmatic ideology in place of a scientific method of inquiry.

Introduction

Since Adam Smith set the foundation of modern economics in his book 'The Wealth of Nations' in 1776, many economists have used his work to define and refine economic concepts. Political economy became an acceptable discipline of social sciences with the appearance of the capitalist mode of production and reflected all its characteristics of boom and bust or business cycle. However discrepancies between theoretical models and real observation often led to theoretical crises and assumptions used to explain economic variables in relation to falling profit rate, inflation and unemployment.

Classical economists such as Smith and Ricardo were concerned with the creation and distribution of wealth. Smith (1991) and Ricardo (1966) argued that labour rather than land or gold was the source of wealth. This notion of labour was used by the political economists to attack the landed aristocracy and the feudal state's restrictions on the rising class of industrial capitalists. Capitalists' self-interest in investing and capital accumulation eventually caused an increase in GDP, economic growth and development in England.

The political power of the industrial capitalists was mainly secured by the Corn Laws in the UK. Thereafter the theories of productive/unproductive labour, which distinguishes the human labour who are employed by capital and produce surplus labour or profit from that employed by unproductive capital or revenue, became less central to the existence of the new bourgeois class and their dominant social relation of production; namely capitalism.

Liberal economists provided an intellectual defence of the new social and economic order. This process started chiefly from Marginalist economists and in the first place by the work of Jevons (1965), Menger (1994) and Walras (1978). In general, they accepted many principles of classical political economy; in particular the law proposed by Say (1971) that "supply creates its own demand", whatever was produced would be sold, due to payment to factors of production, which generated enough income to purchase all goods produced. Consequently, this law had all the necessary ingredients to be used in the general and partial equilibrium, they posited.

In practice, their other principles of perfect competition, free trade and laissez-faire philosophy had already been rejected empirically by the emergence of monopolies, cartels,

oligopolies, trusts, neo-colonialism and rival imperialism amongst the advanced industrial countries by the last quarter of the 19th century, specifically after 1870s.

The climax of the crisis in the new phase of capitalist development appeared in the form of WWI. As though the catastrophe of the world war was not enough to encourage the liberal economists to revisit and revise their theories, soon-after, they struggled to explain the 1930s Great Depression. Unemployment rose dramatically, real GNP fell, tariff barriers rose, world trade stagnated, stock markets crashed and the rate of profit fell deeper. The economic theories and liberal economists were bankrupt alongside the events of the real economy.

Keynesian macroeconomics reconciled neoclassical economics with the new reality. Keynes (1973) argued that the high unemployment in the UK and other industrialised countries was the result of a deficiency in the aggregate demand due to inadequate investment demand. He argued that once full employment prevailed, allocation would be efficient because of the market economy. Keynes was perfectly prepared for the market economy to solve the problem of resource allocation in microeconomic terms. But, from a macroeconomic perspective, the economy could not guarantee full employment without government intervention. Therefore, his economic policies reflected a combination of both laissez-faire and interventionist philosophy.

Keynesian economics were attacked by both orthodox (conservative) and Marxist (radical) economists. Conservatives argued that Keynes' interventionist ideas and his views on the 'socialisation of investment' with some of the implication of his philosophy for taxation and fiscal policy would bring him close to egalitarianism. On the other hand, Marxists rejected Keynes's economics and his policy remedies as the last attempt to save capitalism from imminent collapse.

Despite their differences, and although classical political economists, marginalists and Keynesians talk about business cycles, it seems to me that they have fundamentally nothing to offer about the slump which leads to the collapse of the system of capitalist production. According to their economic models, if a slump happens and brings about disequilibrium in the economy, either the invisible hand of the market or government intervention would bring about general equilibrium. By contrast economic crisis is central to Marxian conception of

capitalism, seeing crisis as fundamentally inherent part of a capitalist system of production that eventually leads to the collapse of the system of commodity production.

The omission from modern economics of a serious consideration of economic crisis is all the more difficult to justify because the phenomenon of crisis is persistent and repetitive on a growing scale. From the collapse of the gold standard and the Bretton Woods system, through the dollar crisis of the 1980s, the third world debt crisis, the Asian Economic Crisis, the Mexican, Russian and Argentine defaults through to the current global financial crisis, the immense disruptions to economic activity are not easily avoided. Yet modern economics tends to treat these as isolated exogenies.

It is because Marxian economics does treat these major events as inherent features of capitalism that this study explores Marx's theory of economic crisis in detail. In the first place, I consider the relevance of Marx's own writing on 'the law of the tendency of the rate of profit to fall' in light of subsequent criticisms. Then I test Marx's theory on the development of the UK economy since WWII, first considering manufacturing industries in terms of Marxian categories. After finding some inconsistencies within Marx's theory of the falling rate of profit with regard to the UK economy, I use an alternative approach by extending his theory to production industries in general, which gives more plausible results; that is, the rate of profit comes to a relative stability, especially after 1991. Next evidence of counteracting forces against 'the law of the tendency of the rate of profit to fall' is considered. The new counteracting forces are proposed in the light of the new era of monopoly capitalism: mergers & acquisitions, government expenditure and intervention, European integration and globalisation. These forces are estimated empirically and statistically tested against the UK rate of profit in production industries.

In order to show the dialectical relationships between Marxian economic growth and crisis theories manifested in 'the law of the tendency of the rate of profit to fall' and counteracting forces by an empirical research, I need to have a structural framework for my thesis. Not only should this structure address the mentioned relationship, but also to be consistent with the fundamental Marxian theories of labour value and the transformation problem. To deal with those important issues in a systematic and consistent method, this study has been organised as follows: in Chapter 1, I discuss the significance of the relationship between economic growth and crisis theories in general, from classical to neoclassical and Marxist economics.

Although my emphasis is mainly on the economic growth theories, then I move specifically to the crisis theories, especially to Marxian economics, which provides us with a valid explanation of the inter-contradiction of capitalist economic growth and development into a self-destructive crisis, in the form of the tendency of the rate of profit to fall shown in Chapter 2. There I argue about the counteracting forces which offset the tendency as well as adding some new counter-tendencies such as: mergers & acquisition, government expenditure and European Union and Globalisation to the existing ones, in the era of monopoly capital. In Chapter 3, I review and discuss different variants of Marxist economists and their interpretations of Marx's falling rate of profit. As labour productivity plays a crucial role in Marxian understanding of surplus-value creation, and therefore calculation of profit rate, I devoted the whole Chapter 4 on productive and unproductive labour, with reference to Physiocrats, classical & neoclassical political economy, especially in relation to Marx's approach which is our main concern for empirical research. However, the labour process is fundamentally a coherent part of the analysis of productive and unproductive labour in relation to the labour theory of value and prices of production. Therefore, the relationship between value and price should be established if we wanted to conduct an empirical research using the national data set. This has been carried out in Chapter 5, by using Seton and Morishima's 'inverse transformation', employing Wolff's (1975) method used for the Puerto Rico economy, to apply it for the UK economy, especially in production industries. As the substitution of price for value has been legitimised, I then use monetary expression of value expressed in national income accounts for discussing our methodology, use of econometrics models and appropriate statistical tests to estimate the Marxian rate of profit variables and counteracting forces in Chapter 6. The actual statistical estimates of the UK profit rate and their analysis, as well as comparison with the previous attempts by Glyn and Sutcliffe (1972) have materialised in Chapter 7. I also conduct Auto Regressive (AR(1)) and Augmented Dickey-Fuller (ADF) tests for unit roots and stationarity of our variables as well as using Vector Autoregressive models; VAR(1) &VAR(2) for our time series analysis. Next, the Granger causality Wald test is employed as a diagnostic test, which indicate the significance of the estimates used for the calculation of the profit rate. The results of the test are summarised in a Granger causality circular flow diagram, which shows how the profit rate is influenced and affects other variables in our econometric models. Finally, my summaries and suggestions of further research are concluded in Chapter 8.

Chapter 1 Economic growth and crisis theories

After a general introduction, this chapter focuses first of all on the classical theories of economic growth in section one; the second section explains Smith's contribution to the theory of economic growth; the third one puts forward Ricardo's discussion on that issue; the fourth section discusses the neoclassical and Marxist economists perspectives; the fifth section introduces an attempt made by Schumpeter to merge Marxian and neoclassical theories of growth and economic crisis and finally summary of the chapter appears in section six.

Marxian economic crisis theory goes hand in hand with economic growth and uneven development of capitalism in the world. Therefore, I commence this with identification of global economic growth, development and crisis theories, examining liberal and Marxian theories of economic growth and economic crisis.

1.1 Classical theories of economic growth

According to Deane (1978), the origin of modern growth theory can be found in the writings of Mercantilists and Physiocrats. The problem of growth was very important in 18th and 19th century economic thought. That is during the classical era of political economy and before the marginalist revolution and the appearance of neoclassical economics.

Deane (1978) says that Mercantilists aimed their analysis at the process of economic expansion by increasing total output, rather than in per capita output. Mercantilists were in favour of government intervention for a higher growth that is by achieving a higher balance of payments surplus. Therefore, the greater the balance of payments surplus is the greater the accumulation of gold or wealth is, consequently the greater the value of total output is.

In brief, through the state intervention we can manipulate international economic relations. By manipulating the power structure, we can achieve a higher balance of payments surplus and therefore more accumulation of wealth. Galbraith (1987) praised Smith for refuting Mercantilist's theories in his book, 'The Wealth of Nations'. "Adam Smith, in history's most

climatic assault of ideas on policy, brought the mercantilists era to an end in 1776." (Galbraith 1987: 44)

Galbraith (1987: 52) argued that in opposition to Mercantilist's idea, there was the concept of the 'produit net'. Stating that all wealth was originated in agriculture, not in industry, trade or occupation. Merchants also bought and sold the same product, without adding to it in that process. This was the case with manufacturing, as Physiocrats thought that only labour added to the products of the soil, therefore nothing new emerged. Deane (1978) argues that, although Physiocrats focused on agriculture sector and on aggregate output, they also used Quesnay's (1758) The Tableau Economique to examine the inter-dependence of the various sectors of the economy. Galbraith (1987) states that Leontief's modern input-output interindustry analysis or Leontief's Tableau Economique, was inspired by Quesnay's method. Having said that Galbraith quotes Quesnay who believed that "Agriculture is the source of all the wealth of the state and the wealth of all the citizens" (1987: 52) Physiocrats believed that economic surplus can only be produced in agriculture either through a fall in the cost of production in the form of lower taxes, interest rates or through technical change. They sought to reform the old system of production and also to defend it at the same time. In conclusion, Physiocrats saw farmers the only productive class and artisans only added their labour which did not enhance the social product. Landlords also produced anything. Physiocrats advocated leissez-faire policies in direct contrast to Mercantilists' government intervention in "protecting British trade by economic means (including the maintenance of a private reservation for it in the colonies) and the need to defend it by force of arms." (Hobsbawm 1968: 232)

1.2 Adam Smith on economic growth

Smith (1991), like the Physiocrats before him, emphasised the role of capital accumulation in the growth process and also adopted their policy prescription for laissez-faire. Unlike Physiocrats, he thought that the main determinant of growth was capital accumulation in the secondary sector and particularly in manufacturing, which was important because it involved more scope for division of labour. Manufacturing also involved a demand with a greater growth potential and finally saving in this sector had a tendency to be higher.

There were two sources of growth for him. Firstly, productivity was important in extending the division of labour, which in turn depends on the size of the market and the rate of capital accumulation. Secondly, capital accumulation was important in providing the equipment to increase labour productivity and also in providing the employment opportunities that in turn determined the size of the market and the degree of division of labour.

The growth process that is built in Smith's theory can be described as follows: as production expands, the demand for the labour expands as well, and also the size of the market increases. Added to this, saving and investment (capital accumulation) expand. As a result of both factors above, a higher degree of division of labour and improved productivity are created. These in turn generate further expansion of production in the future. (Smith: 1991) The process is a cumulative one, which is once development starts, it tends to be self-sustaining. So given an initial capital stock, adequate market opportunities and a certain degree of division of labour, then the above process will follow.

Having said that, the implicit assumption in this process should be made explicit, in order to understand the criticism raised against this type of growth theory, which can be called a supply-side growth theory. Firstly, income is assumed to be spent in one way or another. That is either consumed or invested, and all savings are eventually invested. Therefore, it is assumed that supply creates its own demand according to Say's (1971) Law and there is no need to distinguish between actual and potential output, because aggregate demand does not play any role in this process. The growth process is only determined by the supply side of the economy alone: the rate of capital accumulation/saving and productivity.

Furthermore, Smith linked the demand for labour with the growth rate of population. That is to say, for example, if during a recession the demand for labour decreases, then average wages will fall below subsistence wages and poverty will push down population growth, consequently the supply of labour, until long-term equilibrium is achieved. This assumption was further expanded by Malthus (1951), but later was abandoned by neoclassical economists, although they did not abandon the assumption about the supply-side nature of growth.

Smith, along with other classical political economists, Malthus, Ricardo et al. did not believe that the growth process could go on forever, as natural resources were setting a long-run limit

to growth. Therefore, a capitalist economy inevitably moves towards a stationary state, because of diminishing returns, as a result of rapidly rising population pressure on natural resources.

1.3 David Ricardo on economic growth

Ricardo (1966) also identified the sources of growth in capital accumulation/saving and technical progress/productivity. However, he incorporated a class analysis to describe the process and to show the precise mechanism through which the pressure of an expanding population on natural resources will stop the growth process.

There are three major social classes in his scheme: a) capitalists, who continue to accumulate as long as profits are positive, b) workers, who continue to offer their labour as long as wages cover the natural real wage which is fixed by customs, habits etc., and c) landlords, who earn a differential rent in the production process. This rent equals the difference between the output produced by a piece of land and the output produced with the same amount of labour and capital on the poorest grade of land. Rent, therefore, represents the difference in output between marginal and intra-marginal land.

The growth process described by Ricardo (1966) is a variation of the process described above: as long as profits are positive and all income is spent, growth continues uninterrupted. However, as population keeps expanding, in long-term equilibrium, when average equals natural real wages, poorer and poorer lands are used and as a result rent on richer lands go up. Then, eventually total rent covers the difference between total income and total wage bill (at the natural wage rate), and then the Ricardian stationery state would have been reached. Profit will initially be zero in the agricultural sector, but competition will ensure profit equalisation all over the economy. Nevertheless there are counter-tendencies to this movement towards the stationary state that may delay significantly its arrival. These are technical progress and especially improvements in agriculture and foreign trade that could provide cheap foreign food imports. (Ricardo: 1966)

1.4 Neoclassical and Marxist economists on economic growth

Both neoclassical and Marxist economists have attempted to describe the process of growth, in a capitalist society, in terms of capital accumulation. But they come to two different conclusions. For neoclassical writers it is a harmonious process, whereas for Marx it is not.

Let us examine how neoclassical economists analyse the process of growth through the accumulation of capital. For them savers and investors are playing an important role in the capital market where individual savers and investors are brought together. In other words businessmen can purchase capital goods with borrowed funds and individuals can save by purchasing securities rather than physical assets. The interest rate is the price that performs this function; if the rate of interest rises, it is assumed that individuals will save a larger portion of their income. So the supply side of investible funds has got an upward slop. However, the interest rate also plays a crucial role in determining investment. For businessmen, as long as the expected percentage yield on an investment project is above the percentage rate at which they could borrow funds, it is a profitable investment. This is said to be the demand side for investment. Therefore, the actual market rate of interest (for neoclassical economists rate of profit is the same as rate of interest) determines the volume of saving and investment. (Marshal: 1930)

If the interest rate fell to a low level, no one would undertake net saving. So this would be a stationary state. But neoclassical economists claim that this would not happen, because of two factors. First, technological progress would keep opening up the investment prospects. Second, any drop in the interest rate would make a large number of investment prospects profitable. This is due to elasticity of investment with respect to interest rate. Thus Marshall (1930: 223) says, "There seems to be no good reason for believing that we are anywhere near a stationary state."

In general, neoclassical economists argue that technological progress would be sufficiently rapid to overcome any stagnation pressures (here stagnation means the scarcity of natural resources). Furthermore, growth in one industry causes growth in other industries. For example, as an industry expands, it requires more raw materials and services from other industries and so these industries expand. This interrelation is known as "external"

economies providing harmonious growth that all groups benefit from, in place of any zero sum gain in which one income group gains at the expense of another.

Marx, by contrast, defined the capitalist mode of production in terms of an antagonistic relation between two classes, capitalists and wage-labourers, those who own the instruments of production (c) (and extract the profit) and those actually producing physical output in return for wages (v). Surplus value (s) (surplus product) is produced by labour and seized by capitalists as their profit which can be used entirely for their own consumption ("simple reproduction", where there is no growth), or partly for investment ("expanded reproduction"). (Marx 1958: 344-350)

In Marx's view, capitalists are forced by the pressure of competition to accumulate capital and reinvest it in the production, otherwise they cannot survive. Any new method of production which reduces costs will bring extra profits to those who introduce it quickly. So there is technical improvement in the means of production, because of competition, that leads to the concentration and centralisation of capital. Consequently the organic composition of capital (c/v) will rise higher and higher, and rate of surplus value (s/v) will fall lower and lower. As a result the rate of profit will fall down. Marx calls this interrelationship the law of the tendency of the rate of profit to fall. (Marx 1960: 208-9) This is inherent to capitalism:

> The Bourgeoisie cannot exist without constantly revolutionising the instruments of production, and thereby the relations of production, and with them the whole relations of society. (Marx & Engels 1975: 36)

However, in Marx's model, capitalism does not develop harmoniously, because where one industry develops ahead of others, it can find itself hampered by a shortage of demand relative to a greatly expanded supply. So capitalists, faced by a persistent tendency to overproduction and falling rate of profit, find it more and more difficult to extract a surplus, to fund either consumption or further investment. Thus, Marx's model explains both growth and fluctuations of the economy in terms of the reactions between the institutional environment and the technique of production.

1.5 Schumpeterian economic growth and crisis

Schumpeter (1939) tries to bridge the gap between the Marxists and the neoclassical growth theories. He rejected the harmonious process of growth that the neoclassical approach assumes. Neoclassical economists argue that as long as capital accumulation continues, growth is self-sustaining and everyone benefits from the growth, in a process of gradual change and even development. Schumpeter rejected this idea of gradual change and equilibrial growth. He argues that if growth is important, it is a disequilibria growth. In other words, you can explain the long-term development trends in a capitalist economy only through a model which explicitly assumes disequilibria and uneven development. In this sense, Schumpeter differs very much from neoclassical theorists.

On the other hand, Schumpeter differs from the Marxian analysis of growth process. On the one hand he proposes an endogenous source of growth, but this is quite different to Marx's. Secondly, he provides a cyclical process, which is characterised by fluctuations. Schumpeter states that:

> Now, what causes economic fluctuations may either be individual shocks which impinge on the system from outside, or a distinct process of change generated by the system itself, but in both cases the theory of equilibrium supplies us with the simplest code of rules according to which the system will respond. (1939: 68)

Schumpeter's cycles are becoming more regular and harmonious, in contrast to Marx's cycles which are more cumulative and catastrophic. Schumpeter suggests that:

> The trend is nothing but the result of the cyclical process or a property of it…
> Moreover, we also know that it carries realistic meaning only in discrete points or intervals. (1939: 206)

Going back to the sources of growth, Schumpeter focuses on the concept of entrepreneur. He distinguishes between two types of entrepreneurs; the first type is the ordinary one, or businessmen, who would take decision according to the interest rates and so on, whom in a normal way described by neoclassical theorists. The second brand or a special type of entrepreneur, whom described by Schumpeter, is the visionary one, who has the vision about

new products and new methods of production. They take risk in production and the investment process.

This entrepreneur is not affected so much about interest rates; saving etc. (in fact he does not save, in order to be able to invest in major project). The only things he has to do are to borrow money from a bank use these borrowed funds to invest in production, and repay the loan, which involves a significant element of risk. Obviously the question arises as to how the fund and resources would be available for the entrepreneur. To answer this question, he uses the concept of a forced savings process. In other words, he argues that during the economic expansion, which is initiated by the action of entrepreneurs, prices go up and therefore consumption reduces. So we have a kind of forced saving that releases the resources to be used for the production of new products. (Schumpeter: 1939) Accordingly, the source of growth is an endogenous source, and the vision of an entrepreneur is preeminent.

With regard the cyclical process, Schumpeter, argues that this commences with the visionary entrepreneur having an idea as to how to start a new production line. He borrows money from a bank and invests in the project. This new investment pushes the prices up and ordinary entrepreneurs are induced to invest. This in turn, sets the motion for the expansionary phase of the cycle. However, the entrepreneur borrows money first. This creates inflationary pressures, reinforced by other entrepreneurs entering, creating the expansionary phase. But the entrepreneur has to repay the initial loan plus interest. This sets in motion a deflationary process. In addition we enter a process called created destruction. As new firms, new products and new method of production replace the old ones, old-fashioned firms are bankrupted, adding a further deflationary impact. In the same way as ordinary businessmen invested as the prices went up, now as the prices go down they stop investing, which leads to the new phase of the cycle, depression. But there is a difference between now and when entrepreneur started to invest. The economy stabilizes at a higher level of capital intensiveness now, as the capital had been already invested in the process. Therefore, the economy is going to move upwards. The rate of capital/output and capital/labour ratio is higher than the point where we started, as illustrated in Figure 1.1.

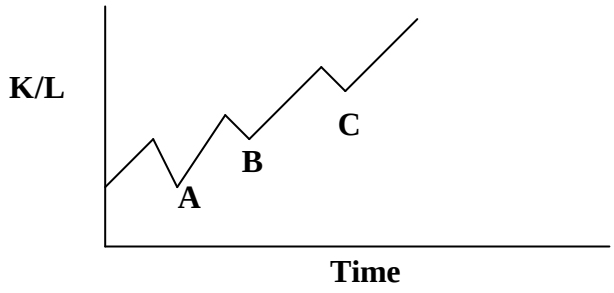


Fig. 1.1 Schumpeterian Punctuated Growth

As can been seen capital/labour ratio in point A should be lower than B, and B lower than in C. In other words, we have a continuous increase in the capital/labour ratio over time for the reason described above.

Having said that, Schumpeter (1939) was pessimistic about the prospects of the capitalist economy. He thought that because of the managerial revolution in the production process, the entrepreneurial role was continuously diminished. The visionary entrepreneur was replaced as decision-maker by the board of directors reflecting the priorities of the managers.

1.6 Conclusion

In summary, although both Marx and neoclassical economists consider a uniform rate of profit across sectors, for neoclassical economists growth is a harmonious and self-equalising process, whereas for Marx it is an uneven process, because of internal contradictions in the capitalistic system that make successful development inherently crisis-ridden. Schumpeter's theory makes an important contribution to growth discussion, because of his emphasis on the role of entrepreneur. But, as the monetarists (Tinbergen: 1951) have criticized, his concept of forced savings is only valid until consumers adjust to the price expectation associated with growth. And from a Marxian perspective he ignores the endogenous dynamic arising from the extraction of surplus value and is insufficiently sensitive to the rapidly mounting nature of crises once they commence.

Now, I need progressively move to Marx's economic crisis theory in the form of falling rate of profit and counteracting forces in the next chapter.

Chapter 2 General theory of market economy & crisis

Following from the previous chapter, our main emphasis shifts from economic growth theories to the crisis theories in this chapter. After introducing Walrasian market economy model and marginalists and monetarists followers of the model, I concentrate in the first place on Marx's crisis theory, which is my main concern in this paper in section one. Section two discusses Marxian tendency of the rate of profit to fall in general. Then specifically, I need to explain the value composition of capital and organic composition of capital, which is materialised in section three. Then I put together the discussion of profit rate variables and offsetting factors in section four. Section five argues about the influences of the contemporary capitalism of monopoly capital and oligopolistic behaviour of the firms. Section six puts forward some new counteracting forces for the falling rate of profit in the light of the new stage of capitalist development. Section seven sums up the foregone arguments including new variables in the form of counteracting elements for the falling profit rate.

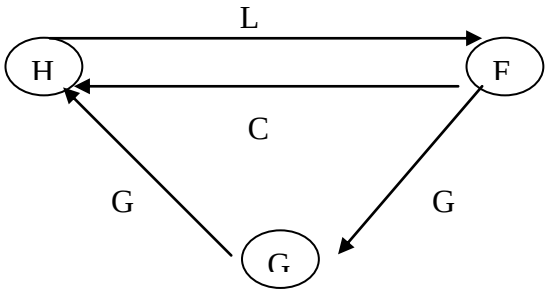
Many economists analyse the current system of production using Walrasian General Equilibrium system. Walras was a well known marginalist whose economic theory is characterised by three important assumptions: first of all the expectations are correct, secondly there is a perfect competition and thirdly all markets clear (Shaw: 1988 and De Vroey: 2004).

Both the marginalists and monetarists use such a model for economic predictions as changes in money supply affect only nominal variables not real variables. The economy is defined as always at full employment and at full capacity because prices are very flexible. As soon as an agent finds out that s/he cannot buy or sell as much as they might demand or supply, prices are immediately changed, best exemplified by financial markets. People accordingly switch on, knowing what the economic environment is, their expectations are correct and every agent occupies only a small proportion of the market place in this perfect competition. These generate a monetarist model of full employment and inflation is always a monetary economic growth rate at a given price, equal to the rate of growth in money supply.

Going back to Walrasian model of economy, for simplicity, it could be drawn in a mixed economy as illustrated in Fig. 2.1 we find that households (H) give labour services (L) to the

firms (F). Firms give consumption goods (C) to the households. Government (G) buys goods (G) from the firms and provides the services of these government goods free of charge to the households.

Figure 2.1. Walrasian circular flow diagram (e.g.)



In this diagram, households believe that they are not constrained in product and labour markets. Firms believe that too. Their expectations are correct and demand is always equal to supply. Therefore, there is no any economic crisis.

2.1 Marx's crisis theory

According to Marx's historical materialism all social systems develop under contradictory inner forces, which lead to its repeated breakdown and ultimately to its transformation into a higher social order. In the case of capitalism, the law of the tendency of the rate of profit to fall plays especially a crucial role· On the one hand, it causes the development of the forces of production through the increase in organic composition of capital, and on the other hand, in a long run, it causes periodic crisis and potential collapse of capitalist system of production as a whole, for the very same reason. For this theory, the decisive cause of crisis lies not in historically contingent external conditions, but in the capital relation itself.

However, Marx's theory is confronted by a number of difficulties. As far as the falling rate of profit is concerned, the implications of the theory are undefined. That is because of the explicit contradiction within the nature of the theory itself. Crisis is explained in terms of a contradictory interplay of tendency and countertendencies. But it does not determine the timing and form of appearance of an actual crisis. Marx left his system of economic analysis in an unfinished form, in spite of the scope, power and basic clarity of his thought.

2.2 Tendency of the rate of profit to fall

To overcome the mentioned problem, clarification and reformulation of this aspect of Marx's doctrine, an empirical test of his model is required. Marx (1960) formulated his law of the falling tendency of the rate of profit on two main assumptions: first of all, technological progress necessarily always means an increase in the value of the constant capital relative to variable capital. However, the validity of this assumption invites empirical testing. Secondly, when a rising organic composition of capital is a correlative assumption, one can assume a constant rate of surplus-value as a basis of the law. But when the very purpose of the increase of the organic composition of capital is to increase the productivity of labour, reduce unit wage costs, and therefore, to raise both the rate of surplus-value and the mass of profit, how can we assume a constant rate of surplus-value with a rising organic composition of capital? Marx related his theory of a rising organic composition of capital to his law of the falling tendency of the rate of profit. The law says that with the rise of organic composition of capital, the rate of profit tends to fall in the face of a constant rate of surplus value.

Marx argued that, on the one hand falling rate of profit imposes a barrier to capitalist accumulation and production. But on the other hand, it increases the concentration and centralisation of capital as the bankrupt firms would be purchased at a rock bottom price by the firms with a higher OCC and with a higher ROP. Despite passing references to these points, Marx did not discuss them in any detail. In particular, he did not analyze how a falling rate of profit would lead to the concentration and centralisation of capital, and what dialectical inter-connections relate them together. However, Marx did explain how the rate of profit would tend to fall.

2.3 Value composition of capital Vs organic composition of capital

The most competitive capitalists in each line of production will introduce most innovations. In other words to gain access to the most advanced technical change is by increasing the level of investment in the means of production. That is to increase the level of dead labour to the living labour. Other things being equal, one could expect that more innovations would increase technical composition of capital. That is the average amount of means of production per worker. The increase in the physical size of the means and materials of production in relation to the workers does not necessarily mean that the cost of investment grows faster

than the variable capital. Marx argues that increasing constant capital to variable capital (OCC) or technical progress would reduce the amount of labour required to produce fixed capital or circulating capital. Marx says that:

> with respect to the total capital, that the value of the constant capital does not increase in the same proportion as its material volume…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 1960: 230-31)

It means, using a technique of production which is more advanced, it reduces the number of working hours to produce the same machine with less advanced machinery. In other words a machine could be twice as productive as the one it replaces, but it costs less. Although the volume of machinery and material of production might increase, they are made by advanced machines and techniques of production which reduce the number of working-hours required to make them. In other words, the technical composition of capital could be increased, but the organic composition of capital, which is the value of constant capital to variable capital or dead to living labour, might be the same or even falling. Marx explains that," The foregone is bound up with the depreciation of existing capital (that is, of its material elements), which occurs with the development of industry". (Marx 1960: 231)

The depreciation or devaluation of constant capital might cause the value of each unit of product to fall, that is socially necessary labour time to produce a unit of output to be reduced, but it might not be reflected in the price of each unit of output. Especially if we go beyond the competitive capital into the monopoly capital era, when the price or quantity of products could be determined by the firms with the monopoly power.

Having discussed the cheapening of the constant capital, the same argument could be true with the production of consumer goods and in the first place wage goods. Therefore it also reduces the value of the labour-power in the commodities produced. Therefore, I need to distinguish between the organic composition of capital and value composition of capital when

conducting an empirical research using Marxian variables. The former one is the investment in the means of production in terms of 'old value' or historical cost. Whereas the latter one is investment in constant and variable capital in terms of the current values, which is my approach for estimating variables to calculate the rate of profit in the UK economy.

2.4 Rate of profit variable and counteracting forces

Marx (1960) argues that any new method of production that reduces costs will bring extra profits to those who introduce it quickly. So there is technical improvement in the means of production, because of competition, that leads to the concentration and centralisation of capital. Consequently, the organic composition of capital ($k = c/v$) will rise higher and higher, and the rate of surplus-value (s/v) will fall lower and lower. The rate of profit (r) is expressed as $s/(c+v)$ or $r = (s/v)/((c/v) + (v/v)) = e/(k+1)$, where e is rate of surplus value or rate of exploitation. So, the rate of profit varies directly with the rate of surplus value and inversely with the composition of capital, the tendency to fall with technical improvement in the means of production.

Marx viewed the falling rate of profit not as a mechanical necessity, but as a tendency that at times could be offset by counteracting tendencies. Marx (1960: 227-35) discusses briefly five sets of causes, which tend to counteract the "law". Three of these are related to rise of the rate of surplus value, without a corresponding prior rise of the organic composition of capital. One tends to cheapen the elements of the constant capital and so to prevent the organic composition of capital from rising. The fifth one is the effect of foreign trade on both rate of surplus value and constant capital.

The counteracting tendencies discussed by Marx are as follows:

(i) 'Raising the intensity of exploitation'.

Under this factor Marx included both the lengthening of the working day (increasing the amount of absolute surplus-value) and the speed-up system (increasing relative surplus-value). An extension of the working day increases the 'surplus-labour time'(s), without a corresponding increase in the 'necessary labour-time' (v). So the ratio of rate of exploitation or s/v (s') is raised. The same result can be obtained from the speed-up, under which the labourer is set 'to watch a larger number of machines' or when the speed of the machine is increased.

(ii) 'Depression of wages below their value'.

That is, the employment of women and children by depressing wages below their value. This increases the rate of surplus value (s')

(iii) 'Relative overpopulation'.

That is, the periodic recruitment of "the reserve army of labour" (cyclical unemployment) which tends to raise the rate of surplus-value, independent of the organic composition of capital involved. The reserve army is often recreated through the introduction of new labour-saving machinery. By doing this, the organic composition of capital is raised and at the same time the rate of surplus-value is increased as well. However, once the reserve army has been increased to a large extent, and labour has become cheap, Marx argues that capitalists tend to expand the industries of low organic composition (using more labour) which yield a higher rate of surplus-value and a higher rate of profit.

(iv) Foreign trade.

This acts so as both to raise the rate of surplus-value and lower the value of constant capital. Its effects are two-fold. First of all, imports of cheap food stuffs help to lower the price of labour-power, as occurred for instance with the abolition of the Corn Laws in England. Therefore, the rate of surplus value is raised. And also, imports of cheap raw materials reduce the value of the constant capital; so the organic composition of capital is lowered.

(v) 'Cheapening of the element of constant capital'.

As we have just seen, one aspect of foreign trade falls into this category. Added to this, in a depression, the deterioration of the physical assets and their depreciation through write-downs, become factors in the rise of the profit rate and so act as stimulants to recovery. Moreover, with technical progress the mass of the constant capital increases as a result of the increased productivity of labour, while it reduces the value of each unit of commodity produced, because less labour time which constitutes exchange value materialised in each unit of output. Marx argues that, with a given rate of surplus-value, the rate of profit will increase with a reduction of the value of the constant capital. He cited the progress of the industrial-chemical sciences, as a clear example of such reduction tending to become the rule. It also increases the quality of the raw materials, and decreases their wastage:

> Reduction of waste depends in part on the quality of the machinery in use. Economy in oil, soap, etc. depends on how well the mechanical parts are machined and

> polished. This refers to the auxiliary materials. In part, however, and this is most important, it depends on the quality of the employed machines and tools where a larger or smaller portion of the raw material is turned into waste in the production process. Finally, this depends on the quality of the raw material itself. This, in turn depends partly on the development of the extractive industry and agriculture which produce the raw material (strictly speaking on the progress of civilisation), and partly on the improvement of process through which raw materials pass before they enter into manufacture. (Marx 1960: 102)

Therefore, the cost of the constant capital is reduced both as a portion of the total value of product and relative to the variable capital. As a result, both the rate of surplus-value and the rate of profit tend to rise. The counteracting forces then cause the historical tendency of the organic composition of capital to rise, to be retarded and, thus, the falling tendency of the rate of profit is diminished. In other words, they "cross and annul the effect of the general law, and which give it merely the characteristic of a tendency, for which reason we have referred to the fall of the general rate of profit as a tendency to fall" (Marx 1960: 227). But this is "a tendency toward a progressive fall" (Marx 1960: 209). As Marx says, that is due to:

> A progressive relative decrease of the variable capital as compared to the constant capital, and consequently rising organic composition of the total capital. The immediate result of this is that the rate of surplus-value, at the same, or even a rising, degree of labour exploitation, is represented by a continually falling general rate of profit....therefore, just an expression peculiar to the capitalist mode of production of the progressive development of the social productivity of labour.... But proceeding from the nature of the capitalist mode of production, it is thereby proved a logical necessity that in its development the general average rate of surplus-value must express itself in a falling general rate of profit...Since the ratio of the mass of surplus-value to the value of the invested total capital forms the rate of profit, this rate must constantly fall. (Marx 1960: 208-9)

At the end of his discussion of counter-tendencies Marx mentions without more explanation, that "the increase of stock capital" (Marx 1960: 235) is a further counteracting forces against the tendency of the rate of profit to fall.

In my estimates (Chapter 7) of variables in production industries, I found that there is a strong correlation between the rate of exploitation and the rate of profit. That is as the rate of exploitation increases the rate of profit tends to increase as well. This could be explained by Marx's theory as one aspect of counteracting tendency of the rate of profit to fall by increasing absolute and relative exploitation. However, we expect from Marx's theory as the organic composition of capital increases, the rate of profit to fall consequently as one major tendency of the capitalist economy, which forms one of the most important foundation of capitalist economy in a long run, and leads to the destruction of capitalist mode of production. But in my estimates, the mentioned hypothesis does not hold a strong negative correlation.

2.5 Monopoly capital

Classical economists, as well as Marx's theories were significantly influenced by free competition or a competitive market, where there are a great deal of sellers. The perfect competition is assumed as a situation where small firms producing the same product. The firms cannot influence the price of their output as they are too small. There are no entry barriers to the firms. With the development of the economy we have big firms with big concentration and centralisation of capital. This historical process has given way to monopoly market structure from perfect competition. In other words the model of perfect competition has developed into imperfect competition. As firms grow in size they are able to become more diversified. Therefore, they can enter into the territory of other firms and compete.

In the imperfect competition models, it might be clear that the information is perfect. Therefore, we are dealing with monopoly and monopsony power. In monopoly powers we assume that the firm is a monopolist, imperfect competitor, but with monopoly power in the product markets. So firms set price and workers via their union in the labour market, set their wages.

According to the neoclassical theory, scarce resources are most efficiently allocated when prices equal long-run marginal costs in all industries. And such allocative efficiency is not possible, unless the assumption of the pure competition is satisfied. But the assumption

which has been undertaken here is that, highly concentrated firms and industries raise prices above competitive levels and earn excess profits.

2.6 Oligopoly

I would like to say that according to the oligopoly theory, the higher the level of seller concentration is, the more likely it is, that dominant firms will be able to collude to raise prices above long run average costs. Therefore profit rate is positively associated with level of concentration and centralisation of capital in any specific industry.

We can find plenty of examples in everyday official newspapers. For example:

> Tesco, Asda, Sainsbury's and Morrisons are accused of fixing the price of milk along with five dairy processing companies. The Office of Fair Trading says the supermarkets secretly informed each other before they put up the price of milk, cheese and butter. They are accused of passing the information to each other through the dairy processing companies Dairy Crest, Arla, Robert Wiseman, the Cheese Company and Lactalis McLelland...The price fixing benefited the supermarkets and large dairy processors, who collect the milk from farms, bottle it, and transport it to the supermarkets. (Wallop: 2007)

Then Sean Williams, OFT Executive Director, believes that supermarkets have been colluding on price of dairy products and consumers have lost hundreds of millions of pounds, expressed in the Daily Telegraph on 15 February 2008. We also read in an article in the same paper by Wallop on 15 February 2008 that M&S and Waitrose increased the price of milk to 42p per pint, after following Tesco's lead to raise the price from 35p to 40p a week before.

Furthermore, in an article by Hall and Fletcher (2008) in the same paper ,we read that about 100 well known household brands such as PG Tips, Coca Cola and Aqua Fresh are at the centre of investigation for price-fixing by leading supermarkets, i.e. Tesco, Asda, Morrisons and Sainsbury's by the Office of Fair Trading. The supermarkets were selling commonly purchased goods at almost the same prices to each other, but prices had risen substantially simultaneously.

As a matter of fact merger and price-fixing activities are happening in nearly all sectors of the economy. An example of the finance sector would be the merger of Lloyds TSB and HSBOS which was persuaded by the UK government in order to supply them with £17bn rescue package in October 2008. Or in the construction sector we are witnessing the OFT's major investigation into cartel activities of 3000 contracts in England. The Times reveals that:

> The focus of the OFT's investigation is on "cover pricing", where companies place a high bid for work that they have no intention of winning so that they are not left off a client's tender list. The cover price is fixed after consultation with another supplier. (Jameson: 2008)

Cartel activities of the firms in Europe and other parts of the world could be seen in the following article:

> Ten European and Japanese were fined a total of ∈750.7m (£494.4m), the largest for a single cartel, while Siemens received the biggest ever individual penalty, of ∈396.56m…Two French companies, Alstom and Areva, and Japan's Mitsubishi and Toshiba were also found to have been part of the price fixing of switchgear used to control electricity to homes, offices and factories. The commission said companies "rigged bids for procurement contracts, fixed prices, allocated projects to each other, shared markets and exchanged commercially important and confidential information" between 1988 and 2004. (The Daily Telegraph: 2007)

Or we can read in the same paper one day later that:

> British executives yesterday were warned about America extending its legal reach after a UK businessman… on charges of price fixing between 1989 and 2000. Alistair Graham [solicitor] at White & Case, said: We have been saying for more than two years that no criminal offence for price fixing existed in the United Kingdom prior to the enactment of the Enterprise Act 2002. Nobody in the United Kingdom has ever been prosecuted for price fixing under the banner of conspiracy to defraud. (The Daily Telegraph: 2007)

As a matter of fact Mergers and Monopolies in the UK seem to be not prohibited but regulated. The term 'unfair competition' is also very vague and it needs to be defined precisely. In addition government policy can also create a monopoly situation. For example tariff protection can bring about or prepare the conditions for monopolies in the home market, by restricting competition from firms abroad, or in the case of merger of Lloyds TSB and

HBOS unless they are broken up otherwise they might to some extent have some monopoly power, because of their big share of the market.

There is some evidence to suggest that larger companies export larger proportion of their total output than the smaller companies do. In addition they can have more access to raw materials and other means of production throughout the world. Therefore, they can more effectively, up to a certain point, prevent their falling rate of profit, than smaller firms do. Merger and cartel activities can increase the size of the market share of industries, but not necessarily increase the internal growth of industries by increasing a higher rate of constant capital in compare to their variable capital. In other words we can have on the one hand higher merger and higher market share and on the other hand lower concentration in terms of internal growth of industries or organic composition of capital.

To conclude, in a competitive industry the firms with the lowest cost are making the largest profit, although their initial money capital advanced could be the same for two firms. There is an incentive to develop and expand production. However less efficient firms must copy the leading firm's method of production to retain factors. Although the more efficient firm increases its output, it eventually lowers the price of each unit of product. Therefore, Darwinian "natural selection" is operational in the market economy and an "invisible hand" regulates the market, without the government interfering in the running of any business or economy, namely to have a laissez-faire economy. In this free competitive economy firms gain normal or average profit according to the amount of capital advanced to purchase the means of production.

Although, monopoly within a market is the other end of perfect competition, there is a spectrum of competition between these two extreme cases. There is no free entry into the industry, therefore firm's profits are not competed away and they earn supernormal or monopoly profits. In a monopolistic competition there are many firms within the industry that sell a slightly differentiated product. In the process of accumulation as the concentration and centralisation of capital increases the number of producers reduces by merging into oligopoly where we have relatively a few producers, or into duopoly where there are only two producers operating in the market. In both cases there may be explicitly or implicitly a certain amount of collusion in order to keep out other potential competitors as well as earning high profit, as we saw in the case of some of the biggest supermarkets in the UK.

2.7.1 a) Mergers & Acquisitions

Alternatively the relative stability in the ROP could be explained mainly in terms of new stage of capitalist development, namely the era of monopoly capital and growth of companies by mergers and acquisitions. There have been many mergers and acquisitions between companies in the UK amongst themselves or other international companies in recent years, as Table 2.1 illustrates.

Table 2.1 Prominent UK M&As in 1988 - 2002

Companies	**Date**
Wal-Mart bought Asda	1999
B&Q merged with France's Castorama	1998
Barclays took over Woolwich	2000
Benfield Group acquired US reinsurance broker E.W. Blanch	2001
British American Tobacco merged with Rothmans Then Imperial Tobacco Company of Canada became a subsidiary	1999 2000
Sky Television merged with its rival British Satellite Broadcasting to form BskyB	1990
Cadbury Schweppes plc acquisition of the Adams sugar and gum confectionery business	2003
Churchill Insurance acquired Prudential's general insurance business	2001
Gallaher Group Plc acquired the Russian cigarette manufacturer Liggett-Ducat Gallaher acquired Austria Tabak	2000 2001
Glaxo Wellcome and SmithKline Beecham merged in Formed GlaxoSmithKline	2000
HBOS as a result of Merger between the bank of Scotland and Halifax	2001
HSBC acquired Midland Bank	1992
Johnson Matthey (JM) made three major acquisitions	2001 2002
Jones Lang LaSall was formed by the merge of LaSall Parents Inc and Jones Lang Woootton	1999
KPMG was formed with the merger of Peat Marwick International (PMI) and Klynveld Main Goerdeler (KMG)	1987
The Royal Bank of Scotland Group Takeover of Natwest	2000
Tesco acquired T&S	2002

Source: Clapperton (2003)

These M&As are not through competition and vertical expansion of the firms, but mainly through horizontal expansion. This does not necessarily increases the percentage of C/V (organic composition of capital), which could lead to the rate of profit to fall. On the

contrary it increases the monopoly power of a firm by securing more profits and therefore increasing the rate of profit.

For instance we can see from the table 5 in Appendix that merger and acquisition (Values) has increased by more than 1600% from 1970 to 2003. One could argue that the increase in merger and acquisition (Values) is not the cause for the falling rate of profit, but it is as a consequence of the falling rate of profit. Merger and acquisition (Values) increases, as the rate of profit tends to fall and it could have an offsetting affect on this trend, in addition to other variables, therefore the rate of profit finds a tendency towards stabilisation. However the number of merger and acquisition has decreased by 30% from 1970 to 2003, whereas the number of UK Company's bankruptcies has increased by 69% in the same period. These results indicate that merger and acquisition (Values) and bankruptcies are constantly increasing with the development of a capitalist production in the UK economy, as the rate of profit tends to fall. They appear to work as counteracting forces, in addition to other explanatory variables discussed beforehand, as the rate of profit tends to fall, as a result the rate of profit stabilises rather than falling further and creating deeper crisis and consequently destroying the total economy.

2.7.2 b) Government expenditure

In a mixed economy, government intervention is another major element for counteracting for the tendency of the rate of profit to fall. Unproductive capital and labour have expanded because of government intervention in the economy, which is necessary for the survival of a capitalist system of production. This intervention plays a crucial role in the materialisation or realisation of surplus labour in the form of surplus products. This system of production based on commodity production, with monopolistic or oligopolistic power of companies over production, distribution, exchange, as well as consumption (for instance, investment in productive capital and also psychological warfare on consumers to buy newly produced, "fashionable" products, by the power of media and advertisement). Therefore, production is not necessarily according to the needs of the society, but only for the sake of profits and accumulation, where companies cannot sell all their outputs, the government would often step in to help them out, by their expenditure on both consumer and capital goods, on army and so on, even by nationalisation of bankrupt firms. Therefore, an army of unproductive labour,

which is necessary for the survival of the capitalist system of production, is created mainly by the government intervention. In addition unproductive capital expands either for financing the government public sector borrowing requirement, or supply of abandon credit to the households.

According to the Blue Book on the Government Final Consumption Expenditure, although not seasonally adjusted, I find that in 1949 it is £2225m which is 17.5% of GDP (£12732m) for the same year. However, it reaches £267530m, which is 24% of GDP (£1110296m) in year 2003. (See Appendix B: Table 7)

2.7.3 c) European Union and Globalisation

The formation of European Union has also helped to maintain the rate of profit, even if temporarily, by removing the trade barriers amongst the member states. The programme of a single market was supposed to be completed by 1992. It was designed to benefit businesses in the first place. As a matter of fact, prior to 1992 deadline, we were witnessing a sharp fall in the rate of profit in the UK production industries. The rate of profit in 1980 was 7% less than that of 1949. This falling rate of profit continued up to 1986 when it reached the same level as in 1949. Then we are witnessing the October 1987 stock market crash throughout the world. However, the European single market was designed to create European multinationals through large-scale mergers in order to compete with the United States, Japan and others. As we discussed previously we are witnessing a large scale of mergers in the UK. This trend is throughout the world in general and in Europe in particular.

Protectionism has become the EU trade policy against third countries under the Treaty of Rome. We find that:

> Under Article 115 of the Treaty, member states are granted the right to impose quantitative restrictions against each other on imports from third countries. They are also empowered to inspect intra-community trade in order to establish the origin of a given import, and thereby prevent what is known as trade deflection, the ability of external exporters to gain access to the protected market of one member state via the unprotected market of another. (Owen and Dynes 1989: 180)

Recently we have seen the effects of this policy on Chinese clothes export to the UK market, known as the 'bra war'. The most recent example is the dispute over Chinese and Vietnamese shoe exports to EU. We read in the Times that, "The import taxes would apply to all shoes with leather uppers. Only sports shoes would be exempt because they are not manufactured in Europe." (The Times: 2006)

Although EU could have become successful in their protectionism and having a bigger share for their products, they have not been able to compete on a global market against the American, Japanese and other corporate, as it was one of their goals for the European single market. If we look for the top 10 global brands, (Table 2.2) whose value would make up about half of those listed in the top 100 in 2005, there is only one EU brand amongst them after 13 years of consolidation of European Union and expansion to 25 members by May 2004.

Table 2.2 Top 10 global brands

Global Brand	**Value in $million**
Coca-Cola (USA)	67,525
Microsoft (USA)	59,941
IBM (USA)	53,588
GE (USA)	49,996
Intel (USA)	35,588
Nokia (Finland)	26,452
Disney (USA)	26,441
McDonald's (USA)	26,014
Toyota (Japan)	24,837
Marlboro (USA)	21,189

Source: Fact File (2006)

Once again we can see how the world market has been divided amongst the giant corporate and businesses, with their asset value sometimes bigger than the value of all industries in some less developed countries. It is very difficult for the EU companies to compete with them on a world stage, let alone developing countries. Although Chinese and Indian corporate are working hard for the world domination, they will find a fierce competition on a global scale.

2.8 Conclusion

Marginalists and monetarists use a Walrasian General Equilibrium system in order to overlook economic crisis. Whereas Marx's theory of the tendency of the rate of profit to fall is one of the most celebrated and controversial theories of economic crisis in the history of political economy. In his theory, the rate of profit will tend to fall in the long run, although the exact timing of it is not clear. Although there is a general agreement amongst Marxist economists that a declining profit rate would lead to economic crisis, different schools of thought focus on different particular aspects of the rate of profit formula. It is very important to understand the underlying causes of the decline in the rate of profit in order to have some idea about the likely trend in profit rate in the future. This is going to be dealt with in the following chapter.

Chapter 3 Review of Marxian tendency of the rate of profit to fall

This chapter starts with a general introduction of Marxian profit rate. Then the first section concentrates on the Okishio theorem and its critiques such as; Cullenberg and Shaikh; the second section explains 'profit squeeze' approaches to the falling rate of profit; the third one presents labour-capital productivity discussion; and the fourth subdivision analysis underconsumptionists' perspective. Finally in section five we find the conclusion of the foregone reviews that links it to the next chapter on productive and unproductive labour.

The movement of the rate of profit over time has been the subject of considerable interesting debate, both within and outside Marxian economics. 'The law of the tendency of the rate of profit to fall' has been criticized and reinterpreted over the last 50 years, or so (see for example, Gillman (1957), Okishio (1961), Mage (1963), Baran and Sweezy (1966), Samuelson (1971), Roemer (1977), Shaikh (1978), Weisskopf (1979), Wolff (1979), Bowles (1981), Moseley (1988, 1992), Freeman (1991), Shaikh and Tonak (1994), Cockshott, Cottrell & Michaelson (1995).

3.1 Okishio theorem

One of the most controversial debates has been around is the Okishio theorem. Okishio (1961) claims that the general rate of profit will not fall as capitalism grows and accumulates. He employs a linear price of production model of the economy and states that technical change would not cause the rate of profit to fall because individual capitalists would only invest in new technology in expectation of a profit rise. His starting point is correct when he says that:

> New production techniques have two counter-acting effects on the rate of profit: to increase the rate of surplus value and to increase the organic composition of capital. (1961: 85-86)

He then immediately asks the question, "why has the rate of profit the tendency to fall?" (p. 86) He goes the wrong way when trying to answer the foregone question, which is the main objective of his mathematical theorem. It is rather more convincing to hear the answer directly from the horse's mouth: "Our conclusions are negative to Marxian Geset□ des tende□ iellen Falls der Profitrate." (p. 95) He explains unless the real wages rise sufficiently,

the new technique of production or the technical innovations employed by the capitalists do not reduce the general rate of profit. Furthermore, he considers innovations in non-basic industries (capital goods i.e. equipment and structures) have no influence on the general rate of profit. Whereas innovations in basic industries (wage-goods industries) raises positively the general rate of profit. He also mentions two reasons for Marx's failure not to get these correct results. First of all his "lack of thoroughness" in the analysis of transformation problem. Secondly, capitalist behaviour in relation to the adoption of new technique of production was neglected by Marx, although he repeatedly mentioned the restrictive character of capitalist choice of methods of production.

However, Okishio has been criticised by Marxist economists especially for his treatment of the rate of profit to increase through time because of technological change, as well as the assumptions used. Kliman (1996) argues that mechanisation causes the rate of profit to fall, even with a constant real wage. He conceived the value 'as a quantum of dead labour' which is depending on the living labour in a historical time. He argues that although some critiques of Okishio abandon his assumption of real wage constraint and show that the profit rate can fall as the real wage increases, for example Laibman (1980), Foley (1986) and Lipietz (1987), they have not foundamentally criticised his theorem. However, both Laibman and Lipietz use the assumption of constant rate of exploitation for their analysis to show neutrality of class struggle in the case of Laibman and with respect to Lipietz to get rid of realization problems associated with the Okishio's assumption of constant real wage. Yet Laibman (2001: 91) claimed that, "The Okishio Theorem is true."

Morishima (1973) extended Okishio's theorem to the case of joint production. Furthermore, Roemer (1979) has tried an extension of it to the case of fixed capital. Having said that, Okishio only considered circulating capital and basic goods industries without taking into account the depreciation of capital. By excluding those crucial elements, and using unrealistic assumptions, one would wonder if Okishio was dealing with Marxian economics at all. Especially when it comes to the analysis of extraction of surplus value from productive labour and its realisation. It is not Marxian approach to define profit as the reproduction-cost principle. We cannot build up our theory on the basis of unrealistic assumptions of market clearance equilibrium, yet stating that is the refutation of the Marx's tendency of the rate of profit to fall, without even seriously considering his counteracting forces against the tendency.

Shaikh (2007) deals with Okishio's notion of competition and profit rate. He distinguishes between two notions of competition, the Marxian 'real competition' and the neoclassical 'perfect competition'. He emphasises that the former one is built on the 'idea of aggressive price-cutting by firms' and the latter one assumes that all firms are passive 'price-takers', which means firms are supposed to invest in a new method of production when there is an expectation of a higher rate of profit at the current price. Therefore, technical change causes the sector's relative prices to fall, but always increases the general rate of profit. Although it may increase the unit investment cost that is lowering output-capital ratio, nevertheless the productivity increase would more than offset the loss. Shaikh argues that according to Okishio's theorem, the only thing that causes the rate of profit to fall is "if real wages rise sufficiently to negate the overall effects of technical change." (2007: 121)

Alternatively, Shaikh puts forward his concept of competition which gives him opposite results. As a new 'lower-cost method' introduced by the first capitalist to invest in a new technology gets an upper hand over his fellow capitalists by driving prices down, as their costs are lower, to the point where their rate of profit is higher than their competitors with older firms. He adds that as long as lower costs are achieved, even methods of production with lower rate of profit at current prices will be used, because their lower costs permit them to have higher expected returns with the expectation of lower future prices. Therefore, the rate of profit goes further lower. Shaikh concludes that:

> *Over time the process of technical change would produce a slow but steady downward drift in the general rate of profit.* Any increase in real wages would then exacerbate, not cause, this decline. (1987: 116, 2007: 28)

Although Shaikh correctly rejects Okishio's notion of capitalist competition, he did not overcome his own weakness of dealing with the same issue. Kliman (1996) criticised Shaikh (1987) and Nakatani (1979) for their 'cut-throat competition' which failed to defend Marx's theory of the falling rate of profit in terms of mechanisation itself, not something imposes on capital from outside.

Cullenberg (1994a) criticised Okishio's method of investigation into political economy by his employment of a Cartesian approach to the social totality. Cullenberg classifies two different Marxian paradigms while discussing the debate over the tendency of the rate of profit to fall. The first group employs the Hegelian totality and the second group uses the Cartesian

totality. In the former one whole determine parts, but in the latter one parts are prior to wholes and stands against the Hegelian approach to totality. Cartesian totality is represented by the Okishio theorem and the debate surrounding it. The Hegelian named as 'traditional' approach and represented by Sweezy, Robinson, Meek and Rosdolsky. Cullenberg says that:

> Not only is the Okishio theorem itself based on the Cartesian totality, but also the presence of the Cartesian totality has slipped into, and left it stamp on, the arguments of even the most ardent critics of the Okishio theorem. Thus various Marxist theorists such as Anwar Shaikh (1978b, 1980), John Weeks (1982) and Pat Clawson (1983) all operate to varying degrees on the terrain of the Cartesian totality in their critiques of the Okishio theorem. (Cullenberg 1994a: 53)

Cartesian totality in social science is referred to methodological individualism, which states that all social phenomena can be explained by the behaviour of independent individuals.

Having discussed the Hegelian and Cartesian totality, Cullenberg suggests an alternative approach called the decentred totality. This is mainly represented by Althusser and Blibar, Hindess and Hirst, Resnick and Wolff, Laclau and Mouffe. He emphasises that:

> Althusser's Marxist totality neither reduces the parts to an expression of the whole, as does the Hegelian totality, nor the whole to the aggregation of its independently constituted parts, as does the Cartesian totality. Instead, the Marxist totality is to be thoroughly nonessentialist as the parts (contradictions for Althusser) mutually constitute one another. (Cullenberg 1994a: 87)

Cullenberg criticises the linear price of production model of the economy, as a "Sraffian model" on which the Okishio theorem and a great deal of his critiques are based. He considers it as a paradigmatic Cartesian way of understanding the workings of the total economy, whose "outcome (general equilibrium) is the direct result of its prior and independently constituted parts" (Cullenberg 1994a: 54)[1] So Cullenberg also criticises

[1]He expresses the linear price of production model as follows:
P=(1+r)(pA+pbL)
Where:
A= the matrix of physical commodity inputs per unit output
L= the row vector of labour inputs per unit output
b= the column vector of commodities advanced per unit of labour
p= the row vector of prices of production per unit of output

Okishio's treatment of the Marxian Transformation problem, which is his second major controversy, and its relation to the rate of profit.

Historically, one of the most important articles on the transformation of value to the prices of production was formulated by Von Bortkiewicz (1952). His method was used by Paul Sweezy (1942) in order to show that a system of value calculation could be transformed into a system of price calculation. It also led to the refutation of the Marx's method. Paul Sweezy states that:

> Our investigation has shown, however, that Marx's method is unsatisfactory, that not only individual prices and profits but also aggregates and their relation to one another may be affected by the transition from value to price. (Sweezy 1942: 126)

Although Shaikh (1977) agrees with Bortkiewicz that the total profit and total surplus value or total prices and total value are not equal, he does not refute the validity of the Marx's labour theory of value and the trend in the rate of profit which influences the money rate of profit. However Shaikh argues that:

> It is through the actual movement of money prices that the system is regulated; as such the analysis of prices of production and their relations to value of the utmost importance to concrete analysis. The first step (which in most discussions of the "transformation problem" is the *only* step) along this path is the derivation of prices of production from direct prices. (Shaikh 1977: 127)

Shaikh's (1973) argument comes very close to Okishio's one on 'Value and production price' by concluding that the total surplus value of all sectors is not equal to the profit when the cost price has been transformed into production price. The cost price in terms of production

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r= the general rate of profit.
Cullenberg opposes "a single, uniform, economy-wide rate of profit due to the assumption of perfect competition also guarantees that the hourly wage, pb, is equal across sections." (p.54) However, "the solution to the n-1 relative prices can be found by rewriting the price of production equation in the following manner: $p = (1+r)(pM)$ where: $M = A+bL$,M is the augmented-input matrix of the technical coefficients of production added to the matrix of the commodities comprising the real wage, bL. "Expressing the result in the context of the Cartesian totality…, the equilibrium configuration of the n-1 prices of production and the general rate of profit is the totality whose existence depends on the prior specification of the parts A,b,L." (p.55)

prices rises above the cost price in terms of values because of the equalisation of the rate of profit.

I have addressed the transformation problem in Chapter 5, where I calculated the ratio of values to prices of production, using UK input-output tables. Contrary to Okishio's or Shaikh's argument, I found very close conformity between the two for the production industries.

In conclusion, Marx's own argument is very clear. If the first capitalist introduces a new, more efficient technology and gets a competitive advantage over his rival capitalists, will be able to gain more profit than others. Once the new techniques are generalised their surplus profit will disappear. That is the value of commodities falls until it reflects the average socially necessary labour time for their production with the new technology. As the costs fall and capitalists competing for larger market share, they reduce their prices therefore their profit rate falls across the sectors of the economy. However mathematical and statistical tools should be used to analyse empirical investigation of the falling profit rate and counteracting forces against that. This is the main purpose of this study that is expressed in Chapter 7.

A great deal of research on the rate of profit has been mainly conducted about the U.S. economy. Glyn and Sutcliffe (1972) Freeman (1991) and Cockshott, Cottrell & Michaelson (1995) have used Marxian variables to estimate the rate of profit in the UK economy, although not time series analysis using econometrics estimates. In this section I intend to discuss mainly the results of the empirical estimates and theories of the rate of profit in the U.S. economy. In Chapter 7, I do the same for the UK experiences and compare Glyn and Sutcliffe's estimates with my own findings.

Marxian and neo-Marxian variants of empirical analysis can be broadly classified as follows; the former emphasises the production sphere of capital and primarily the organic composition of capital and 'structural change' as an essential element in relation to the falling rate of profit. The latter focuses on the circulation sphere of capital, for instance on the distribution of income, and considers that the 'profit squeeze' and 'class conflict' would lead the rate of profit to fall. In other words, changes in the profit share, and correspondingly the wage share, are

often interpreted as a result of a conflict between workers and capitalists. Therefore, a decline in the profit share is often referred to as the 'profit squeeze'.

On the other hand, structural change generally refers to shifts in the industrial composition of either employment or output. Structural shifts can affect the rate of profit in the following ways; first of all, it can affect movements in the output-capital ratio; and a decline in the output-capital ratio is often referred to as a 'rising composition of capital' effect. In Marxian theory, a rise in the composition of capital is viewed as the primary cause of a declining rate of profit. Marx's law of the falling rate of profit is due to continuous mechanisation. That is the development of the techniques of production. This technical change first is introduced in an individual firm in an industry. Therefore, it's technical, organic and value composition of capital increases. As a result there is a higher level of productivity. It means more output or more commodities are produced for the same capital advanced. Therefore, more surplus value or surplus profits could be gained (as long as surplus value is realised). Competition amongst the firms of the same branch will generalise the new techniques of production, therefore eliminating the surplus profit of the first firm which introduced it. Its profit rate falls back again to the same general rate of the industry. As the economic sectors differ in their degree of capital intensity, shifts in output from more capital-intensive sectors to less capital-intensive ones can lower the overall capital-output ratio (raise the output-capital ratio). Secondly, sectors also differ in their rate of labour productivity growth. Shifts in employment from higher productivity growth sector (e.g. manufacturing) to lower productivity growth sector (e.g. service industries) can lower overall productivity growth. This 'unbalanced growth' process has a direct bearing on the overall profit rate. Thirdly, shifts of capital from less profitable sectors to more profitable ones can raise the overall profit rate. As a result of technical innovation, the organic composition of capital (c/v) increases, which causes the rate of profit to fall amongst the economic sectors.

3.2 'Profit squeeze' theories

According to 'profit squeeze' theory, the decline in profit rate is attributed primarily to a decline in the profit share. Different 'profit squeeze' theorists have different explanations for the decline in the profit share. Weisskopf (1979) characterized distributional conflict simply in terms of a struggle over pre-tax factor shares of income. He argued that the main cause of the decline in the profit share was the lower rates of unemployment which prevailed in the

post war period, and which enabled workers to defend themselves against an increase in the relative price of wage-goods and to maintain their real wage share. According to him, the fundamental cause of the increase in the wage share in the post war U.S. economy was the lower rates of unemployment that prevailed in this period, especially in the late 1960s and early 1970s. It is argued that these lower rates of unemployment increased the bargaining power of workers and enabled them to gain a higher share of total income at the expense of capitalists.

Weisskopf (1988) analyzed the trend in the after-tax rate of profit in the manufacturing sector of eight advanced capitalist countries from 1951 to 1985. He finds that with the exception of Italy, the rate of profit declined significantly in all eight countries. His analysis is based on what he calls a 'distribution frontier' to determine the extent to which the decline in the rate of profit in those countries was due to gains by labour and the extent to which it was due to changes in the general economic environment. Labour gains are measured by the rate of growth of after-tax real wages and are interpreted as part of the distributional conflict with capital. Weisskopf's results show that in Canada, France and the U.S.A. the decline in the rate of profit was due almost entirely to general environmental factors, while in the other countries distributional conflict played a significant role. Finally, Weisskopf hypothesizes that the outcomes of the distributional conflict depend primarily on the balance of power between capitalists and workers, which in turn depends on such factors as the rate of unemployment, the extent of unemployment insurance and the strength of unions. In his analysis, Weisskopf distinguishes between "offensive" and "defensive" strength of labour. This distinction is based on a further decomposition of the nominal wage share and the ratio of the price of wage goods (Pw) to the price of all final goods (Py), as follows: $W/Y=w/y.Pw/Py$ where the lower-case letters represent real variables. "Offensive" and "defensive" strengths of labour are then distinguished according to whether an increase in the nominal wage share is due to an increase in the real wage share or to an increase in the relative price ratio, respectively.

Weisskopf used quarterly data for the Non-Financial Corporate Business sector of the U.S. economy for each of the variables for the period 1949-1975. His estimates show that the real wage share remained more or less constant over this period (actually declined slightly) and that the relative price ratio Pw/Py increased 11%. Thus, in Weisskopf's views, this was a situation of "defensive" strength of labour. Weisskopf argues that the increase in the relative

price of wage goods resulted in an increase in the nominal wage share rather than in a reduction in the real wage share, because the lower rates of unemployment increased the bargaining power of workers and enabled them to maintain their real wage share in spite of the adverse trend in the price of wage goods. This "rising strength of labour" variant of the profit squeeze theory is sometimes referred to as the "reserve army" variant, because of its emphasis on lower unemployment as the fundamental cause of the increase of the wage share.

In conclusion, having used two different measures of the power of labour, Weisskopf finds that these measures are negatively and significantly related to the rate of growth of real wages, a result that is consistent with the 'profit squeeze' variant of radical economics.

Wolff (1987) presented a different explanation for the decline in the profit share in national income. This explanation rests on the decline in productivity growth beginning in the mid 1960s, due largely to an employment shift from sectors with a relatively high organic composition of capital to sectors with relatively low organic composition of capital. So, sectoral shifts in the distribution of employment significantly depressed the organic composition of capital. Therefore, it had a significant negative effect on the aggregate organic composition of capital and thus a significant positive effect on the general rate of profit. So, without such structural change, the rate of profit would have fallen even more than it did.

Finally, Lipietz (1987) also argued that the main cause of the decline in the profit share was due to the productivity slow-down, which is in turn due to the 'exhaustion' of the Fordist regime of accumulation. Fordism is generally characterised by (i) mass production based on the assembly-line principle adopted by Henry Ford, by (ii) rising wages which provided the basis for a new articulation between mass consumption and mass production, by (iii) large factories, and by (iv) a high degree of state intervention based on Keynesian principles, the development of the welfare state and a central role for the trade unions both in institutionalising collective bargaining and in the formulation of state policies. This is the basis of the theory of Fordism, which is concerned with the structural characteristics and the politico-economic mechanisms of regulation in post -war capitalism. The argument of 'Fordism', originated with the work of Palloix (1976), Aglietta (1979) and others in France in the mid 1970s, but it has since been taken up in many parts of the world.

Actually, the Fordist formation is based on a strategy of 'intensive' capital accumulation, which rests essentially on the Taylorist reorganisation of the labour process (Braverman: 1974). The establishment of Taylorism signified a decisive intensification of exploitation, based on far-reaching deskilling processes, the destruction of traditional craft forms of workers' power and the introduction of efficient techniques of managerial control and supervision. The Taylorist organisation of production and the enormous increase which it brought in the productivity of labour made possible the mass production of cheap consumption goods and created thereby the precondition for the establishment of new key technologies (automobile construction, household implements, and electronic means of mass communication). It also made possible a gradual increase in real wages; that is, the mass worker created by Taylorism could become the mass consumer of industrially produced commodities. In this way the Fordist articulation of production and reproduction was created.

However, the Fordist regime of accumulation causes economic crisis. As I have mentioned already Lipietz (1987) states that: "the present crisis in intensive accumulation is a crisis of productivity, whereas the crisis of the 1930s was a crisis of overproduction" (Lipietz, 1987: 43). Namely, Taylorist work organisation methods lead to "overproduction" crisis, and Fordist "mass production" leads to profitability crisis. According to Lipietz, by the mid 1960s, the downturn in productivity growth had led to an increase in per capita capital in value terms, or in Marxist terms, to a rise in the organic composition of capital. Since then, productivity rises have failed to compensate for the rise in the technical composition of capital that is the per capita volume of fixed capital. Therefore, this type of fall in profitability is due to the rise in the organic composition of capital.

There is also another type of productivity crisis due to the profit squeeze:

> Initially, the mark-up procedures characteristic of monopolistic regulation (whereby firms add a marginal rate to prices) compensated for the fall in immediate profitability by producing a nominal rise in profits, but that had repercussions in that it led to a general increase in both prices and wages, and meant that a greater share of profits had to be ploughed into amortization. Increasingly, firms ran into debt and the cost of debt-servicing, together with the rise in the relative cost of investment, led to a latent investment crisis. All this took place in an inflationary climate. The downturn in investment, together with the fact that each individual investment created fewer jobs,

> led to a rise in unemployment and therefore to increasing pressure on the welfare state. (Lipietz 1987: 43-4)

Moreover, for him the main cause of crisis in profitability is the productivity slow-down, which is because of the limitations of Fordist work organization principles.

There is another argument that explains the fall in the rate of profit in the Fordist system of production due to its structure. Hirsch argues that:

> Growth, modernity, progress, individualism, consumerism, work discipline, administrative 'feasibility', static social reform and egalitarianism were the dominant normative values which held together this economic-political hegemonic structure of Fordism … [it] has begun to become a barrier to the valorisation of capital. (1991: 18)

He adds that:

> although its establishment was at first the condition for a long-term stabilisation of the profitability of capital and of a relatively long period of capital prosperity, the economic and social structures and mechanisms associated with it have now themselves become a factor of crisis. That is to say that within the given economic, social, political and ideological structures which are knitted together in a historical social formation, the 'countertendencies' which compensate the fall in the rate of profit gradually lose their force. As a result the fall in the rate of profit, from being a contradictory tendency, becomes empirical reality. (Hirsch 1991:18)

Having put forward the main arguments of 'profit squeeze' and 'structuralist' variants of Marxian economic crisis theories, there is also another approach in the 'profit squeeze' spectrum of analysis. This takes into account the role of the state in the determination of the wage and profit share. Miller (1989) examines whether the distributional effects of U.S. government policy have increased or decreased the net earnings of labour. The key concept which is estimated is the 'net social wage' (the social wage after taxes), or the difference between government spending for workers and the tax burden of workers.

The social wage theorists argue that workers receive two types of wages; money wages that they earn as workers and social services from the state that they earn as citizens. These two wages, the money wage and social spending constitute the societal wage of citizen-workers.

The social wage theorists (Bowles and Gintis (1982); Bowles, Gordon and Weisskopf, (1983)) argue that the social wage of citizens, not the money wage of workers, has been the major arena of working-class gain the post war US economy. Bowles and Gintis (1982) calculated that social wage expenditures increased five times more quickly than money wage earnings over the post war period. They conclude that these state policies increased the societal wage bill and therefore, 'squeezed' profits and 'made a significant contribution to the slowdown of the late 1970s and 1980s. Contrary to this argument, Shaikh and Tonak (1987) discuss that working people pay out more in taxes than they receive back in benefits from state spending; in other words, the net social wage is negative. They argue that this shortfall gets larger in the 1970s and 1980s.

Miller (1989) also finds that the net social wage was negative throughout most of the post war period. This is to say that workers paid more in taxes than they received in the form of government benefits. The net social wage has been shown that is becoming more and more negative from 1960s towards 1980s. Miller argues that, although this growing negative social wage did not result in a 'profit squeeze' crisis, it shows more of the burden of financing the state onto labour, and might be a victory for capital in the short term. In the long run, however this compromises the accumulation process by endangering the reproduction of an able-bodied and skilled work force.

Let us now return to Marx's view, in brief, of the determination of the real wage rate and its effect on the general rate of profit. He argues that:

> The value of the labouring power is formed by two elements- the one merely physical, the other historical or social. Its ultimate limit is determined by the physical element, that is to say, to maintain and reproduce itself, to perpetuate its physical essence, the working class must receive the necessaries absolutely indispensable for living and multiplying. The value of those indispensable necessaries forms therefore, the ultimate limit of the value of labour. On the other hand, the length of the working day is also limited by ultimate, although very elastic boundaries. Its ultimate limit is given by the physical force of the labouring man … Besides this mere physical element, the value of labour is in every country determined by a traditional standard of life. It is not mere physical life, but it is the satisfaction of certain wants springing from the social conditions in which people are placed and reared up … This historical or social element, entering into the value of labour, may be expanded, or contracted, or

> altogether extinguished, so that nothing remains but the *physical limit*. (Marx's italics) (Marx/Engels 1968: 222)

If we consider social wage as a historical or social element in the value of the labouring power; therefore, it is one factor in determining wages of the working class. According to Marx its expansion or contraction would have a direct effect on the rate of profit. As he concludes:

> Firstly, general rise in the rate of wages would result in a fall of the general rate of profit, but, broadly speaking, not affect the average prices of commodities. Secondly, the general tendency of capitalist production is not to raise, but to sink the average standard of wages. (Marx/Engels 1968: 226)

So, we can sum up that Marx finds a negative relationship between social wage and the general rate of profit. In other words, the higher the social wage, the lower the rate of profit would be. So, the profit is squeezed.

3.3 Labour-capital productivity theories

Here, we can present an alternative explanation for the decline in the rate of profit that is based on Marx's theory of productive and unproductive labour. Marx's concept of productive labour is labour employed in capitalist production which produces value and surplus-value. Unproductive labour is labour employed in the unproductive functions of circulation and supervision within capitalist enterprises. Therefore, production, extraction and circulation of surplus-value are function of productive labourer. Marx's descriptions of productive labour are worth quoting:

> Capitalist production is not merely the production of commodities; it is essentially the production of surplus-value. The labourer produces, not for himself, but for capital. It no longer suffices, therefore, that he should simply produce. He must produce surplus-value. That labourer alone is productive, who produces surplus-value for the capitalists, and thus works for the self-expansion of capital. Hence the notion of a productive labourer implies not merely a relation between work and useful effect, between labourer and product of labour, but also a specific, social relation of production, a relation that has spring up historically and stamps the labourer as the

> direct means of creating surplus-value. To be a productive labourer is, therefore, not a piece of luck, but a misfortune. (Marx 1954: 509)

So, Marx states two necessary conditions for productivity of labour. First of all, the productive labourer must produce commodities. It means "the labourer produces, not for himself, but for capital". They are paid wages in return for using their labour-power. Therefore, they are wage-labourers, who are employed in the sphere of production. Secondly, they must "work for the self-expansion of capital". It means they "must produce surplus-value", which is unpaid labour.

In contrast to productive labourers, there are unproductive workers whose functions, though socially necessary in present-day society, are involved in administration and distribution, but do not contribute to physical production of goods and services. In other words, they are that portion of the total social labour which produces no surplus-value. There are vast domains of social activity, notably the spheres of circulation and of government (not state owned production industries), in which the wage-labourers are unproductive, in spite of the fact that, the formal identity of their social position is the same as that of wage-labourers in the productive spheres.

Having said that, unproductive labour is socially necessary. This follows from the fact that the work performed by these labourers is necessary to capital and in the first place for the realization of surplus-value; “The creation of a vast number of employment, at present indispensable, but in themselves superfluous”. (Marx 1954: 530)

Actually, for Marx, there is a dialectical unity between productive and unproductive labour, as there is between the production of surplus-value and its realization. Or, there is the same type of unity of dialectical opposite here as in the case of production and consumption. Although, in each case the two sides of the dialectical unity must be analyzed separately for the purpose of conceptual clarity, we must not lose sight of their inter-relations. These inter-relations have to be interpreted dialectically rather than mechanically.

To be more precise about the interactions between the sphere of production and circulation, we can quote Marx himself:

> The costs of circulation which we shall consider now are of a different nature. They may arise from process of production which is only continued in circulation, the ***productive character*** of which is hence merely concealed by the ***circulation form***". (Marx 1958: 136) (My italics)

Another clear example is transportation, which has been seen a productive activity by Marx. On the other hand, there are some circulation activities which occur in the sphere of production. But the value of commodities is not increased by such activities. As Marx says:

> Whatever may be the social form of the products-supply, its preservation requires outlays for buildings, vessels, etc., which are facilities for storing the product, in order to combat injurious influences-These outlays always constitute a part of the social labour, in either materialized or living form-hence in the capitalist form outlays of capital-Which do not enter into the formation of the product itself and thus are deductions from the product. They are necessary, these unproductive expenses of social wealth. (Marx 1958: 144-45)

Here, I do not want to go into more details in distinguishing productive and unproductive labour in empirical research. What I am concerned with at the moment, is the relationship between this distinction and the falling rate of profit and different theories about that.

Moseley (1992) argues that the main cause of the decline in the rate of profit is a very significant increase in the rates of unproductive labour to productive labour during the post-Second World War period. His main conclusion is that the most significant cause of the increase was the slower productivity growth of circulation labour, compared to productive labour, which seems to be inherent in the nature of the two activities. Moseley's main contention here is that the share of profit in national income is not a good measure of the rate of surplus-value and unproductive sector plays an important role in it.

He states that the main difference between the conventional rate of profit and the Marxian one is to do with Marx's distinction between productive and unproductive labour. He then estimates the Marxian variables for the Business sector of the US economy over the period 1947-77. He concludes that the proximate causes of the decline in the conventional rate of profit were the significant increase in the composition of capital and unproductive capital to variable capital. Then he emphasises the slowdown in productivity growth after 1965, which

had a significant negative effect on the rate of profit. However, he argues that this productivity slowdown had resulted in only a small decline in the rate of profit. For him the most important cause of the decline in profit rate is again the significant increase in the flow ratios of unproductive capital to variable capital. He says that the proximate cause of the increase in unproductive capital to variable capital was proportional increase in the number of unproductive workers to productive ones in the post-war US economy.

Although unproductive labour has been discussed in Marxian literature in a great deal, its quantification has not been paid much attention. Gillman (1957) has statistically measured it, in his classic study of the rate of profit in the United States. But there is little theoretical rationale behind this. He argues that:

> We propose to reformulate the law of falling rate of profit for the monopoly period as the tendency of (s-u)/c to fall. And our proposition would be that in the period of pre-monopoly capitalism and of a rising o.c.c, when, u, was a relatively negligible factor in the realization of surplus-value, the basis of the law lies in the faster relative rise of the (c/v) ratio then the (s/v) ratio. In the period of monopoly capitalism, of the new technology and of rising unproductive, when (c/v) is relatively, stable, the basis of the law lies in a faster rise of the (u/v) ratio than the (s/v) ratio. (Gillman 1957: 89-90)

After making some deduction for unproductive expenditures, Gillman does obtain a downward trend for 1919-39, although the bulk of the fall is in the first year 1919-20. The most important point is not that the trend obtained but the fact that the roles of unproductive expenditure under monopoly capital have not been integrated into the theory of the rate of profit.

Mage (1963) criticised Gillman for inserting two new categories into Marxian theory in order to get a closer conformity with the facts. The new categories are: "unproductive expenses" and "diminished s" (net profit), which is equal to s-u. Mage says that these categories cannot theoretically be defended as they are not correct definition of s and u. Furthermore s-u (diminished s) is not a part of the value of a commodity, therefore cannot be included in the general Marxian model of commodity production. In addition the expenses of circulation add no value to commodities. These expenses are only required for the realization of value from one form into another. Although the capital used for those expenses of circulation is unproductive, it is necessary.

Mage restates Marx's argument and says that the expenses of circulation are to be understood "from the point of view of the entire capitalist class" and not from the process of capitalist production as a whole.

Both, Gillman and Mage are in agreement in their high estimate of the level of profitability before World War I. Following the war, a sharp decline occurs and the level of profitability in the 1920s appears as a low plateau compared with the pre-war level, despite fluctuations and a mild upward trend until 1929. Both studies consider manufacturing, but Gillman's rate of profit is measured before-all-taxes, so that the results are not directly comparable. Mage after-tax series locates the 1950s significantly below the level of 1929 and closer to the early years of the great depression. To be specific, Gillman calculated the rate of profit in manufacturing as profit before-all-taxes, plus interest, plus rent divided by net plant and equipment in current dollars without inventories. Mage measured it in the non-farm total economy. His definition of profit included profit, interest and rent, before and after taxes. In his definition of capital he included inventories. But he includes government and non-profit sectors which may introduce distortions not directly related to the profit generating activities. His estimates off the non-corporate gross surplus-value are judged, by himself, to be highly unreliable. (Mage 1963: 192-93) In addition, he unjustifiably includes unproductive worker wages as capital.

A further approach takes into account the productivity of capital (or the output-capital ratio), rather than labour productivity. Dumenil, and Levy (1995) estimated the profit rate for the total US private economy, before all taxes, from 1869 to 1989. They characterized the long-term evolution of the profit rate as follows: 1) up to the WW I, downward; 2) from the WW I to the 1950s, upward; 3) since the 1950s, downward. The important point is that, the productivity of capital follows the pattern as the profit rate. But the other two variables, which are labour cost and labour productivity, grew rather steadily from 1869 to 1989.

Shaikh & Tonak (1994) attempt to solve simultaneously the productive and unproductive labour as well as estimating rate of surplus value using input-output tables. Although for productive workers they use production industries, they include agriculture, mining, construction, transportation and public utilities, manufacturing, productive services (Hotels and other lodging places, Personal services, Auto repair, services and garages, miscellaneous repair services, Motion pictures, Amusement and recreation services, Health services,

Educational services, social services and membership organisations, Miscellaneous professional service and Government enterprises. (pp. 108-9 and 284)

Mohun (2005) criticises Shaikh & Tonak on their calculation of productive and unproductive labour, using the US Bureau of Economic Analysis and the National Income and Product Accounts. Mohun goes into the depth of their methodology and approximations used to extract data for productive labour in general and in particular with regard to "productive services" division (p. 800). He comes up with his own alternative approach and estimates, using the mentioned data sources for the US economy.

Moreover, Shaikh & Tonak are not concerned about the falling rate of profit and in the first place the measurement of the counteracting tendencies of the rate of profit to fall, as it has been my main occupation of this paper with respect to the UK economy.

3.4 Underconsumptionist theories

Finally, we discuss the other variant of radical crisis theory, which focuses mainly on the sphere of circulation rather than the sphere of production or distribution. They are classified as 'underconsumptionist' theorists. Baran and Sweezy (1966) argue that the falling rate of profit is a feature of competitive capitalism and ceases to operate under monopoly capitalism in its present stage. They say that the threat to profitability arises from difficulties in selling the produced commodities at profitable prices. In other words, the problem is that demand conditions prevent the capitalists from realising the full value of the commodities produced, or in Marxian terminology, they face a 'realization problem'.

Mage (1963), in defence of Marx's theory, tries to reject underconsumptionism. He says that, the rate of profit does not fall because there is not enough effective demand; on the contrary, there is "deficient effective demand" because the rate of profit is falling. Mage (1963: 130-1) quotes Marx on overproduction that is "production of too many means of production and necessaries of life to permit of their serving as means for the exploitation of labourers at ***a certain rate of profit.***" (Mage's italics) However he tries to distinguish himself from Say's law, nevertheless the falling tendency of the rate of profit is directly and completely contradictory to this.

Mage notes that the Say's law is considered by radical economists to be on the supply side of the economy, versus Keynesian economics which is seen on the demand side of the economy. For the former one, there is not enough production in the economy. But for the latter one, there is deficient effective demand. However, "Marx definitely assumed that under normal circumstances, capitalists would be able to realize on the market all the "value", including the surplus-value contained in the total social product". (Mage 1963: 129) Accordingly, as has already been mentioned, the rate of profit does not fall because of deficient effective demand. On the contrary, there is not enough effective demand because of falling rate of profit.

Therefore, Mage argues Marx is not at all inconsistent in rejecting both Say's law and underconsumptionism. The basis for his critique of capitalism is not underconsumption, it is underproduction. Mage quotes Marx again: "It is not a fact that too many necessities of life are produced in proportion to the existing population. The reverse is true. Not enough is produced to satisfy wants of the great mass decently and humanely." (Mage 1963: 132)

Mage criticises Sweezy, by quoting him to:

> demonstrate that capitalism has an inherent tendency to expand the capacity to produce consumption goods more rapidly than the demand for consumption goods." … [So that] "the ratio of the rate of growth of consumption to the rate of growth of means of production decline. (1963: 133)

Mage rejects the assumption of a constant proportion between total stock of means of production and the output of consumption goods, which has been used by Sweezy. Then he quotes Lerner, who says that:

> Output is not the same as consumption. It includes not merely consumption but also the output of additions to equipment and to stock of goods in process. Sweezy appears to have been much too dazed by the whirl of different ratios to notice this. (Mage 1963: 134) (Mage's emphasis)

Mage extends this by saying this assumption is quite inconsistent with the proposition that an increasing proportion of the social product will consist of investment goods. Then he concludes that: "The essential point is that it is k, the actual investment that equilibrates production and consumption. The excursion into underconsumptionism serves again to show that, in the Marxian model, the critical factor is *the incentive to invest* and that in this model

overproduction *results from but does not cause* insufficient investment."(Mage's italics) (Mage1963: 139). Therefore, the crucial variables which determine the rate of profit are not extracted from the sphere of production, but are taken from the sphere of circulation. All empirical estimates and theoretical analysis so far have failed to emphasise that Marx's law has to be seen as a *tendency* (My italics) of the rate of profit to fall, with the exception of Gillman and Mage.

3.5 Conclusion

I have tried to identify different variants of Marxian and neo-Marxian crisis theory in relation to the falling rate of profit, to provide a basis for a comparison of their results of estimates with those I derive in this study. In general the approaches here can be classified in two main groups. First, those who concentrate on production process and the second group are those who focus on circulation process. The former includes for instance Gillman, Mage, Shaikh and Wolff in general, as their starting point of investigation has been the production sphere. The latter include 'Profit squeeze', 'Labour-capital productivity' and 'Underconsumptionist' theorists, whose pre-occupation is mainly in the sphere of circulation. In other words, each of these groups focuses mainly on one aspect of capitalist mode of production, in order to show the cause of the decline in profit rate. Here, I have particularly tried to identify the main empirical research related to the tendency of the rate of profit to fall. Although some economists tried to correct Okishio's theorem by removing or adding some assumptions and variables to it, they seem to be trapped in a mathematical analysis, without addressing the reality of the capitalist system of production and exploitation.

In order to carry out our own empirical research of the profit rate, we need to distinguish between productive labour (the source of surplus value) and unproductive labour, as well as productive and unproductive capital which are going to be discussed in the next chapter.

Chapter 4 Productive and unproductive labour

This chapter begins with a general introduction to Marxian categories of productive and unproductive labour. Then the first section focuses on the abstract labour, which is very important from Marx's perspective, as it is expressed in exchange value; the second section discusses classical political economy and Marxian economics on the category of productive and unproductive labour. The third section expresses the difference between Physiocrats and Smith's labour productivity. The fourth section expresses Ricardo's approach to productive and unproductive labour, which has paved the way for the Marx's own theory which is discussed in section five. Furthermore, the controversy surrounding the labour productivity and services workers and self-employment has been explained in subdivision six and seven. In section eight productive and productive capital, especially with reference to Marx's points of view have been explored, as without this clarification the distinction between productive and unproductive labour would have been meaningless. Historically, this category first expressed by Smith, therefore section nine argues about his points of views. The main points of this chapter have been concluded in section ten.

As we have already seen, it is very important to distinguish between productive and unproductive labour in order to present a Marxist classification of the various money terms of the elements of variable capital, constant capital, the mass and the rate of surplus value and hence the rate of capital accumulation. Therefore, this distinction affects estimates of the Marxian rate of profit and economic crisis.

In order to carry out empirical estimates of the key variables in the Marxian system, we need to find the theoretical differences between Marxian and orthodox analyses, especially in distinguishing between production and unproductive activities of labour. Conventional economics text books refer to productivity as the average amount of output produced by all inputs. Their debate mainly emphasises output unit of labour which they call 'labour productivity'. They also might use 'output per head' measurement, which is 'output per person employed'. Furthermore, labour productivity is measured by 'output per person hour' with adjustment for changes in the usage of labour over time because of changes in the length of working day or week.

For Marx however,

> only labour *which is converted directly into capital is productive;* hence only labour which posits variable capital as variable, and therefore = C+D. If the variable capital = x before its exchange with labour, so that we have the equation Y=X, that labour is productive labour which converts X into x + h and therefore makes y = x into y = x + h. This is the sole point that needs to be discussed. Labour which posits surplus value, or serves capital as an agency for the positing of surplus value and therefore enables it to posit itself as capital, as self-valorising value. (MECW: 2002)

This is the secret of the 'self expansion' of capital, through the labour-process. In explaining the labour-process, Marx states that:

> If we examine the whole labour-process, from the point of view of its results, it is plain that both the instruments and the subject of labour are means of production, and that the labour itself is productive labour. (Marx 1954: 181)

However, he adds in the footnotes of the same page that:

> This method of determining, from the standpoint of the labour-process alone, what is productive labour, is by no means directly applicable to the case of the capitalist process of production. (Marx 1954: 181)

Marx's concept of productive labour is labour employed in capitalist production which produces value and surplus-value. Unproductive labour is labour employed in the unproductive functions of circulation and supervision within capitalist enterprises.

4.1 Abstract labour

Having discussed productive labour, there is a social aspect into the concept of labour in general and abstract labour in particular. To understand correctly Marx's theory of abstract labour, we have to realize that value and productive activity are derived from abstract labour. Abstract labour creates exchange value and it is the content or substance of value. So, abstract labour creates value. He says that:

> productive activity, if we leave out of sight its special form, viz. the useful character of the labour, is nothing but the expenditure of human labour-power. Tailoring and weaving, though qualitatively different productive activities, are each a productive expenditure of human brains, nerves, and muscles, and in this sense are human labour.

> They are but two different modes of expending human labour-power. (Marx 1954: 44) (My emphasis)

As it can be seen, here Marx talks about human labour-power in general, not labour or productive workers' labour-power. He concludes it by stressing the generality of abstract labour;

> on the one hand all labour is, speaking physiologically, an expenditure of human labour-power, and in its character of individual abstract human labour, it creates and forms the value of commodities, on the other hand, all labour is expenditure of human labour-power in a special form and with a definite aim, and in this, its character of concrete useful, labour, it produces use-values. (Marx 1954: 46) (My emphasis)

So abstract labour creates exchange value of commodities, and concrete labour produces use-values. However in some other places, Marx talks about the socially necessary labour-time, as the determinants of the magnitude of the value of any commodity. It is defined as the requirement of normal conditions of production with the average degree of skill and intensity prevalent at the time, for the production of an article. For example if for an individual worker takes two hours to make a chair, this cannot be the measure of the value of the chair in that particular society. It would be the time that an individual working with the average level of technology and also the average level of skills prevalent in the society.

Here, Marx again tries to analyze the value of commodities in the sphere of production. Namely, he tries to reduce the creation of value from abstract labour, or all human labour-power to the specific types of labour-power in the production sphere. It seems to be a mechanical rather than dialectical relationship between the two types of value creation. In addition, abstract human labour-power or living labour is mixed with the dead labour in the form of machinery and other constant capital without precise and defined relations between them. As the technology progresses, less and less living labour is required to produce more goods.

In order to have a clear view about value, price and productive labour, we have to remove these opposite and contradictory definitions and explanations from Marx's theories. From my point of view, if we accept abstract labour theory approach, rather than socially necessary labour-time in explaining and defining value of commodities and its other components, we can overcome with the mentioned contradictions. And also we can explain dialectically the relationships between the spheres of production, distribution, exchange and consumption in a capitalist mode of

production. Consequently, we can tackle and analyze clearly other problems of capitalist economy, such as the productivity of labour and capital, falling rate of profit and economic crisis.

Going back to Marx again, we see the social nature of value plays an important role in his works:

> If however, we bear in mind that they acquire this reality in so far as they are expressions or embodiments of one identical social substance, viz. human labour, it follows as a matter of course, that value can only manifest itself in the social relation of commodity to commodity. (Marx 1954: 47)

Therefore, the concept of value here has a physiological and more importantly it has a socio-historical character. It is not enough to say that abstract labour, which creates value, is an expenditure of human energy which is materialised in production of commodities, we also have to differentiate between different types of labour in a capitalist economy. The concept of physiological labour or abstract labour in general has been transformed into a notion of physiologically equal or homogeneous labour. The amount of homogeneous labour is expressed as that of social average labour for explaining the magnitude of value. In order to measure different kinds of concrete labour, we have to find out the common denominator of the social average labour:

> A commodity may be the product of the most skilled labour, but its value, by equating it to the product of simple unskilled labour, represents a definite quantity of latter labour alone. (Marx 1954: 44)

For him simple labour-power is:

> the labour-power which, on an average, apart from any special development, exist in the organism of every ordinary individual...[It] varies in character in different countries and at different times, but in a particular society it is given. (Marx 1954: 44)

He defines skilled labour as:

> Simple labour intensified, or rather, as multiplied simple labour. (Marx 1954: 44)

So, we can sum it up by saying that total value created in a country is equal to: human labour-power=abstract labour=homogeneous labour=unskilled labour + skilled labour (multiple of a certain amount of unskilled labour) = exchange value.

It is better not to go into the depth of the matter very much and it is suffice to say that the process of diskilling the labour force occurs with the development of the means of production. By implementing new techniques of productions and innovation skilled labour is transformed into simple unskilled labour. Added to this, some of the unskilled workers would be made redundant and join the reserve army of unemployed. Therefore, we can conclude that concrete labour, which creates use value, is transformed constantly into the machinery or dead labour. As a result, living labour becomes simple human labour-power, which creates abstract labour or exchange value. In other words, human social labour manifests itself in both variable and constant capital, or in both living and dead labour.

This transformation of social labour-power in the shape of constant capital in general and of in the machinery in particular, embraces the spheres of production, distribution, exchange and consumption. It means that there is an interacting relationship between all these spheres. Although, in the last analysis the sphere of production plays a crucial role amongst them, it cannot exist without the existence of the other spheres. That's why capitalism has to be understood in terms of social relations in general and social relations of abstract labour or human labour-power in particular. If we confine ourselves to the sphere of production, we lose sight of the reality of the social production and its characteristics. In addition policy outcomes of that could be disastrous. Namely, if in theory we go wrong in practice we cannot expect the right policy.

Having discussed Marx's theory of abstract and concrete labour, simple and skilled labour, productive and unproductive labour has been criticised from different angles and perspectives. At this stage of investigation, my main concern has been Marx's own original thoughts and writings as distinguished from classical approaches.

4.2 Classical political economy & Marxian economics on productive/unproductive labour

Here I am trying to clarify and put emphasis on the importance of Marx's theory of productive and unproductive labour in contrast with classical political economy. In particular, the problem of service workers and commercial wage-labour, which is one of the most controversial areas, has been discussed in order to put some light on classifying productive and unproductive labour for empirical analysis later on.

The definition of productive and unproductive labour was important to classical political economy because of its relation to the nature and origin of wealth creation in a nation. The same thing Marx mentions in the Theories of Surplus-Value and Capital about "classical" economists, especially Adam Smith and Ricardo attempted a scientific examination of capitalist production, although with some contradiction and ambiguity, in compare with "vulgar" economists, who do not analyse the essence of capitalist production, but only see the appearance and put emphasise on the circulation of capital. The latter economists ignored the underlying laws capitalist production in terms of the origin and determination of surplus-labour, or surplus value. Having said that, even well before Smith and Ricardo, according to Marx, Sir William Petty:

> One of the most gifted and original economic investigators in his Treaties of Taxes and Contributions, London 1662 (The edition here quoted is that of 1679), there are numerous passages dealing with the origin and determination of surplus value. (Marx 1951: 15)

In relation to productive and unproductive labour, we can historically and in brief trace them back to the creation and the origin of surplus labour, which is a form of surplus value under capitalist production, with Physiocrats, Smith, Ricardo and most importantly Marx. Therefore, I try to discuss their most important points of view on the mentioned issues and stay with Marx's arguments and analysis for a longer period and draw from it the classification of productive and unproductive labour for the empirical investigation, especially in relation to service and commercial wage-labours.

4.3 Physiocrats and Adam Smith on productive/unproductive labour

At the time of the Physiocrats, the problems facing capital were different to those confronting it as a dominant mode of production. The Physiocrats' notion of productive labour was:

> Labour which creates a produit net, not for itself but for the landowner... the surplus value or the surplus labour time is materialised in a surplus product or produit net. .. They see it for example where there is a surplus of wheat beyond what the workers and farmers consume; [but there is also a surplus of cloth beyond what the clothmakers (workers and employers) need for their own clothing] (Marx argued, so capitalist could be productive as well). Surplus value itself is wrongly conceived, because they have false idea of value, reducing it to the use value of the labour, not to the labour time, to social, homogeneous labour. Nevertheless, there remains the correct proposition that only that wage labour is productive which creates more value than it costs. A. Smith frees this from the false notion with which it was linked among the physiocrats. (Marx 1951: 149)

So clearly according to Marx, Smith borrowed the notion of productive labour from the Physiocrats. That is the labour which produces surplus, although their understanding of surplus and value was wrong and also they merely related this to agriculture and agricultural products. Although Smith's definition of productive labour differed from the Physiocrat's one, in some respects it was similar. Marx in his economic works states that:

> … capitalist production is essentially the production of surplus-value…But it also runs counter to Adam Smith's view that e.g. the investment of capital in agriculture is "more productive" because the same amount of capital sets more hands to work. For the developed capitalist mode of production, these are all outdated, and untrue, false, notions. (MECW: 2002)

Adam Smith makes the original productive and unproductive labour distinction:

> There is one sort of labour which adds to the value of the subject upon which it is bestowed; there is another which has no such effect. The former, as it produces a value, may be called productive, the latter, unproductive labour. Thus the labour of a manufacturer adds, generally to the materials which he works upon, that of his own maintenance, and of his master's profit. The labour of a menial servant, on the

> contrary, adds to the value of nothing ... Unproductive labourers, and those who do not labour at all, are all maintained by revenue. (Smith 1991: 294-297)

In contrast to unproductive labour, Smith defines productive labour as the one which is exchanged directly with capital. Thus, two qualities of productive labour are: to be exchanged against capital not revenue, and producing surplus-value. Productive labour as a wage labour is defined here from the standpoint of capitalist production, which is one step forward. But Smith goes two steps backward when he adopts Physiocrat's notion of productive labour. Or even three steps backward when he falls in Mercantilists' trap of "durability" and "imperishibility" of goods and wealth. In the latter case:

> Labour is only productive in these branches of production whose products, when sent abroad, bring back more money than they have cost (or than had to be distributed for them); that is, which enabled a country to participate to a special degree in the products of newly opened gold and silver mines. (Marx 1951: 150)

Gold and silver are the most imperishable goods and Marx recalls the passage in Petty:

> Where wealth is valued according to the degree to which it is more or less durable without perishing, and finally gold and silver are placed at the top as wealth that is "not perishable". (Marx 1951: 172)

Then Marx quotes Smith himself, in chapter I of Book IV, p.385:

> Consumable commodities, it is said, are soon destroyed; whereas gold and silver are of a more durable nature, and were it not for this continual exportation, might be accumulated for ages together, to the incredible augmentation of the real wealth of the country. (Marx 1951: 172)

In the former case, Smith states:

> The expense, therefore, laid out in employing and maintaining artificers and manufacturers does no more than continue, if one may say so, the existence of its own value, and does not produce any new value. It is therefore altogether a barren and unproductive expense. The expense, on the contrary, laid out in employing farmers and country labourers, over and above continuing the existence of its own value, produces a new value, the rent of the landlord. It is therefore a production

> expense...The labour of artificers and manufacturers never adds anything to the value of the whole annual amount of the rude produce of the land. (Smith 1991: 600)

In addition to the forgone incorrect explanation, Smith talks about labour in terms of producing vendible goods. He says that:

> But the labour of the manufacturer fixes and realises itself in some particular subject or vendible commodity, which lasts for some time at least after that labour is past... The labour of some the most respectable orders in the society is, like that of menial servants, unproductive of any value, and does not fix or realise itself in any permanent subject, or vendible commodity... (Smith 1991: 295)

To sum up, we can see that Smith employs, in general, two interwoven but contradictory definitions of productive labour. The first one, which is historically obsolete and outdated, is from Physiocrats and Mercantilists' points of view. The other one is more compatible with capitalist development. That is, the exchange of wage-labour against capital, or the variable part of capital which produces surplus value, or produces a value greater than its own.

Having said that, he has got one specific definition of unproductive labour that is the labour which is exchanged against revenue. Although sometimes, he contradicts himself by replacing unproductive labour with the productive one and vice versa.

4.4 Ricardo on Productive/Unproductive Labour

Ricardo analysed productive and unproductive labour from the standpoint of advanced capitalist production. Ricardo fully accepted the distinction made by Smith between productive and unproductive labour:

> The one always exchanges its labour against the capital of a nation; the other always exchanges it against a part of the national revenue. (Marx 1951: 177)

But Marx (1951) argues:

> He no longer shares Smith's tenderness for and illusion about the productive labourer. It is a misfortune to be a productive labourer. A productive labourer is a labourer who producers wealth for other. His existence only has meaning as such as instrument of production for the wealth of others. If therefore the same quantity of wealth for others

> can be created with a smaller number of productive labourers, then suppression of these productive labourers is in order. (p. 225)

It did not matter to Ricardo the size of the labour force in a country, but the important thing was the amount of surplus-value (net income) produced:

> Adam Smith constantly magnifies the advantages which a country derives from a large gross, rather than a large income... Provided its net real income, its rent and profits be the same, it is of no importance whether the nation consists of ten or twelve million of inhabitants. Its power of supporting fleets and armies, and all species of unproductive labour, must be in proportion to its net and not in proportion to its gross income. (Ricardo 1966: 345-48)

Ricardo shows that the growth in unproductive consumption would not retard the process of capital formation. Every improvement in the science of technology, and with every advance in the science of agriculture, the value of the worker's means of subsistence would decline, the profits of the capitalists would rise and with it the country's capacity to maintain 'all species of unproductive labour' (Ricardo 1966: 120, 420). He explains that it is beneficial for the 'productive labourers' when the owners of surplus (profit, rent) spend it in 'unproductive labourers' (such as menial servants) than in luxury products produced by the productive labourer, because unproductive labourers spend their income on consumer goods, which in return causes the productive labourers to continue their work in the productive industries. Ricardo says that it is in the interest of workers that the supply of labour does not greatly exceed the demand. Therefore, it is in their advantage if the redundant workers are re-employed in the unproductive branches of labour, and productive workers could competitively struggle against the capitalists for higher wages.

4.5 Marx on productive/unproductive labour

Marx argued against Ricardo and other classical political economists that in order to understand capitalist society it is not enough to say what is productive labour, but what is the source of surplus value. He states that:

> Ricardo never concerns himself about the origin of surplus-value. He treats it as a thing inherent in the capitalist mode of production, which mode, in his eyes, is the

> natural form of social production. Whenever he discusses the productiveness of labour, he seeks in it, not the cause of surplus-value, but the cause that determines the magnitude of that value. (Marx 1954: 515-16)

However, Marx went beyond Smith and Ricardo by stating that the definitions of productive labour and wealth are not universal and is specific to capitalist production alone. He also made it clear in order to understand capitalist society, a correct definition of productive labour process the question of as to how this labour produces surplus-value. So we see how crucial the distinction between productive and unproductive labour in Marx's theory is. Marx borrowed from classical political economy that the relation between productive labour and capital produces wealth. Then he asked why does this exchange produce wealth? Capitalist exploitation is the answer to this question and Marx's Capital reveals this exploitative relationship. The distinction between productive and unproductive labours introduced the most important aspect of capitalist social relation that was tackled by Marx.

Now, we need to examine as to whether productivity comes from the variable capital, which is the amount paid out to manual workers in the manufacturing industries, or taking into account the other components of capital as well. Marx explains his theory of productive and unproductive labour in several places of his works. He states in Capital that:

> Capitalist production is not merely the production of commodities; it is essentially the production of surplus value. The labourer produces, not for himself, but for capital. It no longer suffices, therefore, that he should simply produce. He must produce surplus-value. That labourer alone is productive, who produces surplus-value for the capitalists, and thus works for the self-expansion of capital. (Marx 1954: 509)

First of all, we can say that productive labour must be employed as wage-labourers by capital in the sphere of production. Secondly, they 'must produce surplus-value', which is surplus-labour or unpaid labour.

It is surplus labour which leads to capital and capital accumulation as the formation of wealth within the social relations of capitalism. Capital grows faster as the more labour time turns into surplus-labour time. Although we discussed about the intensity of exploitation in Chapter 2, here we are concerned about the magnitude of the surplus-value, which depends on:

> three circumstances; (1) the length of the working-day, or the extensive magnitude of labour; (2) the normal intensity of labour, its intensive magnitude, whereby a given quantity of labour is expanded in a given time;(3) the productiveness of labour, whereby the same quantity of labour yields, in a given time, a greater or less quantum of product, dependent on the degree of development in the conditions of production. (Marx 1954: 519-20)

He states that different conditions of the above circumstances are possible, and yield different magnitude of surplus-value. Although Marx tries to determine simultaneously the value of labour-power and the amount of surplus-value with the foregone circumstances, our intention is mainly to determine the latter one.

He considers the following conditions of the mentioned circumstances, for the production of absolute and of relative surplus-value:

> I. Length of the working-day and intensity of labour constant. productiveness of labour variable. II. Working-day constant. Productiveness of labour constant. Intensity of labour variable. III. Productiveness and intensity of labour constant. Length of the working-day variable. IV. Simultaneous variations in the duration, productiveness, and intensity of labour. (Marx 1954: 520-30)

Actually, a large number of combinations can be made out of the four elements, which would affect the magnitude of the surplus-value. In the final analysis, we can say that if one of the elements increases and the other two are constant, it causes the amount of surplus-value to be increased. Here it could be added that even if all these three elements to be constant, surplus-value can simply be increased with an increase in the number of productive workers.

To prove, without any shadow of doubt, that productiveness of labour comes from 'living labour', not from 'dead labour' or both types of labour, Marx asserts that:

> The labourer adds fresh value to the subject of his labour by expanding upon it a given amount of additional labour, no matter what the specific character and utility of that labour may be. On the other hand, the values of the means of production used up in the process are preserved, and present themselves afresh as constituent parts of the value of the product;... The value of the means of production is therefore preserved, by being

> transferred to the product. This transfer takes place during the conversion of those means into a product, or in other words, during the labour-process. (Marx 1954: 199)

Marx's productive labour is not determined by the content of the labour, its specific use or ability in which it appears. To Marx the same kind of labour could be productive or unproductive. Marx says:

> E.g. Milton, **Who did the *Paradise Lost* for** £5, was *unproductive worker*. But a writer who does factory labour for his publisher is a *productive worker*. Milton produced *Paradise Lost* for the same reason as a silkworm produces silk. It was an expression of *his own* nature. Later on he sold the product for £5. But the Leipzig proletarian of literature who assembles books (such as compendia of political economy) under the direction of his publisher is a *production worker*, for his production is from the outset subsumed under capital, and only takes place so that capital may valorise itself. (MECW: 2002)

In contrast to productive labourers, there are unproductive workers whose labour is exchanged against revenue, whose functions, though socially necessary in present-day society, are involved in administration and distribution, but do not contribute to physical production of goods and services. In other words, they are that portion of the total social labour which produces no surplus-value. However, they are vast domain of social activity, notably the spheres of circulation and of government (not state owned production industries), in which the wage-labourers are unproductive, in spite of the fact that, the formal identity of their social position is the same as that of wage-labourers in the productive spheres.

Having said that, unproductive labour must be socially necessary. This follows from the fact that the work performed by these labourers is necessary to capital and in the first place for the realization of surplus-value. "The creation of a vast number of employment, at present indispensable, but in themselves superfluous". (Marx 1954: 530)

Actually for Marx, there is a dialectical unity between productive and unproductive labour, as there is such a unity between the production of surplus-value and its realization. To be more precise about the interactions between the sphere of production and circulation, we can quote Marx (1954) himself:

> The costs of circulation which we shall consider now are of a different nature. They may arise from process of production which is only continued in circulation, the ***productive character*** of which is hence merely concealed by the ***circulation form***. (p.530) (my italics)

Or another clear example is transportation, which has been seen a productive activity by Marx. On the other hand, there are some circulation activities which are occurring in the sphere of production. But the value of commodities is not increased by such activities.

4.6 Service workers

Although, there is little dispute amongst Marxists over Marx's definitions of productive and unproductive labour in general, the agreement ends when we go beyond the definitions and start talking about specific types of labour, e.g. service workers, state employees, and commercial wage-workers.

The problem arises, for instance, when we ask the question of capitalistically-organised service company in which wage labourers are employed by a capitalist or capitalists, to use their services for others. Do these workers, or those who work in a commercial sector and financial sector, could be classified as productive or unproductive labour?

There are a lot of disagreements here amongst Marxist economists. There are those who believe that if workers do not produce material commodity cannot be productive; for example Poulantzas (1974: 216-19), Mandel (1978: 404-5) are in that group. They are in fact the followers of Smith's second definition of productive labour. That is labourers who are employed by capital and produce material commodities, in contrast to labourers who produce surplus-value. If we look at Marx's critique of Smith, we see that Marx disputed and rejected the former definition and accepted the latter one. As a matter of fact, Marx argued clearly the productivity of labour in the sphere of non-material production:

> If we take an example from outside the sphere of production of material objects, a schoolmaster is a productive labourer, when, in addition to belabouring the heads of his scholars, he works like a horse to enrich the school proprietors. That the latter has laid out his capital in a teaching factory, instead of a sausage factory, does not alter the relation. (Marx 1954: 509)

Marx put forward that:

> Where money is exchanged directly for labour, and the latter does not produce any capital, hence is not productive labour, it is bought as a *service;* this is nothing more than expression for the particular use value provided by labour, just like every other commodity; but it is a specific expression for the particular use value of labour, in so far as labour does not provide services as an *object* but as an *activity,* which however by no means distinguishes it e.g. from a machine, e.g. a clock. (MECW: 2002)
>
> The result is that the mere exchange of money for labour does not convert the latter into *productive labour,* and that the *content* of this labour, on the other hand, is initially a matter of indifference. The worker himself can buy labour, i.e. can buy commodities which are provided in the form of services, and when he expends his wage in such services this expenditure does not differ in any respect from the expenditure of his wage to buy any other commodity. The services he buys may be more or less necessary, e.g. he can buy the service of a doctor or a priest, just as he can buy bread or spirits. (MECW: 2002)
>
> Some *services* or *use values,* the result of certain activities or kinds of labour, are incorporated in *commodities*; others, however, leave behind no tangible result *as distinct from* the persons themselves: or they do not result in a *saleable commodity.* E.g. the service a singer performs for me satisfies my aesthetic needs, but what I enjoy exists only in an action inseparable from the singer himself, and once his work, singing, has come to an end, my enjoyment is also at an end; …These services themselves …e.g. the service of a soldier, or a doctor, or a lawyer, or they may be services which provide me with pleasure…A large part of *services* belong to the *costs of consumption* of commodities, as with cooks, maids, etc. (MECW: 2002)

To make it crystal clear we take another example:

> An actor for example, or even a clown, according to this definition, is a productive labourer if he works in the service 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, is an unproductive labourer. The former's labour is exchanged with capital, the latter's with revenue. (Marx 1954: 157)

We find the same argument in relation to productive and unproductive workers on the issue of sub-contractors:

> Productive workers may themselves be unproductive workers as far as I am concerned. If e.g. I have my house decorated, and these decorators are the wage labourers of a master, who sells me this function, it is the same for me as if I had bought a ready decorated house, expended money for a commodity I intended to consume, but for the master who sets these workers to decorating, they are productive workers, for they produce surplus value for him. (MECW: 2002)

In order to find out as to how consistent he is in his argument on productive and unproductive labour, I have tried to quote him in different works. It is suffice to say that:

> It follows from what has been said that the designation of labour as productive labour has absolutely nothing to do with the determinate content of labour, its special utility, or the particular use-value in which it manifests itself. The same kind of labour may be productive or unproductive. (Marx 1969a: 401)

Marx extended his analysis of productive and unproductive labour to tackle the problem of service workers and wage-labour employed by commercial capital. He points out some similarities and differences between the commercial wage-workers and industrial workers:

> The question now arises: What about the commercial wage-workers employed by the commercial capitalist, here the merchant? In one respect, such a commercial employee is a wage-worker like any other. In the first place, his labour-power is bought with the variable capital of the merchant, not with money expended as revenue, and consequently it is not bought for private service, but for the purpose of expanding the value of the capital advanced for it. In the second place, the value of his labour-power, and thus his wages, are determined as those of other wage-workers; i.e., by the cost of production and reproduction of his specific labour-power, not by the product of his labour. However, we must make the same distinction between him and the wage-workers directly employed by industrial capital which exist between

> industrial capital and merchant's capital, and thus between the industrial capitalist and the merchant. Since the merchant, as a mere agent of circulation, produces neither value nor surplus-value...it follows that the mercantile workers employed by him in these same functions cannot directly create surplus-value for him. (Marx 1960: 287)

Having said that, according to Marx commercial workers do secure a share of surplus-value for their employers.

> Just as the labourer's unpaid labour directly creates surplus-value for productive capital, so the unpaid labour of the commercial wage-worker secures a share of this surplus-value for merchant's capital. (Marx 1960: 288)

4.7 Self-employment

Although self-employment has not been the centre of discussion for classification of productive and unproductive workers, it is very important to understand the nature of this type of labour especially in a dynamic and constantly changing economy and employment. If a self-employed is a producer of commodity, s/he is not a seller of labour, but a producer of commodity. Therefore, s/he is not exchanging their labour power to capital, nor producing surplus value for a capitalist. They own their means of production like a capitalist, and paying their own wages. By taking all these elements into account, we cannot categorise them as productive or unproductive workers:

> But what is the situation with independent handicraftsmen or with peasants who do not employ any workers, hence do not produce as capitalists? Either they are *producers of commodities*; as always in the case of peasants //but not e.g. in the case of a gardener I take into my household//, and I buy the commodities from them, in which connection it makes no difference e.g. that the handicraftsman supplies the commodities to order, whereas the peasant deliver his **supply** according to the measure of his means of producing it. In this relation they meet me as sellers of commodities, not as sellers of labour, and this relation has nothing to do with the exchange between capital and labour, hence it also has nothing to do with the distinction between *productive and unproductive labour*, which depends merely on whether the labour is exchanged for money as money or money as capital. They therefore belong neither to the category of *productive workers* nor to that of *unproductive workers*; although they are producers of commodities…As owner of the means of production he is a capitalist, as worker he is his own wage labourer. He

> therefore pays himself his wages as a capitalist and draws his profit from his capital, i.e. he exploits himself as wage labourer and pays himself in **surplus value** the tribute labour owes to capital…, and he himself is split in two, so that *he* as capitalist employ himself as wage labourer. (MECW: 2002)

Although it has been a long quotation, it clarifies Marx's position on the issue of self-employment in relation to productive/unproductive labour very well. Then Marx predicts that this type of employment disappears through time by the development of capitalism:

> Then there is also the law that economic development divides the functions among different persons, so that the handicraftsman or peasant who produces with his own means of production is either turned little by little into a small capitalist who also exploits alien labour, or loses possession of his means of production flat the outset this may occur even though he remains their nominal owner, as with the mortgage system/ and is turned into a wage labour. This is the tendency in the form of society in which the capitalist mode of production predominates. (MECW: 2002)

Theoretically it seems to be plausible, but as we will later see my estimates of the UK self-employment does not show that the amount of this type of workers has fallen. Although old types of self-employment, namely prior to the ultimate domination of capitalist mode of production, could have been dissolved into capitalist and proletariat classes, we are witnessing the emergence of a new type of self-employment with the new phase of capitalist development, especially in the advanced countries.

In conclusion, in order to have a clear understanding of the wealth of a nation, capital accumulation and economic crisis, the classical tradition suggests we need to have a correct definition of productive and unproductive labour and apply them to the new phase of capitalist development, especially to commercial wage-labourers and service workers. In other words, we need to be able to classify them correctly in order to comprehend the laws of the motion of the advanced societies and being able to estimate the variables related to the falling rate of profit.

4.8 Productive and unproductive capital

It is very important to understand the difference between productive and unproductive capital. It could be argued that the difference to be as crucial as distinction between productive labour from the unproductive ones. Unproductive capital can be a source of unproductive labour, although it is important for the realisation of surplus labour. It can function as a counteracting forces of the rate of profit to fall up to a certain extent, for instance in the form of government expenditure, as my empirical research in the UK economy indicates.

Marx himself extends the distinction between productive and unproductive labour to productive and unproductive capital. If capital is invested in the production activities, it is productive. If it is invested in the sphere of circulation, it is unproductive capital. The former one can be called industrial capital, and the latter one is named as commercial and money capital. Industrial capitalists buy constant and variable capital. Value and surplus-value are created by productive labour in the production sphere. It includes, in a broad sense, activities such as transportation and storage. It excludes all other tasks within the capitalist enterprises, such as circulation and supervision activities. Therefore, capital invested for buying and selling commodities, money lending and credit with all the components jobs related to them (such as selling, advertising, accounting, supervision, book keeping, etc.), are unproductive. It means the workers employed by the commercial and banking capitalists do not create value and surplus-value. The expropriated surplus-value from the productive workers is distributed amongst the capitalist class. Therefore, a certain amount of surplus-value is appropriated by the commercial and money capitalists through their income, in spite of the fact that they posses unproductive capital.

Having introduced Marx's productive and unproductive capital in brief, we need to know how capital is defined by him. Then in order to differentiate Marx's approach with others, I compare his definitions with that of Smith's.

Marx (1996) defines capital as fixed and circulating materials of production, which constitute production of means of production and means of consumption. These forms of capital constitute accumulated labour or dead labour. In Grundrisse (1981), Marx distinguishes between money as capital and money as money with a simple character as a medium of exchange and so on,

although capital's point of departure is money and comes initially from circulation. Industrial capitalists purchase means of productions in the form of accumulated or dead labour and living labour on the market by industrial capital. Marx distinguishes this type of capital from commercial and money capital. The former one is production capital and the latter ones are circulating capital, which could existed prior to a capitalist mode of production.

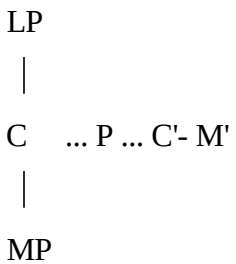
To Marx, capital is a social relation of production, which is not a simple relation, but a process, by which surplus value is extracted from the living labour in the process of production:

> What appears as surplus value on capital's side appears identically on the worker's side as surplus labour in excess of his requirements as worker, hence in excess of his immediate requirements for keeping himself alive. The great historic quality of capital is to create this surplus labour, superfluous labour from the standpoint of mere use value, mere subsistence... (Marx 1981: 324-25)

Although Marx's definition of capital has to be considered in its relations with other theoretical concepts and arguments, it shows its historical and dialectical aspects of capital analysis. To be more precise, the history of capital can be summed up as follows:

> The modern history of capital dates from the creation in the 16th century of a world-embracing commerce and a world-embracing market...we find its final result to be money: this final product of the circulation of commodities is the first form in which capital appears. (Marx 1954: 146)

Therefore, the starting-point of capital is the circulation of commodities. But capital is a social relation of production and it is "productive of value only as a relation, in so far as it is a coercive force on wage, labour, compelling it to perform surplus-labour" (Marx 1969a: 93) This has been expressed clearly by Marx (1954) on the transformation of money into capital. There Marx talks about the circuit or circular movements of capital. This circuit can be written as follows:



This can be broken down into three different stages, viz. M - C, ...P... and C'- M'. The capitalist buys commodities (C), which are labour power (LP) and means of production (MP) (in the appropriate proportions). Therefore, money-capital is identified in the sphere of exchange as the first stage in the circuit of capital. The second stage is production process (P), which is the function of productive capital, in which surplus-value is produced. The third stage is commodity-capital (C'), in which surplus-value is embodied in the completed commodities which are ready to be sold (M'). As it can be seen, the circuit starts with money-capital (M), which has been transformed into productive capital, next into commodity-capital, and finally into the increased money-capital again. In short, it is expressed as M - C - M' formula.

At the end the cause of the augmented M (M'), is the productive capital or industrial capital, which can extract the surplus value from the productive workers. Then other capitalists can receive their share of surplus-value. Although money-capital and commodity-capital can exist separately, they are subordinate to industrial capital.

4.9 Adam Smith on productive/unproductive capital

As mentioned before, not only Smith is one of the most important founders of the political economy, but also he is one the most important contributors on productive/unproductive capital, which laid the foundation for Marx's theories on these issues. Now, let us see Smith's explanation and definitions of capital in general and productive/unproductive capital in particular.

For Smith capital is productive and revenue is unproductive. To him capital is invested in industry and revenue is unproductive expenditure:

> The proportion between capital and revenue, therefore, seems to regulate the proportion between industry and idleness. Wherever capital predominates, industry prevails: wherever revenue, idleness. Every increase or diminution of capital, therefore, naturally tends to increase or diminish the real quantity of industry, the number of productive hands, and consequently the exchange value of the annual produce of the country, the real wealth and revenue of all its inhabitants ... Capitals are increased by parsimony, and diminished by prodigality and misconduct (Smith 1991: 301)

To Smith, all capitals are productive capital, irrespective of as to where it is going to be invested as well as where it is coming from; even if to be a part of revenue. Moreover, capital accumulation is as a consequence of sacrifices that capitalists would make by saving up, not as a result of exploitation and unpaid work in the form of surplus value by them. “Parsimony, and not industry, is the immediate cause of the increase of capital. Industry, indeed, provides the subject which parsimony accumulates“. (Smith 1991: 301)

Therefore for Smith the source of growth of the capital is not surplus value, which is expropriated from the productive labour, and appropriated in industries again as a productive capital, according to Marx's approach.

In addition Smith’s concept of productive capital is consists of all types of capital, in the form of money, commercial and industrial capital. In some other occasions, productive capital is invested in durable commodities:

> The expense, besides, that is laid out in durable commodities gives maintenance, commonly, to a greater number of people than which is employed in the most profuse hospitality. In the one way, besides this expense maintains productive, in the other unproductive hands. (Smith 1991: 312)

To sum up, Smith's views on productive capital is about all different types of capital, which employ productive workers, and all are invested in durable commodities. Whereas for Marx productive capital is only invested in production industries and not by recruiting craftsmen, who produce durable goods, the same as masons carpenters upholsterers or mechanics. However, to explain capitalists' consumption and accumulation, Marx uses two different schemes of production. The first one, as already discussed, is a simple reproduction, by which a capitalist purchases means of production in the form of labour (variable capital) and machinery (constant capital). In this scheme of reproduction, a capitalist consumes for personal use the amount of surplus value produced in the process of production. That means first of all the produced surplus value should be realised in the form of money. Then the

money is used by the capitalist to buy commodities for personal services or for the family. So this money is not invested in industry as a capital, but spent as unproductive consumption. Whereas in the second scheme of production, or the extended one, by which surplus value is invested back into economy as productive capital, into production of commodities. Therefore, capital accumulation occurs, when the surplus value is not spent as revenue, as in simple reproduction, but is capitalised, which is the case in an extended reproduction. Although it is not important to say that entire surplus value is accumulated, unless for the sake of the argument and assumption made prior to explaining the difference between the two schemes of capitalist production.

For Marx, there is a qualitative difference between money and capital. He considers mainly money as a medium of exchange rather than anything else in Capital and other late economic writings.

4.10 Conclusion

In summary, it could be said that, for Marx, although productive capital is the capital which is invested in production, or industrial capital, it is also true to state that productive labour equals productive capital. This is because it is in the processes of production that labour becomes productive of surplus value and also transforms money capital, as a means of exchange, into productive capital. However, the same is not true in the case of Smith's approach, as he considers capital to be productive prior to its function as an industrial capital in the processes of production.

Having followed Marx and Smith's discussions on capital and its productivity, which were mainly during pre-capitalist (in the case of Smith), or during the era of free competitive capital (in the case of Marx), it is possible to conclude that the productivity of labour and capital has to be explained in a dialectical or mutual relations. This is not only as social relations of production, but also social relations of distribution, exchange and consumption as well. In other words, the productivity of labour and capital has to be found in the productive parts of the capitalist mode of production. That is to say that, it is necessary to separate the productive and

unproductive parts of labour and capital in each of the spheres of production, distribution, exchange and consumption, rather than confining ourselves only to the production sphere. This becomes especially an important issue under monopoly capital, in which Hilferding (1981) and Bukharin (1972) argue the fusion of bank with industrial capital, or finance capital, dominates the world economy. As a result, the separation of industrial, commercial and money capital becomes more difficult in this epoch.

This study tries to analyse the production sphere, which is fundamental to Marxian economics in terms of labour process and creation of surplus value. Marx (1864a) argues that productive labour is "consumed directly in the production process for the purpose of valorising capital." Then he criticises those who cannot distinguish between productive labour and unproductive workers:

> "narrow-minded bourgeois, who ..., can confuse the question of what are productive labour and productive workers from the standpoint of capital with question of what productive labour is in general, and can therefore be satisfied with the tautological answer that all that labour is productive which produces, which results in a product, or any kind of use value, which has any result at all." Marx (1864a)

In my research, I have tried to use productive labour from the standpoint of the labour process, "of productive consumption of labour capacity" according to Marx (1864a), which is consumed directly in the capitalist production process. Having said that, although commercial wage-workers, who operate in the sphere of distribution, are wage-labourers and are exploited by the merchant capital, do not directly create surplus value, they are used to materialise the surplus value created in the production process in the sphere of production. Therefore, I excluded them in my estimate of the productive labour.

Although in my calculation, I could not find data for other productive labour; for example for those transport workers who are included in the productive labour category; as well as other productive labour extended from the sphere of production to the sphere of circulation. At the same time we have not had data for unproductive labour in the sphere of production, to be excluded from our calculation for example those workers who are engaged in packaging. Therefore, we could assume that unproductive labour in the production sphere would cancel out those productive workers in the circulation sphere. Although there might be some

discrepancies, it could not have a significant effect on our estimates of the profit rate. Therefore, in our data sources and methods at the end of Chapter 6, and empirical research in Chapter 7, the manufacturing and in the first place production industries take the centre stage for our calculation of the productive labour.

However, productive and unproductive labour cannot be accurately understood without understanding the labour process and the labour theory of value which are the task of the subsequent chapter.

Chapter 5 The labour process

This chapter consists of two main parts; the labour theory of value and the transformation problem. After a general introductory discussion on Braverman's labour process, the first section explains Smith's views on price and labour theory of value. The second section expresses Ricardo's approach, which discusses more fundamentally the production sphere**.** Most importantly, Marx's analysis of the labour theory of value has been discussed in section three. Qualitative and quantitative aspects of the value theory has been explained in section five, which prepare the foundation for the transformation problem that is calculated by using UK input-output data and Morishima and Seton's 'inverse transformation' method in section five. Finally, everything is summed up in the subsequent section.

The distinction between productive and unproductive labour is highly contested but is crucial to any estimation of labour values. The debate has its origin in differing conception of the labour process itself.

Marx defined labour as being a process which occurs between a worker and nature, in which there was a transformation between labour and nature. So that the first characteristic of labour process is this close relationship with nature and that is usually seen as a product of forces of production themselves. The forces of production involved with the organisation of the work process and also a particular relationship which occur with work in production.

The relationship of ownership is mainly about the appropriation of surplus labour or surplus value within a particular mode of production. So in the relationship of ownership which imposes specifically capitalist nature, or the labour process under capitalism, we see the integration of production valorisation in the production process. By contrast under feudalism there is a degree of separation between the acts of appropriation of surplus value from the direct producer of value. Under capitalism you have capital organising the labour process, through which the labour process is organised to extract surplus value.

Braverman (1974) is a central figure in reviving the debate over the labour process. He emphasises that the problem of the capitalist labour process is about the transformation of labour power into labour. In fact capitalists are always confronted with a degree of

uncertainty when they purchase labour power, because they have to make a payment in advance of the work to be done and subsequently can they realize the product. So there is uncertainty partly with respect to whether workers are working sufficiently hard in the production process and secondly about whether surplus value is being appropriated to the maximum degree.

Braverman argues that the degree to which workers work to their maximum capacity during the hours that they are employed or during which they sold their labour power, is subject to increase by control over the labour process by maximising control over workers. So on the one hand the management strategy is actually to try to minimize the uncertainty which exists under capitalism, regarding both the production and appropriation of surplus value. On the other hand they seek to reduce the scope for independent action by the workers themselves. Therefore, the issue of management strategy is to develop control.

Direct control is essentially emphasised by Braverman associated with a kind of Taylorism and Fordism system of production, which is an oppressive regime of control. Clearly the relations of control were central to Marx's whole debate over the labour process. Coombs (1978) praises Braverman for writing "with great force and clarity" (p. 95) on the labour process. "Braverman has revealed a particular dimension of the development of technology and the forces of production in general." (P. 95) However, he criticises Braverman for dissociating possession from economic ownership in the development of monopoly capitalism. (P. 92) He also criticises him on the issue of the class structure of contemporary capitalism and accepts Poulantzas's approach. "For Poulantzas, classes are structurally determined not only at the economic, but also at the political and ideological levels; and though the economic level is still granted its primacy." (P. 91) Cohen (1987) also criticises Braverman by emphasising the inherently political nature of the labour process. She suggested that one of the problems with this kind of debate on the labour process, is that the focus on the control features removes emphasis from the production process itself; a focus on the relationship between management and workers rather than between capital and labour.

One of the problems with shifting the discussion towards a kind of management-worker relationship is to detract the attention from ownership issues. This also allows a view of the decline of the working class which is popular amongst so called New Left and Marxism Today. As Braverman accepted what Marx very broadly said that the logic of capital

accumulation is an increase in the use of machinery which partly will increase productivity of labour, and it is also concerned with the undermining of the power of the workers themselves to organise against capital.

The central point about undermining workers is essentially seen to deskilling which occurs as a result of mechanisation. Braverman criticises Marx on the idea of workers resistance to the development of capital in various ways, for example workers struggle against lengthening of the working days and hence resist increasing the extraction of surplus value. Braverman argues that labour cannot actually undermine the process of deskilling and homogenisation, which implies a separation of mental and manual acts of work.

In Marx and within Marxist writings in relation to labour process and accumulation, we have three phases in the development of capitalism to which Braverman has added the fourth phase. The first phase is the early capitalism where there is a simple cooperation in the labour process and we have a kind of gathering together by mergers of artisans and producers. There is a very limited subordination of labour to capital. The artisans still have control over the labour process. The second phase is the era of manufacture where we begin to have slightly more capital dominated production process. The accumulation is largely through direct extraction of absolute surplus value. Next we have the emergence of machine-facture, where we increasingly have capital introducing machinery. Then machinery itself is used to dominate and control the labour process. It therefore limited the ability of workers to take their own initiatives.

These three phases can be seen as a move from early emergence of capitalism through the establishment of capitalism through the wage relationship onto increasing subordination of labour by capital, i.e. control by capital and machines. Braverman then added a fourth phase, which Marx did not talk about. That is the monopoly capitalist phase, which could be identified with the managerial forms of organisation of control that is associated with Tylorism and scientific management techniques.

The whole point about subdivision of labour is that we have a multilayered hierarchy of management, from top management down to supervision of the shop floor. Although some of the hierarchy is purely fictional, it is useful for the domination of capital against the interest of the working class. It undermines their ability to organise and present a coherent

position against capital. Therefore, all these layers of managers would be in the camp of capital rather than labour, and also they are categorised as unproductive labour when we try to estimate Marxian variables.

5.1 Smith on price and labour theory of value

While standard neoclassical economy starts off with the theory of price, Smith took a long time to come to the question of what determines the prices of the commodities. He started off with growth, division of labour, exchange, size of the market, capital stock, transaction, and characteristics of money and finally the exchange rate of money for other commodities at their prices or their values. After going through that historical framework, does he try to tackle the question of price determination? After the prices of the goods, he looks at the prices of factors of productions. That is how wages, profits and rents are determined.

Smith distinguishes two characteristics of commodities; "value in use" and "value in exchange" (Smith 1991: 25). He gives a very famous example of diamond and water, by saying that:

> "The things which have the greatest value in use have frequently little or no value in exchange; and, on the contrary, those which have the greatest value in exchange have frequently little or no value in use. Nothing is more useful than water: but it will purchase scarce anything; scarce anything can be had in exchange for it. A diamond, on the contrary, has scarce any value in use; but a very great quantity of other goods may frequently be had in exchange for it." (Smith 1991: 25)

He is making the point that usefulness of the commodities does not determine their price. Or there is no relationship between utility and price. Therefore he needed to look at some sort of objective theory of value that is not purely related to the subjective notion of utility. He found it the labour, which is required to produce an object. This labour theory of value links all classical economists together.

Smith tries to answer the following questions; what is the real measure of exchange value? What is the composition of price? What are the circumstances where push the price above or below its natural rate? He gave three contradictory answers to these questions. He provides

the labour theory of value for the first question. For the second question, he says wages, profits and rent, a summative theory of price. The answer to the third question is the relationship between the supply and demand. Supply fluctuates above and below its natural level with respect to variation in supply and demand.

As the market price cancels out, the natural price is revealed in the same manner as value and price which are important to Marx, market price and natural price are crucial to Smith's analysis. Smith's summative theory of price is used to explain his natural price, because he considers the normal price as a long run level to which wages, profit and rent tend. This approach to price contradicts his labour theory of value approach. In the latter, price is determined by the embodied labour time, whereas in the former the price is materialised as a result of supply and demand.

His labour theory of value expressed in his example of "hunters" society, where he talks about hunting dear and beaver:

> If among a nation of hunters, for example, it usually costs twice the labour to kill a beaver which it does to kill a deer, one beaver should naturally exchange for or be worth two deer. It is natural that what is usually the produce of two days' or two hours' labour, should be worth double of what is usually the produce of one day's or one hour's labour. (Smith 1991: 41)

Therefore, the price of beaver would be twice that of a deer. That is the prices to be determined by the amount of the labour which has to be expended in order to get them. He also states that this is only true if there is no capital. As people start investing relative prices are just the amount of labour which goes into them as well as some capital.

5.2 Ricardo on price and labour theory of value

Ricardo attempts to resolve Smith's contradictory theories of exchange value. Ricardo argues that since capital is made by labour, it is possible to go back and trace the sequence of labour. Smith does not do that; he switches from labour embodied theory of value to a labour commanded theory of value. That is, Ricardo departs from how much labour actually is embodied in that good to how much labour can you get in exchange for a commodity.

Namely you measure the value of the good by its equivalence of labour time. The problem here is not actually price determination, but how you actually measure prices. It is quite clear you measure prices in terms of money. But the value of money changes over time, that is relative and absolute price changes. Ricardo deals with these issues in terms of the basic underlying element which is comparable over time, i.e. labour. So we get rid of the problem of the fluctuation in the value of money by looking at labour commanded, that is an amount of work needs to be done in order to buy a commodity.

Smith was not actually providing a labour commanded theory of price determination, it was a theory of measurement of the price, rather than measuring the real value of commodities by the labour commanded in each of them. In other words, that is how much labour is required in order to buy a commodity. Foley (2000) explains that:

> what Ricardo got right is much more important than what he got wrong, both analytically and in terms of his future influence on the development of economics…This essential point in Ricardo's labour theory of value, which was its defining characteristic at its inception, provides the foundation for modern general equilibrium and growth theories. A subsidiary feature of Ricardo's theory, the analysis of cases in which commodities exchange at natural price ratios proportional to the labor embodied in them, only came to define it in contrast to its own generalization in retrospect (p. 3)

5.3 Marx on price and labour theory of value

Marx's concept of labour theory of value, which was embodied labour time, was different with both Smith and Ricardo's. For Marx capitalists purchases by money (M) constant (c) and variable capital (v), which are the value of means of production and the labour power in the production process. Marx's argument was that all these exchange relationships were exchange of equivalents. The value of the output is now c+v+s, where s is surplus value. Capitalists then exchange these commodities for money (M'), which is equal to the value of products. In that process the surplus value created by the workers, or productive workers. Therefore, he located the source of surplus value, extraction, or exploitation within the process of production.

Having said that, I should add that we need to take into account, both qualitative and quantitative dimensions of the value theory. They relate both to the nature of social relations, which is a qualitative matter, and to the determination of economic variables, which are quantitative in character. So it is incorrect to ignore one aspect and concentrate on the other, although it is frequently done. Philosophers and sociologists tend to emphasise the qualitative part and dismiss the technical economic matters, whereas economists have the tendency to do exactly the opposite.

However, in the field of economics, the main debate around value theory and its relation to prices, profits, rents, wages and measuring the degree of capital intensity in an economy or sector of an economy, is linked with both Ricardo's and Marx's theories of value.

From these two paradigms, in general, three schools of thought now exist: a) Neo-Ricardian b) Marxist fundamentalists and c) Eclectics. Neo-Ricardians are mostly interested in Sraffa's implicit critique of neoclassical economics. They regard his contribution as an advance over Marx. Even some of them, for example Steedman in his book (1981), Marx after Sraffa claims the superiority of Sraffa over Marx and reject Marx's theory of value entirely. Marxist fundamentalists such as Shaikh (1977) argues Sraffa's work is incompatible with Marx. They say that neo-Ricardians, especially Sraffa, "reduces" Marx to Ricardo. Eclectics say that Sraffa and the "neo-Ricardians" are operating on a different level from Marx, for example Roncaglia (1974) and Eatwell (1990). The two models are dealing with a different problematic. Sraffa is more concerned with the formation of prices of production and distribution, whereas Marx is more concerned with the sources of profit and uncovering the exploitative operation of a capitalist economy. In order to understand the differences between the three schools, we need to go back and find out in general the differences between Ricardo's and Marx's theory of value, then compare that of Marx's and Sraffa's theory.

Marx's concept of value is very different from that of Ricardo and orthodox economists. In the latter case, the value term simply means price or the ratio at which one good exchange for another at a point in time and space. Marx uses for this the term "price" or "market prices", and "prices of production" for its long run equilibrium level, and often uses the term exchange value to refer to either or both, depending on the context. Here exchange value is the quantitative relationship between commodities. It is generally expressed in terms of money where there is a developed system of exchange. However, since in commodity

production the social character of production is expressed through this exchange of commodities, these exchanges are simultaneously exchanges of the activities of the producers set apart by the division of labour. Thus the relations between the commodities are simultaneously a relation between people (commodity producers). Marx's concept of value represents this social relation of commodity production. Consequently, value must be distinguished from the associated concepts of exchange value and use value. In expressing the social relations of commodity production then, the concept of value refers to the commodity conceived as a product of human labour, and the quantitative magnitude of value is the amount of labour embodied in it. This is measured in 'socially necessary' units that are units of labour "required to produce an article under normal conditions of production" (Marx 1954: 47). In other words it is measured in terms of labour-time. It is only the labour-time of commodity-producing labour that regulates the exchange-values of commodities. Therefore, according to Marx, the law of value of dominates price movements and prices of production are transformed values, which gives rise to the 'transformation problem' then we have to accept that total price equals total value and that; total profit equals total surplus value. Thus, the 'solution' offered by Marx cannot be practically measured in its real terms.

The second problem is the reduction of heterogeneous to homogeneous labour and the rather more specific problem of reducing skilled labour to unskilled labour as the most difficult problem of determining the values of commodities in an objective, quantitative way. Apart from the failure of Marx's value theory in handling cases of joint production, the value theory formulated in that way cannot explain important problems concerning fixed capital (which is a part of Marx's constant capital) in a satisfactory way. Such problems as how to calculate capital costs to each unit of the outputs which a capital good produces at different points in its lifetime, how to determine when a capital good is to be scrapped, etc., can adequately be dealt with by treating used capital goods remaining at the end of the production period for use in the future as by-product of the current manufacturing process. Therefore, the period of production of commodities and the lifespan of capital goods are the two major time elements which any value theory must deal with.

Having mentioned some problems with Marx's value theory measurement, I would like to say that Ricardo's theory was not able to solve the paradox of distribution, in any way. That is, he could not construct an invariable standard of value which would allow us to observe the relationship between profits and wages independently of the price disturbances which result

from such changes in distribution. This paradox has been tried to be solved by Sraffa. His important contribution, thereby reaffirming the Ricardian theory of price and value, giving rise to a new wave of "neo-Ricardianism".

In reality Sraffa substituted the theory of prices instead of the theory of value. Therefore, he does not make any significant contribution to the solution of the relation between value theory and prices. Sraffian perspective does not take account of the class struggle in the dynamics of profit determination. That is in the form of struggle over both the technical conditions of production and the real wage. An example of the former would be struggle within production over introduction of new machines and struggle within the labour market which of course, shapes the real wage.

In Marx, profits (here only one form of the surplus value) arise from the employment and subsequent exploitation of living labour. Accordingly, as the technology becomes increasingly capital intensive, because of competition among capitalists, there is less living labour to exploit. Therefore, profit must eventually fall. He argues that in order to increase the rate of profit the capitalists must increase the rate of exploitation by increasing absolute and relative surplus value in the production process. However, this is not the case with Sraffa's analysis. According to him, to raise the rate of profit the capitalists need only "squeeze share of wages in the net product [surplus]". In other words, the real wage is assumed to be fixed, and in order to increase the profit the share of wages has to be decreased. Whereas, it is definitely possible to increase the rate of profit without decreasing the share of wages, and it is even possible to increase the share of wages simultaneously. Indeed, Roemer (1981: 27-29) has mathematically shown that technical change will increase the equilibrium profit rate even if the real wage remains fixed. Thus, in fact, the foregoing argument shows another difference between the neo-Ricardian branch and Marxian branch of value and price theory.

As it has been discussed, briefly, there are still several fundamental problems with the theories of value and prices in these schools of thought. The way in which I am going to approach this problem, is from the concrete fact. I will start from the distribution sphere, and then I will examine the production sphere in order to analyse its abstract dimension. I will try to calculate empirically the amount of capital (constant and variable capital) which has been advance in the production process in the UK.

However, empirical research on the quantitative aspect of the value theory provides us with the essential basis for analysing the qualitative aspect of it, in terms of "socially necessary labour time". In my opinion, from the understanding of this general issue we can much better grasp any specific socio-economic problems under a capitalist society.

5.4 Qualitative and quantitative relations of the value theory

The labour theory of value is one of the most fundamental economic theories from Adam Smith to Marx. In reality, economic theory, here value theory, plays a crucial role in conditioning the way we perceive the economy which itself is rooted in the social and political relationships of a society. Therefore, our analysis of value theory has to be understood in terms of economic, political and social phenomena to avoid subjectivity and superficiality.

Rubin (1972: 61) praises Hilferding for talking before than anybody else about the "sociological" aspect of Marx's theory of value. He also states that "But the complete dialectical ground of Marx's theory of value can be given on the basis of his theory of commodity fetishism which analyzes the general structure of the commodity economy" (p. 61). In other words he considers some strong qualitative aspect to the value theory, which is not only based on quantitative exchange transactions in the form of commodities, but also the social production relations have been expressed in the transaction. He says that the basic political economy would express social production relations among people. Then he suggests that "If we approach the theory of value from this point of view, then we face the task of demonstrating that value: 1) is a social relation among people, 2) which assumes a material form and 3) is related to the process of production" (p. 63). Therefore, the labour theory of value to him is not something neutral. It has two clear dimensions; quantitative and qualitative.

I would add that the qualitative aspect of that mainly related to class relations, which are exploitative relations between labour and capital, and the emancipation of the working class from this relations and conditions and not for tickling his intellectual imagination. Hence Marx's famous thesis against Feuerbach: "The past philosophers have only interpreted the world, in various ways, the point, however is to change it" (Marx/Engels 1968: 30). To

ignore this sociological feature of the value theory is a common mistake amongst Marxists and non-Marxist alike. For example Arvidsson (2009) claims:

> There is an emerging consciousness that the absence of an adequate theory of value makes for poor management of these resources, poor business strategy and, at the societal level, poor governance. So the search for a theory of value is also a search for a political rationality. (p.16)

In the end, without taking into account the qualitative and quantitative aspects of the labour theory of value, we would not be able to understand the real essence of the laws of motion of capitalist development. Our theory, estimates and the relations between the value and prices of production at best remains descriptive rather than trying to move forward and make a progress in Marxian economics.

5.5 The transformation problem

The Marxian transformation problem is one of the most discussed issues in the history of economic theory. This is the transformation of prices of production into values. Here I am doing the 'inverse-transformation' discussed by Morishima and Seton (1961) and the first empirical work carried out by Wolff (1975) for the Puerto Rico economy. I have adopted their approach for solving transformation problem by starting with a system of equations terms and solving for values and prices.

The Model

The original input-output tables take the following forms:

(1) $\sum_{j=1}^{101} Aij + \sum_{j=1}^{5} Fij = Xi$

(2) $\sum_{j=1}^{101} Aij + \sum_{j=1}^{5} Uij = Xj$

(i) A is a 101 X 101 matrix of total inter-industry flows.

(ii) U is a 5 X 101 matrix of value added by sector, showing wages, gross profit etc., government taxes on expenditure (less subsidies), sales by final demand and imports of goods and services.

(iii) F is a 101 X 5 matrix of final consumption, showing household expenditure, gross domestic fixed capital formation, general government final consumption, value of physical increase in stocks and exports.

(iv) Xi is a 101 X 1 vector of total output.

(v) Xj is a 1 X 101 vector of total input.

We can represent it symbolically, as follows:

(A_{ij}) **(F_{ij})**

a_{11} + a_{12} +.....+a_{1101} + f_{11} + f_{12} +... +f_{15} = x_1

a_{21} + a_{21} +..... +a_{2101} + f_{21} + f_{22} +... +f_{25} = x_2 **(X_i)**

....

a_{1011} + a_{1012} + ... +a_{101101} + f_{1011} + f_{1012} +...+f_{1015} = x_{101}

U_{11} +U_{12} +....... +U_{1101}

U_{21} + U_{22}+........ +U_{2101} **(U_{ij})**

....

U_{51} + U_{52} + ... +U_{5101}

----

x_1 x_2 .... x_{101}

(X_j)

We divide the total interindustry flows, A matrix, into a 7-sector economy. Now we can modify the given matrices:

A) is augmented by one row and one column. The additional row D, is the depreciation of fixed capital. It is an 1X8 vector. In accordance with the additional row vector, we have a column vector N. It is an 8X1 vector. It is derived from the fixed capital formation column by splitting it into net fixed capital formation and capital consumption, or depreciation (N), such that $\sum_{i=1}^{8} N = \sum_{j=1}^{8} D$.

Let the augmented matrix to be called B, which is $\begin{bmatrix} A & N \\ D & - \end{bmatrix}$. So B is an 8X8 matrix.

(ii) The value-added matrix U, is aggregated into three row vectors: WW, wages; SS, surplus value including profits, rents, interests, taxes (less subsidies) and other value added; and D, depreciation, which has to be considered endogenous, according to Marx's theory. So matrix U is divided into: $\sum_{j=1}^{8} WW$, $\sum_{j=1}^{8} SS$ and $\sum_{j=1}^{8} D$.

(iii) We aggregate the matrix F into three column vectors; workers' consumption, CC; capitalist consumption, K; and depreciation, N, which is endogenous. We assume that workers' consumption to be equal to their wages, such that $\sum_{j=1}^{8} CC = \sum_{j=1}^{8} WW$.The surplus consumption,$\sum_{i=1}^{8} K$ includes capitalist consumption, net capital formation, value of physical increase in stocks, government expenditure, and exports less imports.

Now, we are able to transform the flow of prices to values, by using Morishima and Seton (1961) "inverse transformation" scheme. To do this, we define the 8-order matrix of row coefficients Q such that:

$Q_{ij} = \frac{B_{ij}^{p}}{z_i^{p}} = \frac{B_{ij}^{v}}{z_i^{v}}$ i,j = 1,2, ..., 8 (where the superscripts p and v refer to prices and values, respectively)

To express it symbolically:

$$Q=\begin{bmatrix} \frac{B_{11}}{z_1} & \cdots & \frac{B_{18}}{z_1} \\ \vdots & \ddots & \vdots \\ \frac{B_{81}}{z_8} & \cdots & \frac{B_{88}}{z_8} \end{bmatrix}$$

We also need to define the 8-order matrix RR, such that:

$RR_{ij} = \frac{cc_i^{p}}{z_i^{p}} \text{ x } \frac{ww_j^{p}}{\sum ww^{p}} = \frac{cc_i^{v}}{z_i^{v}} \text{ x } \frac{ww_j^{v}}{\sum ww^{v}}$

Or symbolically to be expressed as:

(8X1)

$$C_p = \begin{bmatrix} \frac{CC_{11}}{z_1} \\ \frac{CC_{21}}{z_2} \\ \vdots \\ \frac{CC_{71}}{z_7} \\ \frac{CC_{81}}{z_8} \end{bmatrix}$$

(1X8) (8X8)(8X1)(1X8)

$W_p = \frac{WW_{11}}{\sum WW} \quad \cdots \quad \frac{WW_{18}}{\sum WW}$, So RR = C_p X W_p

(8X1) (1X8) (8X8)

$$RR=\begin{bmatrix} \frac{CC_{11}}{z_1} \\ \vdots \\ \frac{CC_{81}}{z_8} \end{bmatrix} \text{ X } \begin{matrix} \frac{WW_{11}}{\sum WW} & \cdots & \frac{WW_{18}}{\sum WW} \end{matrix} = \begin{bmatrix} \frac{CC_{11}}{z_1} X \frac{WW_{11}}{\sum WW} & \cdots & \frac{CC_{11}}{z_1} X \frac{WW_{18}}{\sum WW} \\ \vdots & \ddots & \vdots \\ \frac{CC_{81}}{z_8} X \frac{WW_{11}}{\sum WW} & \cdots & \frac{CC_{81}}{z_8} X \frac{WW_{18}}{\sum WW} \end{bmatrix}$$

Therefore, RR_{ij} shows the proportion of output of each sector i consumed out of wages by workers of sector j.

Next we define μμ such that: $WW^{v}+SS^{v} = \mu\mu WW^{v}$ or $\frac{1}{\mu\mu} = \frac{ww^{v}}{ww^{v}+ss^{v}}$

(1X8) (1X8) (1X8)

If $\mu=[WW_{11} \quad \cdots \quad WW_{18}]+[SS_{11} \quad \cdots \quad SS_{18}] = [WW_{11}+SS_{11} \quad \cdots \quad WW_{18}+SS_{18}]$

(1X8)

We have; $\frac{1}{\mu\mu} = \frac{WW^{v}}{\mu}$,or $\frac{1}{\mu\mu} = [\frac{WW_{11}}{WW_{11}+SS_{11}} \quad \cdots \quad \frac{WW_{18}}{WW_{18}+SS_{18}}]$, which implies that the rate of surplus value is equal to $\mu\mu^{-1}$, assuming that the rate of surplus value is the same in each sector. As a result: $\left[\left(\frac{1}{\mu\mu}\right).I - (I-Q')^{-1}RR'\right]Z = 0$

(8X8) (8X8)

$$Q' = \begin{bmatrix} \frac{B_{11}}{Z_1} & \cdots & \frac{B_{81}}{Z_8} \\ \vdots & \ddots & \vdots \\ \frac{B_{18}}{Z_1} & \cdots & \frac{B_{88}}{Z_8} \end{bmatrix}, \quad RR' = \begin{bmatrix} \frac{CC_{11}}{Z_1} X \frac{WW_{11}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{11}}{\sum WW} \\ \vdots & \ddots & \vdots \\ \frac{CC_{11}}{Z_1} X \frac{WW_{18}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{18}}{\sum WW} \end{bmatrix}$$

Substituting IT instead of (I – Q'), we get: $\left[\left(\frac{1}{\mu\mu}\right).I - (IT)^{-1}RR'\right]Z = 0$

(8 X 8) (8 X 8) (8 X 8)

$$IT = \begin{bmatrix} 1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & 1 \end{bmatrix} - \begin{bmatrix} \frac{B_{11}}{Z_1} & \cdots & \frac{B_{81}}{Z_8} \\ \vdots & \ddots & \vdots \\ \frac{B_{18}}{Z_1} & \cdots & \frac{B_{88}}{Z_8} \end{bmatrix} = \begin{bmatrix} 1-\frac{B_{11}}{Z_1} & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & 1-\frac{B_{88}}{Z_8} \end{bmatrix}$$

Substituting IIT and Rr instead of $(IT)^{-1}$ and RR', we obtain: $\left[\left(\frac{1}{\mu\mu}\right).I - (IIT.RR')\right]Z = 0$

(8 X 8) (8 X 8)

$$(IT)^{-1} = IIT = \begin{bmatrix} 1-\frac{B_{11}}{Z_1} & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & 1-\frac{B_{88}}{Z_8} \end{bmatrix}^{-1}, \quad RR' = Rr = \begin{bmatrix} \frac{CC_{11}}{Z_1} X \frac{WW_{11}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{11}}{\sum WW} \\ \vdots & \ddots & \vdots \\ \frac{CC_{11}}{Z_1} X \frac{WW_{18}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{18}}{\sum WW} \end{bmatrix}$$

If we substitute ππ and ir instead of $(\frac{1}{\mu\mu}).I$ and (IIT.Rr) respectively, we get: [ππ – ir] Z= 0

ππ is a diagonal matrix of $(\frac{1}{\mu\mu})$,

(8 X 8)

$$\pi\pi = \begin{bmatrix} \frac{WW_{11}}{WW_{11}+SS_{11}} & \cdots & 0 \\ \vdots & \frac{WW_{12}}{WW_{12}+SS_{12}} & \vdots \\ 0 & \cdots & \frac{WW_{18}}{WW_{18}+SS_{18}} \end{bmatrix}$$

$$\text{ir}=\underset{(8\text{ X }8)}{\begin{bmatrix} 1-\frac{B_{11}}{Z_1} & \cdots & 0 \\ \vdots & 1-\frac{B_{22}}{Z_2} & \vdots \\ 0 & \cdots & 1-\frac{B_{88}}{Z_8} \end{bmatrix}^{-1}} \text{ X } \underset{(8\text{ X }8)}{\begin{bmatrix} \frac{CC_{11}}{Z_1} X \frac{WW_{11}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{11}}{\sum WW} \\ \frac{CC_{11}}{Z_1} X \frac{WW_{12}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{12}}{\sum WW} \\ \frac{CC_{11}}{Z_1} X \frac{WW_{18}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{18}}{\sum WW} \end{bmatrix}}$$

(B_{ij})

$$\begin{aligned} &b_{11}+b_{12}+\ \ldots+b_{18}+CC_1+KK_1=\ Z_1 \\ &b_{21}+\ b_{22}+\cdots+b_{28}+CC_2+KK_2=\ Z_2 \qquad (\mathbf{Z_i}) \\ &\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ &b_{81}+b_{82}+\cdots+b_{88}+CC_8+\ KK_8=Z_8 \end{aligned}$$

Finally, πz and vz give the vector of surplus value and labour values, respectively. Or $\pi z = \pi\pi \,.\, z_{i \text{ and}}\ vz = ir \,.\, z_i$

$$\pi z = \underset{(8\text{ X }8)}{\begin{bmatrix} \frac{WW_{11}}{WW_{11}+SS_{11}} & \cdots & 0 \\ \vdots & \frac{WW_{12}}{WW_{12}+SS_{12}} & \vdots \\ 0 & \cdots & \frac{WW_{18}}{WW_{18}+SS_{18}} \end{bmatrix}} \cdot \underset{(8\text{ X }1)}{\begin{bmatrix} Z_1 \\ \ldots \\ \ldots \\ \ldots \\ Z_8 \end{bmatrix}} =$$

$$\begin{bmatrix} \frac{WW_{11}}{WW_{11}+SS_{11}}.Z_1 & \cdots & 0.Z_8 \\ \vdots & \frac{WW_{12}}{WW_{12}+SS_{12}}.Z_2 & \vdots \\ 0.Z_1 & \cdots & \frac{WW_{18}}{WW_{18}+SS_{18}}.Z_8 \end{bmatrix}$$

$$vz = \underset{(8\text{ X }8)}{\begin{bmatrix} 1-\frac{B_{11}}{Z_1} & \cdots & 0 \\ \vdots & 1-\frac{B_{22}}{Z_2} & \vdots \\ 0 & \cdots & 1-\frac{B_{88}}{Z_8} \end{bmatrix}^{-1}} \cdot \underset{(8\text{ X }8)}{\begin{bmatrix} \frac{CC_{11}}{Z_1} X \frac{WW_{11}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{11}}{\sum WW} \\ \frac{CC_{11}}{Z_1} X \frac{WW_{12}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{12}}{\sum WW} \\ \frac{CC_{11}}{Z_1} X \frac{WW_{18}}{\sum WW} & \cdots & \frac{CC_{81}}{Z_8} X \frac{WW_{18}}{\sum WW} \end{bmatrix}} \cdot \underset{(8\text{ X }1)}{\begin{bmatrix} Z_1 \\ \ldots \\ \ldots \\ \ldots \\ Z_8 \end{bmatrix}}$$

Therefore, we obtain two 8 X 1 vectors for both πz and vz, respectively.

Before applying data to the model we need to make it clear that in order to develop a model which is consistent with the Marxian theory, depreciation of capital (D) has to be taken into account as an endogenous variable. I would like to say that I estimated moral depreciation of capital and added to its "real depreciation". In order to create a column corresponding to D, the gross capital formation is split into depreciation (N) and net capital formation, such that ∑N = ∑D. I have mainly followed the model and notations employed by Wolff (1975), except the notations which have been used for constructing the program which are readable

by Mathematica. Although I wrote this program for the UK economy, it can be extended to any economy for any period as long data is available.

Due to lack of data availability for the net capital formation for the above industries, I have categorised them into a 7-sector economy (using input-output tables published in 1988), which are: Agriculture, Energy, Manufacturing, Construction, Distribution, Transport and Services. I have done these using Excel spreadsheets.

As figures have been rounded by the government statistics, it creates £153m discrepancy between total inputs and outputs in our calculations, which was the transfer of value from the old firms to the new ones, as our estimate of moral depreciation of capital. This problem can be overcome by adjusting gross profits by £153m. Therefore, total inputs will be equal to total outputs in the economy.

After doing the above calculations, we aggregate the value added matrix U, into three rows: WW, wages; SS, surplus value including gross profits, taxes on expenditure less subsidies and other value added; and D, depreciation. For the empirical work we use Kalecki's (1969) assumption that workers spend what they earn and capitalists earn what they spend. Therefore, we divide the household consumption column into worker's consumption, CC, such that ∑CC = ∑WW, and capitalist consumption, K, which includes exports minus imports; and Depreciation, N.

Having estimated them, we can get the augmented matrix B, which is A_{ij} (7X7) of total inter-industries flow) plus N (8X1 column vector) and D (1X8 row vector). In other words B becomes 8X8 inter-industry flow matrix. As a result we come up with the following model:

$$\sum_{j=1}^{8} B_{ij} + CC_i + K_i = Z_i$$

$$\sum_{i=1}^{8} B_{ij} + WW_j + SS_j = Z_j$$

Now, we are in a position to transform the flows from prices of production to values, by using Morishima and Seton's (1961) "inverse transformation" scheme, as analysed above and expressed symbolically. Next we insert input-output tables and data entries into the mentioned equations and formulas.

After defining our variables and using Mathematica codes, we arrive at the values for vz and πz for industries as follows:

Table 5.1 Ratio of values to prices of production in the UK (1988)

Industry	**vz**	**πz**	**vz/πz**
Agriculture	8687.62	7212.449	1.20
Energy	14857.6	9272.629	1.60
Manufacturing	95854.6	98286.829	0.97
Construction	57488.6	-19380.514	-2.96
Distribution	34690.3	30640.202	1.13
Transport	16304.2	20185.752	0.80
Services	72745.3	93984.953	0.77

However, the ratio of values to prices of production, i.e. vz/πz for production industries (manufacturing plus energy) is 1.029 or almost 1. We can calculate the above relationships for any country, as long as we have input-output tables accessible, by running the computer package I developed by Mathematica programming.

5.6 Conclusion

Within the production relationship we have two relationships to consider. Those are the relationship of exploitation which is between labour and capital and the second one, which is the focus of the labour process debate, refers to the relations in production or relations of control. The latter one is essentially about the relationship between workers and management. Braverman adds another dimension to the Marx's labour process by showing that under the monopoly capitalist phase the managerial forms of control over the labour process associated with Tylorism and scientific management techniques. That is used for the appropriation of more surplus value from the productive labour, which is the source of labour theory of value which in turn leads to the problem of transformation of value to the prices of production. I tried to use UK data to address the problem. I used inverse transformation approach used by Morishima and Seton (1961) applied by Wolff (1975) in the case of Puerto Rico. My estimate of values and prices of production, in terms of production industries, proves that Marx was correct in his theory of the transformation of values to the prices of production.

Therefore, using price data as a substitute for value in our empirical investigation of the profit rate can be justified. It is going to be discussed and used for our estimates of the profit rate variables in the succeeding chapter.

Chapter 6 Monetary expression of value Vs embodied labour coefficient approach

This chapter will address the use of monetary expression of value for our empirical estimates. It starts with a general introduction on qualitative and quantitative aspects of value theory, especially some considerations given to the embodied labour coefficients as a substitute for the value theory when an empirical estimate of the profit rate has been done by some Marxists economists; such as Wolff and others. Then the first section discusses our methodology of empirical investigation of the Marxian categories of the rate of profit. It follows by the application of national income accounts for estimating Marxian components of the profit rate in the UK in section two. The classical economists' points of view with regards to national accounts are presented in section three. Section four focuses on our data sources, definitions of variables and methodology used for mapping them with the national account data set. Section five develops the counteracting forces for the falling rate of profit; namely mergers and acquisitions, UK trade with the EU and government expenditure. It also analysis the sources of data collection, as well as conducting some descriptive statistical measures. In subdivision six, we talk about data analysis for Marxian variables of the profit rate: statistical tests and econometrics models for time series analysis, by suggesting that AR(1) model to be used for testing unit roots and Augmented Dickey-Fuller (ADF) and DW (Durbin-Watson) tests for multicolliniarity of the residuals in our multiple regressions multiple regression models; correlograms for AR(1) models of our variables depicted in order to determine the correlation of the error terms to the past errors, and finally VAR(1) and VAR(2) econometric models to be used for our variables, and also Granger causality Wald tests to be employed for diagnostic tests for the models. Next the conclusions of the chapter presented in section seven.

The qualitative aspect of the value theory should remain in the realm of 'sociological' analysis, rather than statistical and economic ones. If it was too difficult to be measured under competitive capital, it would be much harder under monopoly capital, because of the complexity of the capitalist economy, especially in a global scale.

Qualitative aspect of the value theory gives a good ground to discuss philosophical, political and sociological aspects of a capitalist society. That is mainly concerned with the historical materialism of the Marxian theory. Whereas quantitative side of the value theory should

measure and analyse the price relations in a capitalist society. That means not only there is a dialectical relations within each sphere, but also between them.

If we accept that value is determined by the quantity of labour time socially necessary for the production of a unit of output, then the higher the productivity of labour the lower the value would be in each unit of commodity. Therefore, qualitative and quantitative features of value are expression of abstract labour, which manifest itself in the exchange relations of commodities. Or abstract labour is expressed in the exchange value and concrete labour creates the use value of commodities. Rubin argues that:

> We must answer that the theory of value does not deal with labour as a technical factor of production, but with the working activity of people as the basis of the life of society, and with the social forms within which that labour is carried out. Without the analysis of the productive relations of society, there is no political economy. (1972: 82)

As we know, for Marx the substance of value is labour, which is measured in labour-time. Marx makes it clear when talking about measuring the magnitude of labour. He explains that:

> "You will collect that I used the word 'Social labour,' and many points are involved in this qualification of 'Social.' In saying that the value of a commodity is determined by the quantity of labour worked up or crystallised in it, we mean the quantity of labour necessary for its production in a given state of society, under certain social average conditions of production, with a given social average intensity, and average skill of the labour employed. (1996: 87-8)

Then Marx trying to find the relation between value and market value or between natural prices and market prices. For him the market price is the average amount of social labour necessary for the production of commodities of a certain description, under the average conditions of production. Whereas the value of commodities is their natural price. He expresses that the deviation of market prices from the value or natural price is due to the rise or fall of supply or demand. Let us clear this matter once for all by his own words:

> It suffices to say that if supply and demand equilibrates each other, the market prices of commodities will correspond with their natural prices, that is to say, with their values, as determined by the respective quantities of labour required for their production. But supply and demand must constantly tend to equilibrate each other, although they do so

> only by compensating one fluctuation by another, a rise by a fall, and vice versa. If instead of considering only the daily fluctuations you analyse the movement of market prices for longer periods…, you will find that the fluctuations of market prices, their deviations from values, their ups and downs, paralyse and compensate each other … commodities are, on the average, sold at their respective values or natural prices. (Marx 1996: 91)

There are also other tendencies that consider empirical estimates of the rate of profit should be considered in terms of the embodied labour coefficients interpretation of the labour theory of value, by using input-output tables, rather than using market prices in a time series analysis. For example Wolff (1975) using data for Puerto Rico economy, Shaikh and Tonak (1994) estimating the US economy and Cockshott, Cottrell & Michaelson (1995) using UK data. Their prime concern is to study as to how much the market price or prices of production fluctuate around the embodied labour coefficients.

We can compare these two approaches by saying that the monetary expression of the value or labour time is more flexible and has got more potential for developing Marxian economy into new economic phenomena, theoretically and empirically. Data is more available for the a time series and dynamic estimates of economic variables, rather than using input-output tables which are mainly published with a time lag of five to ten years. In addition, Foley (2000) argues that "monetary expression of labor time":

> has some significant methodological advantages. It is completely general, in that it is consistent with any theory of price formation (including, but not restricted to, theories of profit-rate equalizing prices of production). It opens the way to an interpretation of the substantive parts of Marx's theory… It opens up new avenues of empirical-theoretical work in the Marxist tradition, such as an examination of the relation of national exchange rates to relative monetary expressions of labor. (p. 23)

6.1 Methodology

My method of inquiry into economic growth and crisis is to start from abstract theories then go to analyse concrete facts and data and again relate it to abstract ideas. That is going from the general to the specific and from the specific to the general again. To achieve this I need

to undertake an empirical investigation into economic theory of growth and crisis and in the first place the Marxian falling rate of profit. As Marxian data is not readily available to test the theory, I need to use official government national income account data. However it was very important to conduct such a research into the UK economy, as not enough research has been done in this field in compare with the US economy. In addition historically it is important to observe as to how the capitalism has developed in the first industrialised nation.

Having said that my approach differs from most studies which examine US economic data which are readily available, as for example, used in Shaikh & Tonak's (1994) estimates of Marxian categories.

6.2 National income accounts & estimate of rate of profit

The history of national income estimates goes back as far as seventeenth century, when Sir William Petty estimated it for England in 1665 (Alessandro 1947). In those days the main reasons for national income estimation were mainly related to nationalism, and the comparison of the economic performances of rival nations, as well as the effects of proposed tax policies and other policies in order to strengthen and reform the national economies.

After WWI, there was a great demand for a better national income estimates to assist the devising countercyclical policies, especially following the Great Depression of the 1930s. National income calculation and estimation entered a new phase of development and requirements after the WWII, especially when the question of the underdeveloped countries, new theories of economic growth and development and economic theories of demand and employment were taking the centre stage of the national and international economic policies.

However, because of a number of limitations, which I will now address, national income accounts cannot show the fundamental economic problems of a nation. Even when there is a periodical economic recovery, it is not a good measure of economic productivity, growth, development and welfare economy. In particular, state impacts on income and expenditure bring about more obscurity to the national income accounts as a good measure for estimating economic activities particularly in a long term.

Official statistics are mainly produced in the first place to provide information required by administrators, high level civil servants, and government ministers. Its secondary role is to provide information to industry, commerce and banks using the assumptions, conceptions and priorities of the state and social order.

Although academic researchers can use the published data, they have the lowest priority of the government statistical service. Therefore, economists and social scientists are compelled to work out their own way of analysing the compiled data in order to explain their new findings or theories, which differs from the official statistics, though these statistics provide the raw materials for producing new economic models, definitions and theories. That is to say it is necessary to separate the wheat from the shafts, or to get the main facts, rename and reclassifying and ignore or throw away unnecessary, biased and obscured data. To provide a theoretical critique of the national accounting system it is necessary to; first of all to demystify the data that is, by revealing the crucial assumptions which are used in their methods of data collection and their analysis. Thereafter, to develop our own critical theory, it is necessary to re-estimate some of the data using new definitions, terminologies and concepts.

6.3 Classical economists on national accounts

After William Petty and Gregory King in England, the French Physiocrats such as Francois Quesnay (1758) used national income concepts, originating in agriculture. Marx wrote to Engels on 7 March 1877:

> The great merit of the Physiocrats is that they were the first to attempt to depict, in their 'tableau economique', the annual production as it emerged from circulation. (Marx/Engels 1983: 185)

In Quesnay's tableau economique (economic table), the agricultural and industrial products would be exchanged on the market place. The Physiocrats saw only agricultural labours to be productive as the land rent as a form of surplus value by these workers. Adam Smith disagreed strongly with the Physiocrats' concept of national income. He argued all commodity production and distribution to be 'productive'. For him manufacturing and the distributive trades were returning a net income to manufacturers and merchants in the form of profit, as the landlords were earning their income in the form of rent. Having said that, Smith

excluded all services from the national income. For him labour was productive, if it was employed by capital and produced surplus-value.

According to Smith, the national income, or "neat revenue", consisted of wages, rent, profit and interest which derived from the production of commodities, but not from services. He argued that expenditures on services, including:

> The sovereign, for example, with all the officers both of justice and war who serve under him, the whole army and navy, are unproductive labourers. Their service...produces nothing for which an equal quantity of service can afterwards be produced... In the same class must be ranked... churchmen, lawyers, physicians, men of letters of all kinds; players, buffoons, musicians, opera-singers, opera-dancers, etc. (Smith 1991: 295)

Smith considers these expenditures and dwelling rentals as a redistribution of income, a transfer of "neat revenue" to the "unproductive" classes. Although some classical economists such as Ricardo and Mill mainly inherited Smith's concept of national income, Marx considered income to include wages, rent, profits and interest, but all the nonwage compensation as 'surplus-value'. For him surplus value created by productive labour but appropriated by owners of capital. Marx saw "net income" as capital compensation (surplus-value). He criticised Smith for including wages in net income as being inconsistent with the capitalist system of production, as it aims at the production of net income for them. Marx's "newly produced value" which is called value added in the formal statistics, is only produced by productive labour as previously discussed.

Productive workers, then to Marx, include all workers in production, transport, commercial industries and services, who are wage-earners and employed by capital rather than revenue and produce surplus value in one way or another. Unproductive labour earns their income from dwelling rentals, supervisory labour, sales and banking interests. That is from redistribution of income or a transfer of 'net revenue' to the unproductive class.

After critically evaluating the National Accounts in relation to productive/unproductive labour, here I would like to present an empirical research, estimating Marxian variables in respect to the falling rate of profit using UK National Accounts data.

Actually, the best thing that can be done is to work with the available data in order to obtain measures, which are consistent. Although there are numerous problems, there are also some practical solutions. For the purpose of the present study, all variables are expressed in nominal terms at current prices. Both Weisskopf (1979) and Moseley (1985) estimated the Marxian concepts in terms of prices. But Wolff used input-output data and converted them to Marxian labour values. Wolff (1988) himself suggests that both approaches are legitimate. And also Wolff's estimates (1979) of the rate of surplus-value in the post war U.S. economy show that the conversion of the estimates from quantities of money to quantities of labour-time makes no significant difference in the estimated trend in the rate of surplus-value. So, we can start from a principle of value analysis, which says that, prices are ultimately a form of value; namely one commodity is measured in terms of another.

For Marx:

> Price, taken by itself, is nothing but the monetary expression of value. The values of all commodities of this country, for example, are expressed on gold prices, while on the continent they are mainly expressed in silver prices. The value of gold or silver, like that of all other commodities, is regulated by the quantity of labour necessary for getting them. (Marx/Engels 1968: 205) (My emphasis)

So, in short, we can say that price is value in the form of money. Although price of a commodity is fluctuating around its socially necessary labour time required for its production, the total price of all commodities in circulation expresses the total number of hours of abstract labour which went into their production. This is invariant with respect to relative price changes. If one price falls and another rises, it means value has been transferred from the owners of one commodity to the owners of another.

We need to conclude that in order to be able to estimate variables in the UK rate of profit in price terms; we need to use the available national accounts data. Although these data have not been calculated according to Marxian economics approach, we need to make sense of Marxian variables in relation to the rate of profit out of the “official” available data.

6.4 Data Sources and Methods

Productive and unproductive activities

As my main starting point has been to estimate Marxian variables in relation to the production sphere, I have mainly concentrated on this aspect of capitalist mode of production. Although some function of production activity could be found within the sphere of circulation, for example transportation of produced goods to warehouses or some unproductive activities, which do not increase the value of the commodities, could be found in the sphere of production, for example packaging. I could not find separately any data for such activities in order to categorise them as productive or unproductive variable capital. However not a lot of activities would fall into these type of categories. Therefore, they cannot have a significant influence on the estimate of Marxian variables.

Having said that, even finding data for variable capital was not accessible from one source only. As there was discontinued after a while or not available at all. Therefore, I had to use different national accounts in order to find consistent data.

Because of the major restructuring of the UK economy during the period including the decline of manufacturing, the classical centre of production, I derived a second, alternative set of data, estimating the variables in production industries (manufacturing plus energy and water supply industries), from 1949 to 2003. Having said that, publication of Census of Production ceased in early 1990s as the UK national accounts moved towards the new European System of Accounts. Therefore, not all necessary and consistent data was available for manufacturing industries. But even if we could find the continuation of the same data, it would not have changed the main results and conclusion as we discussed above. However, production industries include the industries in Standard Industrial Classification (SIC 1989: 23-54), which are almost equivalent to the industry headings 3-87 in our Input-Output tables in Appendix A.

Variable capital (annual flow) has been taken from UK Census of Production, Business Monitor, Annual Abstract of Statistics and Input-Output data. Variable capital is the amount invested to purchase productive labour during the year. Wages, salaries or commissions of

the following are excluded; directors, managers, foremen, draughtsmen, editorial and advertising staff, travellers, all office employees, research and design employees, which constitute Administrative, Technical and Clerical Employees. Variable capital only includes Operative, i.e. all manual wage earners including operatives in power stations, operatives engaged in outside work of erecting, fitting, etc., inspectors, maintenance workers and cleaners. Staff engaged in transport (including roundsmen) and employed in warehouses, stores, shops and canteen are, in general, excluded.

Operatives' wages include all overtime payments, bonuses, commission, holiday pay and redundancy payments less any amounts reimbursed for this purpose from government sources are included. No deduction is made for income tax or employees' national insurance contributions. Wages and salaries of operatives for 1949-1957 have been taken from The Board of Trade, The report on the Census of Production, Table X, for 1958-1963, 1968 and for 1970-1987 extracted from the Census of Production, Table 2, and for 1988 from the Business Monitor, Summary Tables PA1002. From 1989 to 1991 using Census of Production: Summary Table (8.1) in Annual Abstract of Statistics 1994. Then for the rest, up to 2003, taken from United Kingdom Input-Output Analyses, 2005 edition.

Constant capital, which is the sum of fixed and circulating capital, has mainly been estimated from the Blue Book, National Income and Expenditure, Annual Abstract of Statistics and Input-Output data for Gross Domestic Fixed Capital Formation (fixed capital) as well as using the Census of Production, Annual Abstract of Statistics and Input-Output data for Purchases of Materials and Fuels (Circulating Capital). In this paper I have preferred to estimate circulating capital on a flow basis. It is because of mainly the nature of circulating capital, which is a sum of capital is used up in the process of production, normally one year, and its value transferred into the final product. Whereas in the case of fixed capital, only a percentage of its value (normally is calculated at 10%) is transferred to the final product, as a form of its depreciation over one year. I have treated fixed capital as a stock in my calculation of the rate of profit in the UK economy. That's why I used invested capital rather than adding consumption of fixed capital to circulating capital as our constant capital, which is the basis for a flow calculation, for both manufacturing and production industries (see Appendix B: Table 1, which shows how c,v and s are calculated for measuring the rate

of profit for the manufacturing industries, and the same method has been used for the production industries later). Furthermore, I have taken into account the total constant and variable capital advanced for the production of commodities. Marx (1960: 224) argues that:

> "The rate of profit must be calculated by measuring the mass of produced and realized surplus-value not only in relation to the consumed portion of capital reappearing in the commodities, but also to this part plus that portion of unconsumed but applied which continues to operate in production."

However, in the Marxist literature there is no any conclusive respond as to whether the capital or any component parts of it to be calculated on a flow or stock basis. Gillman (1957) was first to apply the constant capital on both flow and stock basis for the calculation of the rate of profit to the US economy. He comes up with different results, when estimating rate of profit on different basis in the US manufacturing industries. For example, on a flow basis without depreciation allowance, the rate of profit increases from 29% in 1849 to 38% in 1939 (p.37) The second estimate of the flow basis with materials consumed and depreciation allowance, the rate of profit increases less than before, that is from 27.6% in 1919 to 32% in 1939 (p.40). Whereas, when he estimates it on a stock basis with fixed capital only, the rate of profit falls from 122% in 1880 to 51% in 1952 (p.49). The rate of profit falls even more, when total constant capital measured on a stock basis, that is from 69% in 1880 to 22% in 1933 (p.55).

Having said that, it would be very difficult if not impossible to apply Marx's theoretical categories strictly on each input used in the production process. In my estimates of the rate of profit to the UK manufacturing and production industries, I have used wages and circulating capital as flow and the gross domestic fixed capital formation as a proxy for the fixed capital stock, as defined in National Accounts Statistics, Sources and Methods (1985: 6):

> First the producer may buy building, machinery, vehicles or plant which will give services to production over a number of years. This form of expenditure is described as *gross domestic fixed capital formation.* The amount by which it exceeds the wearing out or depreciation of existing assets represents an addition to wealth and is described as *net domestic fixed capital formation*.

Therefore, this stock of fixed capital in my estimates remains for 'a number of years' rather than to be consumed over a year as a flow. As discussed above not only we need to have the

total circulating capital, but also the total fixed capital stock as our constant capital engaged in production, rather than total fixed capital involved in other spheres of distribution and exchange, mainly measured by the national statistics office. Nevertheless Marx (1960) suggests that the costs of commercial activities, which occur to the industrial capitalist for the realization of value and surplus value would increase the total cost of capital "advanced, without directly increasing surplus-value. This necessitates the employment of commercial wage-workers who make up the actual office staff." (p. 293) First of all we cannot obtain data for these distributional operations in the production sphere. Secondly, "The office from the outset always infinitesimally small compared to the industrial workshop." (Marx 1960: 293)

Having said that the measurement of fixed capital stock is another controversial and complex issue, which needs to be addressed, especially with respect to capital consumption (depreciation) and retirements of assets. That is due to lack of information about the length of life of the depreciated or discarded assets. However, the method of "straight line" is employed by accountants to estimate depreciation. It is assumed that an asset to depreciate by one-tenth of its cost each year, if it has a life span of ten years on average. Furthermore, estimating the value of capital stock is equally difficult. The perpetual inventory method, which expresses the stock of fixed capital as the accumulation of past investment, is commonly used by the national statistics office.

One of the purposes of this study is applying Marxian variables to the existing national data set; I could not find the exact total fixed capital for manufacturing and production industries. Alternatively, I used gross domestic fixed capital formation has been used. In this approach, we have to deal with the problem of initial stock of total fixed capital which cannot easily be estimated. This obstacle can be roughly overcome by using a time series of gross domestic fixed capital formation over a long period of time. By doing this, the effect of the initial stock of capital would be diminishing year by year, especially if we take into account the average life span of machineries and equipment about ten years. Therefore, it would have been be reduced to an insignificant figure after 20-30 years, as the new assets would have replaced the obsolete and outdated fixed capital stock which would be materialised in the gross domestic fixed capital formation.

Gross Domestic Fixed Capital Formation includes the purchase of new assets and second-hand assets. Sales of fixed assets, e.g. for scrap or export or to a consumer, are deducted. Transfer of existing assets, including transfer of land, between one domestic owner and another contribute to total Gross Domestic Fixed Capital Formation only to the extent of any transport, legal or another costs of transfer. The word 'gross' indicates that nothing is deducted for wear and tear, obsolescence and accidental damage. The significance of the word 'domestic' is that the fixed asset, concerned are confined to assets located in the United Kingdom and on its continental shelf (e.g. in the North Sea). Fixed assets held abroad are excluded since the concept of fixed capital formation is designed to measure changes in the physical capacity for production in the United Kingdom. Ships and aircrafts are exceptions to the general rule of classification on the basis of physical location. Ships are included where they are owned by U.K. companies and registered as U.K. vessels on the department of transport's General Register of Shipping and Seamen; and aircrafts are included where they are owned by U.K. registered companies irrespective of location.

Gross Domestic Fixed Capital Formation is analyzed here, by type of asset, vehicles, ships and aircraft, plant and machinery, new buildings and works, which has been invested in all manufacturing and production industries. Gross Domestic Fixed Capital Formation is valued at the cost to the purchaser including the costs directly connected with acquisition and installation. In the case of new buildings it includes the cost of clearance and the fees of architects designers and engineers. In the case of plant and equipment any transportation costs are included. For all assets legal costs and taxes are included, except that reclaimable VAT is excluded. I exclude various types of buildings and equipment used for industries such as Agricultural, Forestry and Fishing; natural resources; dwelling and transport. I also exclude foreign assets; consumer durables; buildings and equipment for the Armed Forces and those which are used for commercial, circulating and supervision activities. GDFCF for 1949-1982 has been taken from the CSO, National Income and Expenditure. For 1983-1988 it has been taken from the CSO United Kingdom National Accounts. From 1989 to 1991, I

used Annual Abstract of Statistics 1994. Then, for the rest up to 2003, taken from Part C, United Kingdom Input-Output Analyses, 2005 edition.

Circulating Capital includes all purchases of materials for use in production and of fuel, oil, gas and electricity for all purposes, including heating, lighting and transport, all packing materials, including the full cost of returnable cases and containers, workshop materials, office materials, water charges, materials for repair to firms own buildings, plant and vehicles when carried out by their own workpeople included in the return, and consumable tools and parts for machinery purchases during the year as replacements. Cost of materials include transport charges to the works, other than transport carried out by the establishment's own staff and generally, any duty paid (less rebates, etc.). Materials, gas or electricity transferred from other departments of the firm not covered by the same return were to be included at the value recorded as output by the other department, plus any payment for transport. Materials and fuels for 1949-1957 have been extracted from the Board of Trade. The report on the Census of Production, table X, for 1958, 1963, 1968 and 1970-1987 taken from the Census of Production, table 2, and for 1988. From 1989 to 1991 using Annual Abstract of Statistics 1994. Then for the rest, up to 2003, taken from Part C, United Kingdom Input-Output Analyses, 2005 Edition.

Surplus Value (annual flow) is the difference between the new value produced by productive labour and the amount of variable capital invested during the given period. Estimates of new value are derived from the Census of Production data, which is the Net Output of the manufacturing industries, as the value of circulating capital is transferred from the production line to the output. Net output is the amount left after deducting from the value of the gross output the aggregate of the cost of materials and fuel used and the amount paid for work given out. This residual figure represents the value added to materials by the process of production and constitutes the fund from which wages, salaries, rents, rates and taxes, advertising and other selling expenses and all other similar charges have to be met, as well as depreciation and profits. Therefore, the deduction of Operatives' wages from Net Output

gives us the estimate of surplus-value which is expropriated from the productive workers. The data for 1989 to 1991 is drawn from Annual Abstract of Statistics 1994. Then for the rest, up to 2003, taken from Part C, United Kingdom Input-Output Analyses, 2005 edition.

Therefore, my mapping of the Marxian rate of profit categories to the national statistics data is as follow, if each line corresponds to a variable then we have:

Line 1 Wages of operative workers = v
Line 2 Gross domestic fixed capital formation = Constant capital
Line 3 Circulating capital (materials plus fuels)
Line 4 Net Output = New value= Gross Output - (materials plus fuels + amount paid for work given out) = Wages, salaries, rent, rates and taxes, advertising and other selling expenses and all other similar charges have to be met, as well as depreciation and profits.
Line 5 Total constant capital = (Line 2 + Line 3) = c
Line 6 Total surplus value = (Line 4 – Line 1) = s
Line 7 Organic composition of capital = (Line 5 ÷ Line 1) = c/v
Line 8 Rate of exploitation = (Line 6 ÷ Line 1) = s/v
Line 9 Rate of profit (Line 6/(Line 5 + Line 1)) = s/(c+v) = r

For explicit mapping of those empirical measures to the theoretical Marxian categories, see Appendix B: Table 1.

6.5 Counteracting forces

Data on counteracting forces were likewise collected from official statistics in the following manner. Mergers and Acquisitions in terms of their values (concentration ratio), which is in terms of the market value of mergers or their current prices. As well as estimating the effect of UK trade with the EU, total exports (globalisation) and government expenditure on the rate of profit of production industries.

I came across some problems with data availability for M&A (Values), as it only accessible from 1969 from the ONS publications. Furthermore, it does not explain the type of merger activity as to be horizontal, vertical, conglomerate or lateral integration. Therefore the sample size is not very big and it can affect our statistical results, especially using time series estimates. Having said that, I collected data for the bankruptcies of the UK companies from the Annual Abstract of Statistics from 1949 up to 2003. For making the data consistent with

other available data for the other variables, I estimated them from 1970 to 2003 (See Table 5).

Data for the UK total imports and exports to the world, capital goods trade as well as her import and export from or to the European Union, has been taken from the Annual Abstract of Statistics for the years 1949–2003. I have also extracted data from the Blue Book for the UK government expenditure for the same period of time.

I have used ONS publications, Annual Abstract of statistics, and the Blue Book for M&A (values or in money terms), UK import/export trade to EU and government expenditure respectively. There was not data available with regard to M&A (values), prior to 1970. Therefore, I had to estimate all those variables from 1970 rather than from 1949, that means less observations for our estimates, which would affect our results, especially when estimating time series variables the more observations we have the better it is.

Because the dependent variables of interest are ratios (ROP, OCC, ROE), I calculated the countertendency variables as ratios too. These are EU exports/total output, EU imports/total output, government expenditure/total output, sales of 100 largest companies/total output (as a proxy for M&A). Furthermore, I tested the effect of the inflation rate and total exports/output (as a proxy for globalisation).

Annual abstract of statistics gives the following data for the UK total export and import, as well as her export to and import from the EU. UK total export was £1787.4m in 1949, of which £421m went to the EU, i.e. 23.5%. Whereas in 2003, UK exported £187846m of which £99159m to the EU countries, namely 52.7%. UK total imports were £2277.5m in 1949, of which £456m came from EU, namely 20% of total imports. However in 2003, UK total imports were £235136m that £121485m imported from the EU, which was 51.6%. Find table 8 in the appendix for UK total import/export, as well as her share of import from or export to the EU countries.

6.6 Data Analysis

Annual estimates of the principle Marxian ratios of rate of profit (s/(c+v)), rate of exploitation (s/v) and organic composition of capital (c/v) were calculated from the data series collected. In order to find if there is a link between the derived estimates of the rate of

profit and the organic composition of capital or rate of exploitation, I ran a regression against those variables in manufacturing and production industries, first testing for unit roots and stationarity of the variables with Autoregressive, first order (AR(1)) and Augmented Dickey-Fuller (ADF) tests.

The Augmented Dickey-Fuller test for stationarity of a time series, for example Y_t , starts with the estimation of a regression equation without a linear trend as follows:

$\Delta Y_t = \propto_0 + \propto_1 Y_{t-1} + \sum_{j=1}^{p} \gamma_j \Delta Y_{t-j} + \varepsilon_t$.

If we add a linear trend to the regression equation, we get:

$\Delta Y_t = \propto_0 + \propto_1 Y_{t-1} + \propto_2 t + \sum_{j=1}^{p} \gamma_j \Delta Y_{t-j} + \varepsilon_t$.

The series is said to have a unit root and is nonstationary if $\propto_1 = 0$. However, if the $H_0 = 0$ is rejected for one of the two equations, it can be said that the time series does not have a unit root and is stationary or is integrated of order zero. The other two parameters, namely $\propto_0$ and $\propto_2$ are to test for the presence of drift and trend components respectively. However, the Augmented Dickey-Fuller for unit root tests, it has been criticised by Maddala and Kim (1998: 45,145) as being a weak test and should not be used in practice, so I rely primarily on the Autoregressive test.

By definition if a series has time-invariant mean, variance and serial correlation, this is called a stationary series or is integrated of order of zero, I(0). However, if a nonstationary series becomes stationary after being differenced once, then the series is said to be integrated of order, i.e. I(1).

In addition if two series are both I(1) and a linear combination of them is stationary, then we would say that the two series are cointegrated. I carried out both DW and ADF tests for our multiple regression models, which was going to be used later in an econometric model. Although error correction models are closely related to the notion of cointegration, by doing the above tests, they could indicate as to what models to be used for our estimates of variables in a long term.

I then extended the regression model to test for the effect of the counteracting forces thought likely to be present in the contemporary UK context. I ran regression of the rate of profit,

rate of exploitation and organic composition of capital on those simple secondary data to find out empirically if there is any significant effect on those indigenous variables. Although theoretically in a time series analysis of data we are concerned about the relative changes in data not the absolute changes, here for the sake of comparing the results and showing how different estimates could have different outcomes, which could affect our interpretation of the statistical estimates and therefore our economic theories. First of all I started with the first set of data as an absolute numbers and ran the following equations:

ROP = $b_0 + \boldsymbol{b_1}[\boldsymbol{M\&A}]_t + \boldsymbol{b_2}[\boldsymbol{UK\ Export}]_t + \boldsymbol{b_3}[\boldsymbol{UK\ Import}]_t + \boldsymbol{b_4}[\boldsymbol{Gov.Exp}]_t + \boldsymbol{e_t}$

ROE = $b_0 + \boldsymbol{b_1}[\boldsymbol{M\&A}]_t + \boldsymbol{b_2}[\boldsymbol{UK\ Export}]_t + \boldsymbol{b_3}[\boldsymbol{UK\ Import}]_t + \boldsymbol{b_4}[\boldsymbol{Gov.Exp}]_t + \boldsymbol{e_t}$

OCC = $b_0 + \boldsymbol{b_1}[\boldsymbol{M\&A}]_t + \boldsymbol{b_2}[\boldsymbol{UK\ Export}]_t + \boldsymbol{b_3}[\boldsymbol{UK\ Import}]_t + \boldsymbol{b_4}[\boldsymbol{Gov.Exp}]_t + \boldsymbol{e_t}$

The regressions were tested for cointegration using the Durbin-Watson test by Ramanathan (1995: 454-5). In a general form we have a multiple regression model such as:

$Y_t = \beta_1 + \beta_2 X_{t2} + \beta_3 X_{t3} + \cdots + \beta_k X_{tk} + u_t$

$u_t = \rho u_{t-1} + \varepsilon_t \qquad -1 < \rho < 1$

In order to find out whether a dependent variable may be cointegrated with an independent variable, we need to test if two or more variables are cointegrated. Estimating the model by OLS and computing the residuals $\hat{u}_t$ *as*:

$Y_{t-} \hat{\beta}_{1-} \hat{\beta}_2 X_{t2} - \hat{\beta}_3 X_{t3} - \ldots - \hat{\beta}_k X_{tk}$.

Then Durbin-Watson statistic is:

$$d = \frac{\sum_{t=2}^{t=T} (\hat{u}_t - \hat{u}_{t-1})^2}{\sum_{t=1}^{t=T} \hat{u}_t^2}$$

Now from the estimated residuals we can obtain an estimate of the first-order serial correlation coefficient as follow:

$$\hat{\rho} = \frac{\sum_{t=2}^{t=T} \hat{u}_t \hat{u}_{t-1}}{\sum_{t=1}^{t=T} \hat{u}_t^2}$$

Therefore DW statistic d is roughly equal to $2(1 - \hat{\rho})$, or $d \approx 2(1 - \hat{\rho})$. If ρ is 0, then d = 2. As a result, a DW statistic of approximately 2 means that there is no first-order serial correlation. If ρ is close to 1, it indicates a strong positive autocorrelation, and if ρ is close to -1, it shows a strong negative serial correlation.

In addition, I did correlograms for AR(1) model for our variables to determine how correlated the error terms (u_t) are to the past errors (u_{t-1}, u_{t-2},$\cdots$). We need to define our autocorrelation function as expressed by Ramanathan (1995: 624):

r(s) = Cor(u_t, u_{t-s}) = $\frac{Cov(u_t\ ,u_{t-1}\ )}{Var(u_t)} = \frac{E(u_t\ u_{t-s})}{E(u_t^2)}$

r(s) = ρ^s is the correlation coefficient between u_t and u_{t-s} for values of s from 0 to t-1. We need to take into account that r(s) is independent of t and if $|\rho| < 1$, then the variance of u_t will be finite.

The results from unit roots and cointegration tests as well as correlograms would allow us to choose models such as VARs for our econometrics estimates of our variables. A Vector Autoregression (VAR) is the extension of the autoregressive (AR) modelling in which there are several variables under study. An autoregressive model has only one dependent variable, whereas a VAR model has more than one dependent variable, therefore has more than one equation to estimate. Each dependent variable in each equation uses the lags of itself and all other variables under investigation as its explanatory variables, and possibly a deterministic trend. In general we have the following VAR(ρ) model with X, Y and Z variables:

$$Y_t = \propto_1 + \delta_1 t + \emptyset_{11} Y_{t-1} + \cdots + \emptyset_{1p} Y_{t-p} + \beta_{11} X_{t-1} + \cdots + \beta_{1p} X_{t-p} + \delta_{11} Z_{t-1} + \cdots + \delta_{1p} Z_{t-p} + e_{1t};$$

$$X_t = \propto_2 + \delta_2 t + \emptyset_{21} Y_{t-1} + \cdots + \emptyset_{2p} Y_{t-p} + \beta_{21} X_{t-1} + \cdots + \beta_{2p} X_{t-p} + \delta_{21} Z_{t-1} + \cdots + \delta_{2p} Z_{t-p} + e_{2t};$$

$$Z_t = \propto_3 + \delta_3 t + \emptyset_{31} Y_{t-1} + \cdots + \emptyset_{3p} Y_{t-p} + \beta_{31} X_{t-1} + \cdots + \beta_{3p} X_{t-p} + \delta_{31} Z_{t-1} + \cdots + \delta_{3p} Z_{t-p} + e_{3t};$$

In VARs models each equation has p lags of all variables plus an intercept and a deterministic trend. In our study we have VAR(**ρ**) model with 11 variables, which can be obtained in a similar way as above. We have ROP (rate of profit), OCC (organic composition of capital), ROE (rate of exploitation), EXP (total export), IMP (total export), ExpToEU (export to EU), ImpFromEU (import from EU), CGExp (capital goods export), CGImp (capital goods import), M&Avalue (merger and acquisition in money terms), and Gov.Exp (government expenditure).

The next step is to use OLS to estimate the coefficients of variables in each equation. The P-values are used to specify as to whether any individual coefficient is significant or not. Finally, I will need to carry out diagnostic tests, using Granger causality Wald tests for the two models.

6.7 Conclusion

Marx clearly states that overall in a longer term, commodities sell at their value or natural price. Therefore, once the discrepancy between prices and labour values is considered as in the previous chapter, time series analysis of Marxian variables for estimating the trend in the rate of profit would be a valid approach in Marxian economics, if not the only one.

In my method of estimation I have used current prices as monetary expression of the value. This method not only is more flexible but also has got more potential for developing Marxian economy into the new phase of capitalist economy both theoretically and empirically. In terms of data is more accessible for a time series or estimates of economic variables, than using input-output tables which are not readily available and they are mainly published with a big gap of five to ten years.

In my estimates of the rate of profit and counteracting forces, I am going to use multiple regressions and conduct unit roots tests, Durbin-Watson tests for multicolliniarity of the residuals. Then estimating the variables employing VARs models as well as running Granger causality diagnostic tests for the models in the following chapter.

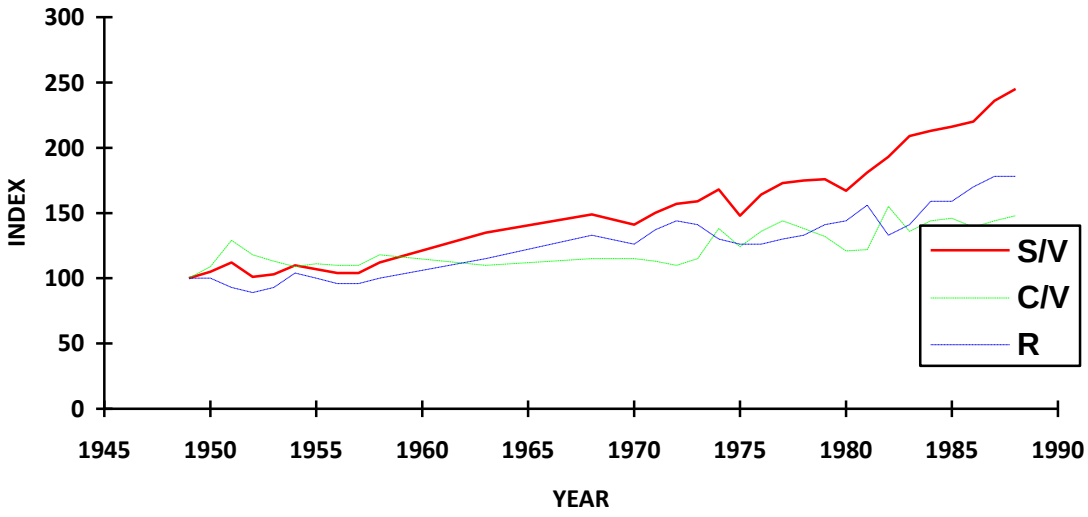
Chapter 7 Estimates of the falling rate of profit and counteracting forces in the UK

This chapter consists of two main parts; the first one presents the results of the empirical estimates that I have carried out for the Marxian profit rate in the context of the UK economy, using the officially published data, as discussed in the previous chapter. It also compares them with that one of Glyn and Sutcliff (1972). The second part of the chapter analyses the econometrics models that I have used and the results found. Having said that, section one specifically deals with the estimates of the UK profit rate; section two discusses and compares the results with the previous empirical research for the UK mentioned above; section three brings about the controversy surrounding the North Sea Oil and Gas industries, which could have influenced the outcome of our estimates of the profit rate for the UK. Section four puts forward statistical results of AR(1) (Autoregressive(1)) and ADF (Augmented Dickey-Fuller) for unit roots and stationarity tests; cointegration tests of the variables are revealed in section five. In section six, I discuss and express the results of econometrics estimates, using Vector Autoregressive models; VAR(1) and VAR(2). Afterwards, Granger causality Wald tests for the models are carried out and as a result, we obtain Granger causality circular flow of the rate of profit and counteracting forces. At the end, we conclude the chapter in section seven.

7.1 Estimates of the ROP in the UK

The origin of profit lies in the process of production, according to Marx's theory. Therefore, the sphere of production of commodities is our starting point in order to analyze the mentioned 'law'. Here, we are initially concerned with the manufacturing industries, in order to be consistent with Marx's theory of productive labour, these constitute mainly orders III to XIX Standard Industrial Classification revised 1968, or divisions 2 to 4 SIC revised 1980. (See Appendix B: Table1**)**. Figure 7.1 presents the results of the estimates of the Marxian variables on this basis: s/v, c/v and R = s/(c+v).

Fig. 7.1 Estimate of variables in manufacturing industries



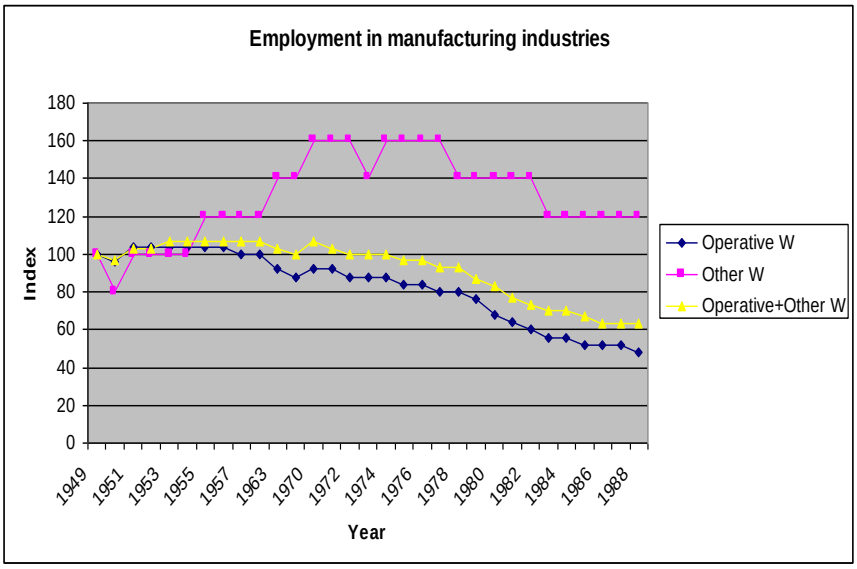
Source: Appendix B: Table 1.

As it can been seen in Figure 7.1, as well, the estimates of the rate of surplus-value increased 145 per cent over this period, namely, it has increased from 1.27 in 1949 to 3.11 in 1988. The trend in the estimates of the organic composition of capital shows an increase of 48 per cent in the same period. This supports Marx's prediction of a rising tendency of the organic composition of capital through time. However, rate of profit (R) has risen against Marx's expectation.

One major component of the organic composition of capital is variable capital (v). In manufacturing industries, the percentage of Operative Workers (v) has decreased by 52%. Whereas the percentage of Other Workers (administrative, technical and clerical employees), or unproductive labour has increased by 20%. Overall, (Operative + Other workers)/Total employment, has decreased by 37%. (See Appendix B: Table 2)

So, we can obtain the following results, that through the period 1949 (using as an index year for employment) to 1988 the number of manual workers in manufacturing industries has dropped. This could be one reason for the increase in the organic composition of capital, apart from some increases in constant capital itself. It seems to be a contradiction in Marx's value theory and in the first place in his theory of productive and unproductive labour. That is to say; how is it possible that the number of productive labourers to be decreased by 52% in manufacturing industries, and at the same time the rate of surplus-value to be increased by 145%? If productive workers (manual labourers) alone create surplus-value, why capitalists do not employ more of them? Figure 7.2 shows the employment trend in manufacturing industries:

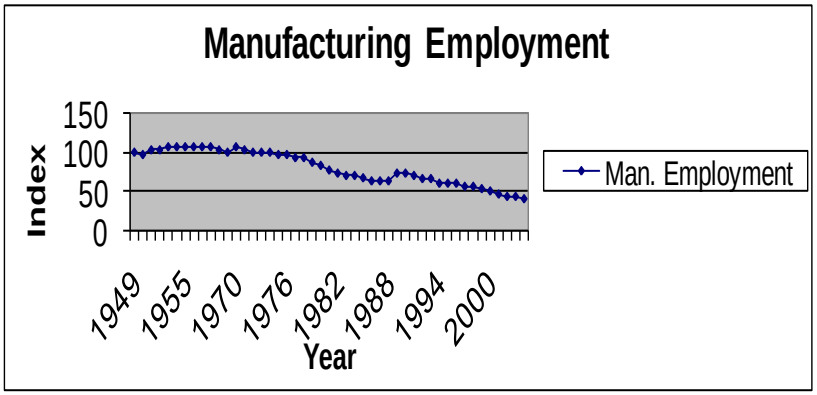
Fig.7.2 Operative and other workers in manufacturing industries



Source: UK Census of Production.

Even putting all workers together, that is operative plus other workers in manufacturing industries, I find that from 1949 (using as an index year for employment) to 1988 worker's number has decreased to 63 percent of total employment in the U.K. (Appendix B: Table 2) Moreover, when we extended the time scale up to 2004, the number of workers decreased even further, to 40 percent, which is shown below in Fig. 7.3.

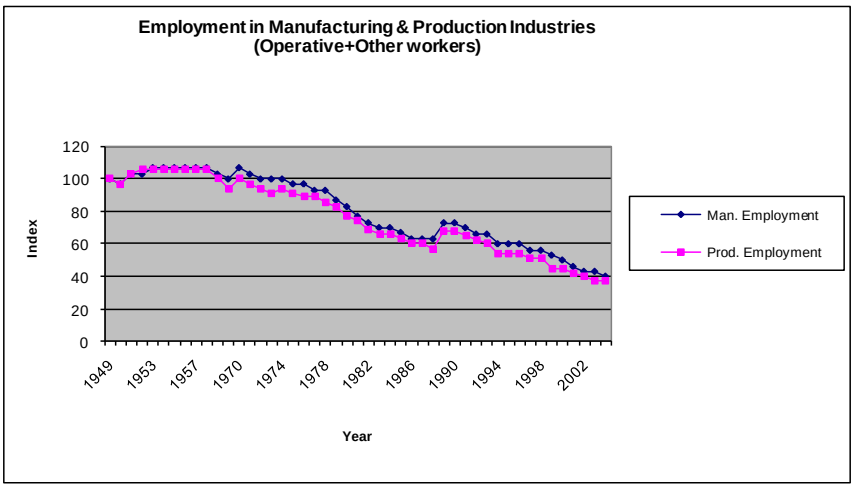
Fig. 7.3 Total operative and other workers in manufacturing



Sources: UK Census of Production, Annual Abstract of Statistics & Input-Output Tables.

Then we found that the number of workers in production industries decreased to 57 percent of total employment from 1949 (using as an index year for employment) to 1988, and also further decrease to 37 percent in 2004, which is almost similar to manufacturing industries. See Fig. 7.4 for the employment trend in production industries, (see also Appendix B: Table 2) for the number of workers in manufacturing and production industries).

Fig.7.4 Total operative and other workers in manufacturing & production industries



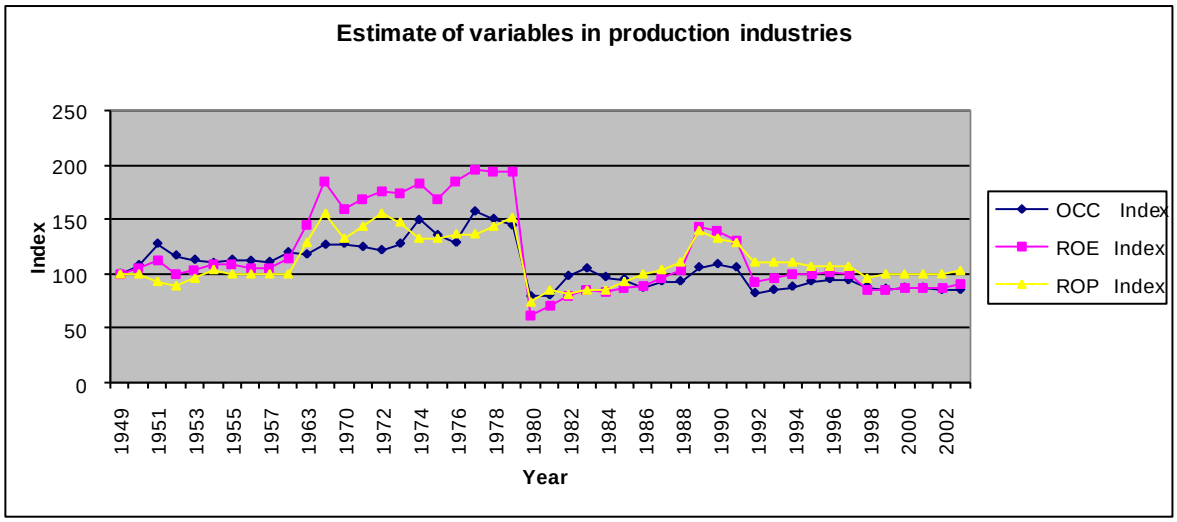
Sources: UK Census of Production, Annual Abstract of Statistics and Input-Output Tables.

Having discussed the decrease in the number of workers, and in the first place productive workers, one would wonder as to how the rate of profit could have been increased in manufacturing industries. This increase in the rate of profit with the magnitude of 78%

seems to be inconsistent with Marx's theory. Although there is some short-run cyclical decline in the ROP, it tends to increase constantly in a long run.

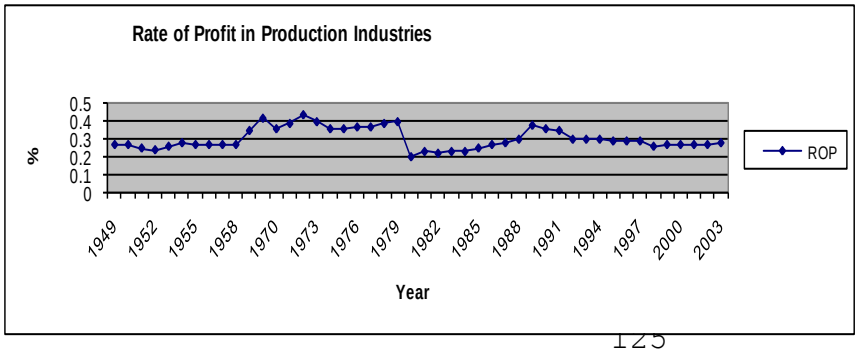
In my alternative approach, I found that the rate of profit is steadier than the one I found in the manufacturing industries. The profit rate in production industries mainly fluctuates around the index in 1949. For example in Fig. 7.5, you will find that the rate of profit for years 1999, 2000, 2001 and 2002 is the same as the rate in 1949, namely at 0.27% and in 2003 increases to 0.28%.

Fig.7.5 Organic composition of capital, rate of exploitation and rate of profit in Production industries



As Figure 7.5 shows, the rate of exploitation falls by 10% from 1949 to 2003 and the organic composition of capital drops even further to 15% in 2003, compared to 1949 (See Appendix B: Table 4). Figure 7.6 presents the percentage change of ROP in production industries more clearly and its oscillation separately from the OCC and ROE:

Fig. 7.6 Rate of profit in production industries



The trend in the rate of profit shows the main cyclical crisis in the UK economy after World War II. For example the rate of profit falls suddenly from 40 percent to 36 percent 1973-1974, where in the history of the UK economy has been recorded as the energy crisis, when the OPEC (The Organisation of the Petroleum Exporting Countries) members increased the price of oil per barrel. We witness a steep decrease in the profit rate from 0.40 in 1979 to 0.20 in 1980 when Steel strike begins in January and Tory government with Margaret Thatcher as prime minister took power just a few months before. The rate of profit increases slightly for the next year and falls again from 0.23 to 0.22 percent in 1982 during the Falklands war in March and also unemployment reaches 3 million by September (ONS 2005). In general the rate of profit was much lower during 1980 to 1985 than the one in 1949 at 0.27%. Only in 1986 did it reach the same level as in 1949. That would not come as a surprise as Steel workers and Miners were on strike, there were also high unemployment and the Falklands war.

The rate of profit improves a little in 1987, moving upwards up to 1990 and falls back again in 1991 when it decreases constantly until it goes below the index year in 1998. At this time the Sterling Exchange Rate Index hits its highest point since 1989, and the value of the pound sterling greater than its competitors, and UK exports became more expensive than her competitors. Exports fell from £232887m to £231034m 1997-1998. This supports Marx's argument that commodity exports work as counteracting force for the rate profit to fall.

In contrast with manufacturing industries, the rate of profit in production industries has reflected the UK economic crisis more comprehensively. The rate of profit in manufacturing industries tends to increase through the time. But in production industries it oscillates mainly around the index year and reflects very well the business cycle in the form of boom and bust in the economy. This oscillation of the rate of profit moves to relative stability in the 1990s. One major contributing factor to this phenomenon may be the relative consolidation of European Union with their large protected internal market. Another element would be the easy access to "Eastern European" markets. In terms of the UK domestic market, monopoly capital which is expanding every day, through a large scale of mergers especially from 1990s

may also play a crucial role in preventing the rate of profit to fall. I will discuss in the following chapter the mentioned counteracting tendencies of the rate of profit to fall. The appearance of other forms of crisis that their essence lies in the production sphere with its old disease of the tendency of the rate of profit fall will be tackled there.

This relative stability of the rate of profit, although unlikely last forever, is very significant in relation to Marxian falling rate of profit. It shows that the falling tendency of the rate of profit, not only did not decrease, but also has become relatively stable in the UK economy. This period of stability is rather longer than expected, that is, from 1991 to 2003. This is significant in terms of Marx's tendency of the rate of profit to fall, suggesting a new era of capital accumulation and capital development. This new phase of capital development is characterised with the domination of big firms with monopoly power that have gone beyond the competitive capital epoch, in which a uniform rate of profit could be materialised across the sectors of the economy.

This relative stability of the rate of profit, might seem not to be consistent with the assumptions and theories of traditional Marxists based on competitive capital, but yet it does not show that we are at the equilibrium level and all markets are clear in a Walrasian or Keynesian model of full employment. It is likely that this relative stability is only a tendency of the rate of profit due to the characteristics of the UK economy, especially after the formation and consolidation of the European Union.

7.2 Comparison with previous results.

Here, I would like to compare my estimate of the rate of profit with that one of Glyn and Sutcliffe (1972).

Table 7.1 Comparing Glyn & Sutcliffe Profit Shares and Rates with the current estimates

	Glyn & Sutcliff Profit Shares (%) Company Profits Net of SA & CC*	**Glyn & Sutcliff Profit Rate (%) Before Tax, Excluding SA****	**Current Profit rate (%) Production Industries**
1950	23.4	15.6	27
1951	25.4	17.0	25
1952	25.7	16.9	24
1953	25.8	16.6	26
1954	25.5	16.6	28
1955	24.9	16.0	27
1956	22.6	14.8	27
1957	22.4	14.1	27
1958	21.8	14.0	27
1963	20.9	12.5	35
1968	16.6	11.6	42
1970	12.1	9.7	36

*CC is capital consumption
**SA is Stock appreciation

Glyn and Sutcliffe calculate their rate of profit on net assets of companies in manufacturing, construction, communications and distribution. They calculate their profit shares as follow: P/Y, where P is profit of the industry and Y is income. Rate of profit is P/K, where K is the capital stock invested. Therefore share of profit = rate of profit x K/Y (the capital/output ratio). They employ two different calculations for the rate of profit, i.e. before and post-tax profit. The latter one is Net distribution plus Retained earnings plus Minority interest divided by Net assets at end year. They were choosing the largest three or four firms in each industry to calculate the rate of profit. Although they did it for the sake of "data were readily available" (Glyn and Sutcliffe 1972: 249) for those industries, it seems to be a wrong method of gathering data which do not comply with our theories and would highly influence the outcome of calculation of the rate of profit.

Glyn & Sutcliffe calculate the profit and wages at the national level. That is to assume that all capital is a productive capital and all wage labourers are productive labour too. Next the relation of these profits to national income determines the share of profits and those profits to capital invested gives us the rate of profit. To them profit can be generated in all spheres of production, distribution and exchange. With the same token all wage labourers in the spheres

of production, distribution and exchange are producers of surplus value. Whereas in my calculation of profit rate, capital invested in production industries is a productive capital and the workers employed in the production process are the sources of surplus value (unpaid labour or profit). Consequently the rate of profit is influenced by productive labour and capital in the sphere of production.

Glyn & Sutcliffe's method of calculating the profit rate and shares was different with my approach to calculate the rate of profit in the UK production industries. They were using conventional profit calculation rather than Marxian approach. Secondly, although their profit shares estimate was roughly near to my results of calculating the rate of profit, for the early 1950s, but from the mid-50 to the end my estimate of the rate of profit was fluctuating around the index year, namely 27 per cent, whereas their profit shares and rate of profit calculations showed a decrease of 7 and 11 per cent respectively by the end of the decade. Their after tax profit rate, excluding stock appreciation, gives a very small percentage for example for 1950, it is 5.7 per cent. It eventually ends up with 5.2, 4.7 and 4.1 for 1968, 1969 and 1970 respectively. The way the profit rate was heading since 1950, the capitalist economy would have been in a negative territory for ever.

During 1960s my rate of profit estimate shows an upward trend, it reaches 33% increase from the index year by 1970. But the trend in their estimates shows a continuous downward trend. Their shares of profit and profit rate reduce by 48 and 38 per cent respectively by 1970. Both rates were falling dramatically; therefore one would have thought that British capitalism would have seized to exist within a few decades. Their approach did not into account the dynamism of capitalism for employing counteracting forces of the falling rate of profit.

Glyn and Sutcliffe argued about the causes of the profit squeeze as follow: "since 1950 wage increase has been an important cause of the declining profit share because of their effect on the U.K. capital's competitive position." (Glyn and Sutcliffe 1972: 60) A few pages after the international competition were also added to the main causes of the profit decline. (1972: 70) So profit squeeze occurs as a result of wage increase and international competition which pushes down the prices of the commodities. However it is contradiction in terms when Glyn (2006) in his estimates of manufacturing gross profit in EU countries, talks about "the rise in imported material costs...exacerbated the distributional struggle." (p. 7)

Once again spheres of distribution and exchange have occupied the centre stage in analysing the profit squeeze, rather than the production sphere to be their starting point. That is to see the appearance rather than the essence of capitalist commodity production. That is mainly observing and analysing the effect rather than the cause of the problems of a capitalist society, which is the production sphere. I prefer to sum up the main argument of the profit squeeze approach by a direct quotation from Marx:

> ...you have seen that a struggle for a rise of wages follow only in the track of previous changes...in one word, as reaction of labour against the previous action of capital. By treating the struggle for a rise of wages independently of all these circumstances, by looking only upon the change of wages, and overlooking all the other changes from which they emanate, you proceed from a false premise in order to arrive at false conclusions. (1996: 113)

Glyn (2006: viii-ix) "Taking the story through from 1970s to the present day necessarily involves a widening of the perspective. Distributional conflict between capital and labour in the rich economies is for now not the most problematic element in their functioning."

Glyn (2006) is mainly focusing on the rising profitability in the financial sector now. He also talks about the expansion of manufacturing capacity by the low wage producers, or globalisation has been blamed for undermining competitive position of traditional industries in the advanced countries. Furthermore, he argues that the effect of the new technology has undermined the position of less qualified workers in the advanced countries. Overall, he abandoned his views on the profit squeeze and instead has concentrated on the foregone problems in the UK economy. If we want to present a Marxian approach to the problem of economic crisis our starting point of analysis should be the production industries, as I have tried to focus in this paper and then we can expand our analysis to the other spheres in the society, i.e. spheres of distribution, exchange and consumption, which constitute the capitalist mode of production. Our production sphere includes manufacturing plus energy and water supply industries.

7.3 North Sea Oil and Gas industry

North Sea Oil and Gas industry did not seem to play any roles in a slight recovery of the rate of profit in late 1970s in the UK economy, according to Glyn (2006: 145-6) : "The 1980s saw

very rapid recovery in the rationalization under Mrs Thatcher … aided by the boost to profits from North Sea Oil." Whereas in my estimates of the rate of profit, the influence of the North Sea Oil and Gas industry just started as early as 1976, immediately after the first flow of British oil ashore in the Argyle field in 1975 by the Hamilton Brothers (an American company), then it followed by the BP (British Petroleum) in the Forties field.

If we look at a short history of the UK North Sea Oil and Gas, we will see that it goes back to late 1965, when gas discovered in the West Sole field by the BP jack-up drilling rig Sea Gem. But the discovery of oil was no sooner than in November 1970 in the Forties field "(240m tones of oil) and then in July 1971 the Brent field was found (229m tonnes of oil)" (Atkinson and Hall 1984: 29) Table 7.2 shows the rate of exploration and success factors by the same authors:

Table 7.2 Exploration and Success Factors for the UK sector of the North Sea

	Exploration wells drilled	**Significant oil and gas finds**	**Success factors**
1964	1	0	0
1965	10	1	0.1
1966	20	4	0.3
1967	42	3	0.07
1968	31	3	0.09
1969	44	6	0.13
1970	22	4	0.18
1971	24	5	0.20
1972	33	6	0.18
1973	42	8	0.19
1974	67	15	0.22
1975	79	27	0.34
1976	58	14	0.24
1977	67	8	0.12
1978	37	3	0.08
1979	33	8	0.24
1980	32	2	0.06
1981	47	12	0.24

Source: Development of the oil and gas resources of the United Kingdom 1982.

North Sea Oil contributed to the UK economy first of all by increasing national income through oil and gas output adding to the GDP (Gross Domestic Product). Secondly its contribution through the balance of payments; either in exports or in displacement of imports. Thirdly government could obtain a great deal of tax revenue either from oil production or

direct revenue and employment. The following table provides us with the North Sea contribution to the UK GDP. (Atkinson and Hall 1984: 23)

Table 7.3 North Sea Gas Production and Value

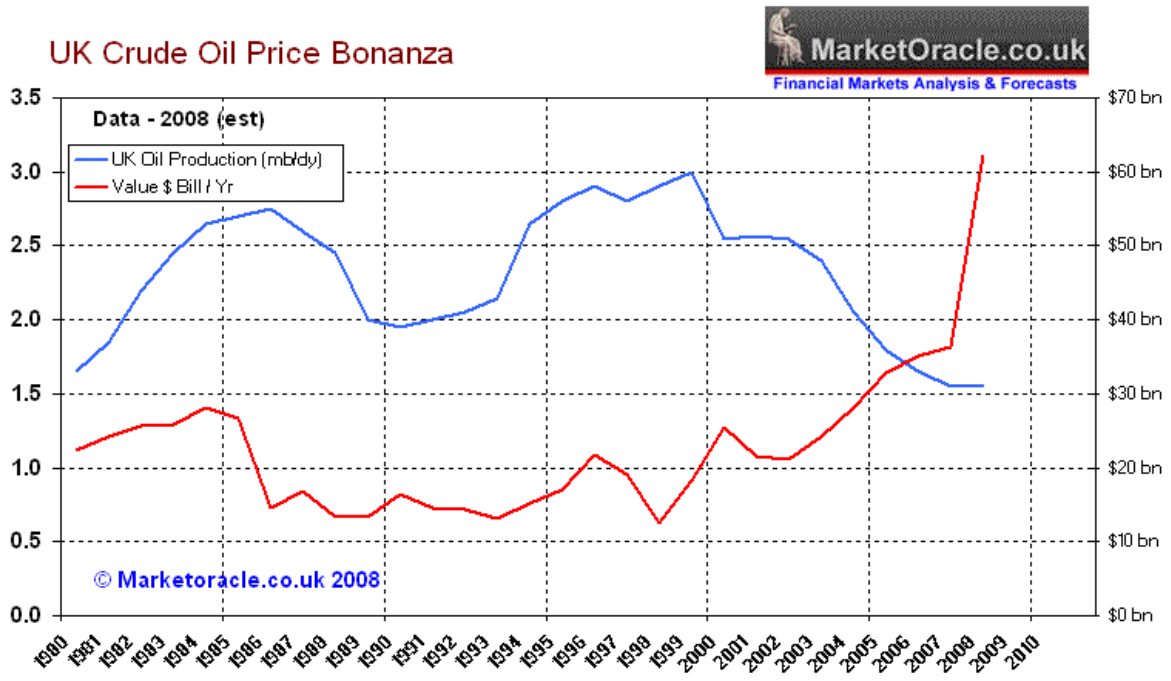
	70	71	72	73	74	75	76	77	78	79	80
Recorded contribution of oil and gas to GDP £m	24	18	57	40	11	-7	596	2079	2771	5680	8762
Adjusted GDP oil & gas contribution £m	106	149.2	240.2	223.7	222.1	321.4	1039.2	2874.5	3721.8	6528	9841.9

Source: Digest of UK Energy Statistics; authors' calculations; Development of the Oil and Gas Resources of the United Kingdom 1982.

Then the same authors (p.35) give us adjusted GDP contribution as % of GDP for years: 1973, 1974, 1975, 1976, 1977, 1978, 1979 and 1980 as 0.3, 0.3, 0.3, 0.8, 2.0, 2.3, 3.4 and 4.4 respectively. Especially from 1975 to 1976 there is a big jump in GDP contribution almost three times more than in 1975 which is reflected in our estimates of the rate of profit. This upward trend of the rate of profit, although very slowly, goes up to 1979 when the balance of political power and consequently economic policies changed from the labour government to the conservative ones in terms of the North Sea Oil revenue and its expenditure. Having said that it constitute only a small fraction of the UK's GDP and cannot be a dominant economic force, therefore it can influence the economy up to a certain point, especially taking into account the cost of the oil platforms, hundreds miles of pipelines and most importantly as an environment to work in. With reference to latter one, we had the loss of thirteen lives on Boxing Day 1965 as the Sea Gem capsized and also 167 men died by the Piper Alfa disaster in 1988. This race for oil and gas overshadows the safety and working conditions of the working class for the sake of profit.

However, if we extend the North Sea Oil production and prices from 1980 up to 2008 we find that although the production of crude oil has got a downward trend after 1999, the prices have got an upward trend, which has been shown in the following graph extracted from 'Britain's North Sea Crude Oil Revenue Bonanza' (Walayat 2008: 2):

Fig. 7.7 North Sea crude oil revenue



Walayat (2008) argues that there has been a great benefit from the North Sea Oil and Gas ($1trillion), but all have been spent by the successive governments "into black holes such as the NHS where money meant for healthcare is pocketed by managers, doctors and GP's, hence a tripling in budgets has resulted in barely a 30% increase in output." (p.3) Atkinson and Hall 1984: 12) discuss that nearly 10% of the government budget is coming from the North Sea Oil revenue. They also suggest that government should use the revenues for financing new expenditures, either on investment projects or on the public sector improvements as well as reducing taxes, rather than financing the budget deficit and what is known as PSBR (Public Sector Borrowing Requirement).

In conclusion, we can see again as to how the revenue from the North Sea Oil and Gas industry has been used as unproductive capital when it is used for unproductive activities by the government.

7.4 Statistical estimates

To determine whether there is any evidence of the counteracting forces offsetting the tendency of the rate of profit to fall, I undertook a time series analysis. I first ran AR(1) and ADF to test for unit roots and stationarity. Table 7.4 shows the results:

Table 7.4 AR(1) and ADF unit root tests

AR(1)			ADF				
			With Trend			With Drift	
Variables	**Coefficient**	**t-statistic**	**Critical value 5%**	**10%**	**t-statistic**	**Critical value 5%**	**10%**	**t-statistic**
ROP	**.76**	**6.50**	**-3.56**	**-3.22**	**-2.37**	**-1.69**	**-1.30**	**-2.11**
OCC	**.78**	**7.06**	**-3.56**	**-3.22**	**-2.19**	**-1.69**	**-1.30**	**-1.95**
ROE	**.81**	**7.76**	**-3.56**	**-3.22**	**-2.40**	**-1.69**	**-1.30**	**-1.84**
M&A	**.46**	**2.90**	**-3.56**	**-3.22**	**-4.98**	**-1.69**	**-1.30**	**-3.40**
Gov.Exp	**.90**	**47.26**	**-3.56**	**-3.22**	**3.50**	**-1.69**	**-1.30**	**3.84**
Exp to EU	**.96**	**44.91**	**-3.56**	**-3.22**	**-5.30**	**-1.69**	**-1.30**	**0.74**
Imp from EU	**.97**	**62.11**	**-3.56**	**-3.22**	**-2.36**	**-1.69**	**-1.30**	**1.20**
EU Exp/TPro	**.19**	**0.37**	**-3.56**	**-3.24**	**-49.7**	**-1.75**	**-1.34**	**-7.59**
EUImp/Tpro	**1.03**	**16.71**	**-3.60**	**-3.24**	**-2.22**	**-1.75**	**-1.34**	**-1.58**
Gov.Exp/Tpro	**.79**	**6.24**	**-3.60**	**-3.24**	**-2.03**	**-1.75**	**-1.34**	**-0.62**
TotalExp/Tpro	**.97**	**10.58**	**-3.60**	**-3.24**	**-1.44**	**-1.75**	**-1.34**	**-1.15**
ConRatio	**.97**	**10.66**	**-3.60**	**-3.24**	**-2.85**	**-1.75**	**-1.34**	**-1.08**
RPI(InflationRate)	**.50**	**2.32**	**-3.60**	**-3.24**	**-2.49**	**-1.75**	**-1.34**	**-2.12**
Total Exp	**.96**	**72.38**	**-3.53**	**-3.19**	**-1.27**	**-1.64**	**-1.30**	**1.76**
Total Imp	**.95**	**87.18**	**-3.53**	**-3.19**	**-0.41**	**-1.68**	**-1.30**	**3.29**
CapitalGExp	**.97**	**54.68**	**-3.53**	**-3.19**	**-1.32**	**-1.68**	**-1.30**	**0.69**
CapitalGImp	**.96**	**51.54**	**-3.53**	**-3.19**	**-1.06**	**-1.68**	**-1.30**	**1.16**

The ADF test indicates stationary for merger and acquisition, export to EU and export to EU/total production. But the rest of the variables are nonstationary. But as previously discussed, the Augmented Dickey-Fuller for unit root tests, it has been criticised by Maddala and Kim (1998: 45,145) as being a weak test and should not be used in practice.

However, we have the AR(1) model as below:

$Y_t = \propto + \emptyset\, Y_{t-1} + e_t$, for t = 2, … , T

It reveals that all variables are stationary except for the EUIMP/total production, as the coefficient of the variable is 1.03. According to our statistical theory if the coefficient value of a variable is $0<\rho<1$, then Y is stationary, but if $\emptyset = 1$ or $|\emptyset|>1$ and Y is nonstationary. If Y

has a unit root then the series will express trend behaviour, especially if $\alpha \neq 0$. Then ΔY will be stationary, it is often referred to as difference stationary series. In other words if we subtract Y_{t-1} from both sides of the equation in an AR(1) model, we obtain:

$\Delta Y_t = \propto + \rho Y_{t-1} + e_t$,

Where $\rho = \emptyset - 1$ and the stationary condition for this model will be $-2 < \rho < 0$. If $\emptyset = 1$ and $\alpha = 0$, then our model changes to a random walk model such as:

$Y_t = Y_{t-1} + e_t$.

As $\emptyset = 1$ (or, equivalently, $\rho = 0$), Y has a unit root and is therefore nonstationary.

As I had different observations due to limitation of the available data, I conducted three different statistical tests as follow:

Table 7.5 Regressing ROP on external variables

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.5610603
R Square	0.3147886
Adjusted R Square	0.2364788
Standard Error	0.0504176
Observations	40

ANOVA

	df	*SS*	*MS*	*F*	*Significance*
Regression	4	0.040872155	0.010218	4.019782	0.008718
Residual	35	0.088967845	0.002542		
Total	39	0.12984			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.5156473	0.060652213	8.501706	4.95E-10	0.392517	0.638778
Euexp	0.2166838	0.168986534	1.282255	0.208182	-0.12638	0.559745
Euimp	1.0184561	0.396786723	2.566759	0.0147	0.212936	1.823976
Government expenditure	0.0095726	0.347662601	0.027534	0.97819	-0.69622	0.715365
Total exports	-1.630588	0.470428593	-3.46617	0.001415	-2.58561	-0.67557

Next I tried to run a multiple regression with regard to ROP using all independent variables, although with less observations (only 23) due to limitation of data availability. I found the following results:

Table 7.6 Regressing ROP on EUexp/TP, EUimp/TP, Gov.Exp/TP, Total exports/TP Concentration Ratio and Inflation Rate

Regressing ROP on external variables

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.812726
R Square	0.660524
Adjusted R Square	0.53322
Standard Error	0.04601
Observations	23

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	0.065903	0.010984	5.188569	0.003879
Residual	16	0.033871	0.002117		
Total	22	0.099774			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.553025	0.106748	5.180669	9.11E-05	0.32673	0.77932
Euexp/TP	0.075126	0.159498	0.471015	0.643988	-0.263	0.413248
Euimp/TP	1.322442	0.43683	3.027357	0.008009	0.396403	2.248481
Gov.Exp/TP	-0.09825	0.789753	-0.12441	0.902543	-1.77245	1.575951
Totalexports/TP	-2.29571	0.758325	-3.02734	0.008009	-3.90328	-0.68813
ConRatio	0.328656	0.150543	2.183128	0.04427	0.009518	0.647793
InflRate	0.000583	0.001831	0.31847	0.754248	-0.0033	0.004464

In order to compare the results with the previous estimates, the most important estimates are summarised as follows:

Table 7.7 Summary of Regressing ROP on EUexp/TP, EUimp/TP, Gov.Exp/TP, Total exports/TP, Concentration Ratio and Inflation Rate

	Observations	Coefficients	Multiple R %	R squared%	R bar-squared %	Standard error %	F – Test
EU exports/TP	23	0.075					
EU imports/TP	23	1.322					
Government Expenditure/TP	23	-0.098					
Total exports/TP	23	-2.295	81	66	53	4	5.18
Concentration Ratio	23	0.328					
Inflation ratio	23	0.000					

By adding another two variables to the ROP regression as independent variables, we can see that although the R squared goes up to 66% from 31% and F – test also increases to 5.18 from 4.01, the coefficient of the government expenditure/total output becomes negative (-0.09). In addition total export/total output decreases from -1.63 to -2.29, and also zero coefficients for the rate of inflation suggests that it has no positive effect on the rate of profit. These new values of the coefficients suggest that the government spending and total export (to EU plus the rest of the world) as a proxy for globalisation could not have a significant effect on the rate of profit. Therefore I abandoned counteracting tendency ratios and continued with the rest of counteracting variables for the cointegration tests and estimation of VARs models.

7.5 Cointegration test

As shown in Table 7.8, our Durbin-Watson statistic d is 2.004277 which is ≈ 2. Therefore, we conclude that ρ = 0 and there is no first-order correlation I(1) and the series is integrated of order zero or as I(0). It is a stationary time series and is time invariant. That is Var(u_t) and Var(u_{t-s}) are the same for the values of s>0.

Table 7.8 Durbin-Watson Test

```
. regress rop occ roe exp imp exptoeu impfromeu cgexp cgimp mavalue govexp
```

Source	SS	df	MS		
Model	.123377455	10	.012337745	Number of obs =	34
Residual	.003119601	23	.000135635	F(10, 23) =	90.96
				Prob > F =	0.0000
				R-squared =	0.9753
				Adj R-squared =	0.9646
Total	.126497056	33	.003833244	Root MSE =	.01165

rop	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
occ	-.0678887	.0116308	-5.84	0.000	-.0919489	-.0438285
roe	.2174307	.0171403	12.69	0.000	.1819734	.252888
exp	1.01e-06	7.65e-07	1.33	0.198	-5.69e-07	2.60e-06
imp	-1.87e-06	9.50e-07	-1.97	0.061	-3.83e-06	9.73e-08
exptoeu	1.34e-07	7.13e-07	0.19	0.853	-1.34e-06	1.61e-06
impfromeu	9.08e-07	7.45e-07	1.22	0.235	-6.34e-07	2.45e-06
cgexp	-3.04e-06	2.15e-06	-1.42	0.170	-7.49e-06	1.40e-06
cgimp	4.36e-06	2.29e-06	1.90	0.070	-3.84e-07	9.11e-06
mavalue	-1.61e-07	2.07e-07	-0.78	0.444	-5.90e-07	2.67e-07
govexp	7.99e-08	2.70e-07	0.30	0.770	-4.79e-07	6.39e-07
_cons	.2350788	.0223723	10.51	0.000	.1887981	.2813595

```
. estat dwatson

Durbin-Watson d-statistic( 11,    34) =  2.004277

. dfuller rop, trend lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        33
```

	Test Statistic	1% Critical Value	Interpolated Dickey-Fuller 5% Critical Value	10% Critical Value
Z(t)	-2.371	-4.306	-3.568	-3.221

```
MacKinnon approximate p-value for Z(t) = 0.3953

. dfuller rop, drift lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        33
```

	Test Statistic	1% Critical Value	Z(t) has t-distribution 5% Critical Value	10% Critical Value
Z(t)	-2.117	-2.453	-1.696	-1.309

```
p-value for Z(t) = 0.0212

.
```

Although Augmented Dickey-Fuller test is not our main concern (refer to the criticism of the DF and ADF tests by Madalla and Kim 1998), it reveals that it is significant at 5% when only a drift included rather than with a trend. The value of t-statistic is -2.11 which is more than -1.69 at 5% critical value.

However as mentioned in our methodology the AR(1) model is stationary if the autoregressive coefficient (ρ) does not go beyond 1 in absolute value, as the following correlograms exhibit this condition:

Fig. 7.8 Correlogram for ROP

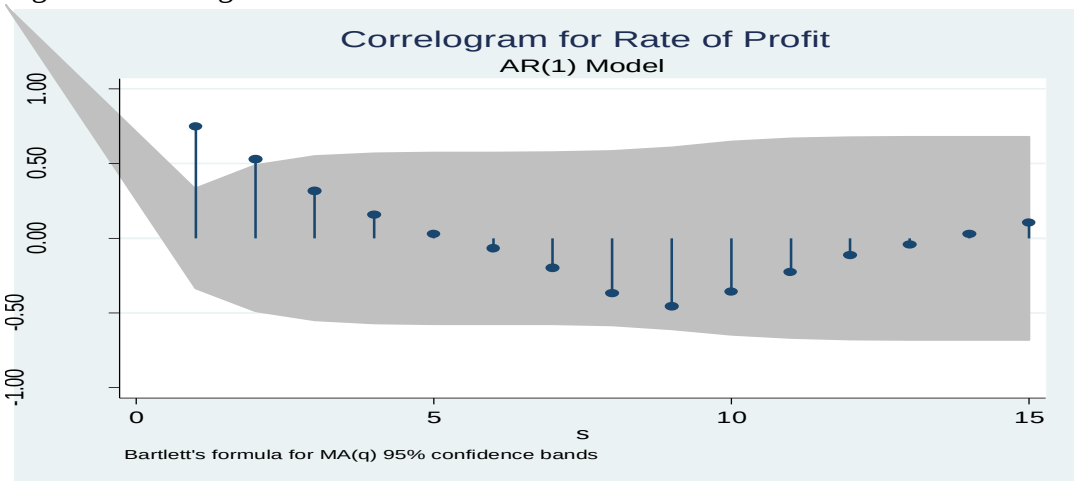


Fig. 7.9 Correlogram for OCC

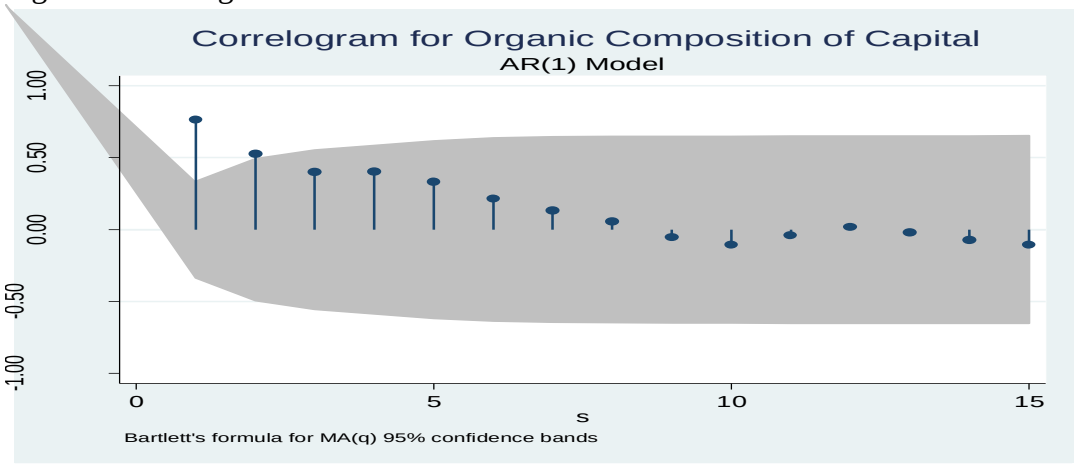


Fig. 7.10 Correlogram for ROE

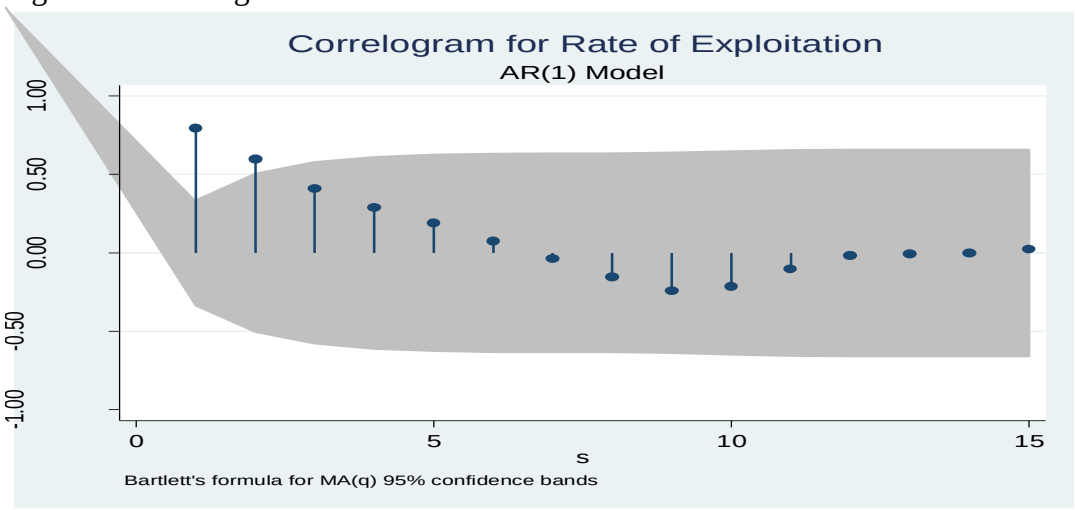


Fig. 7.11 Correlogram for M&A

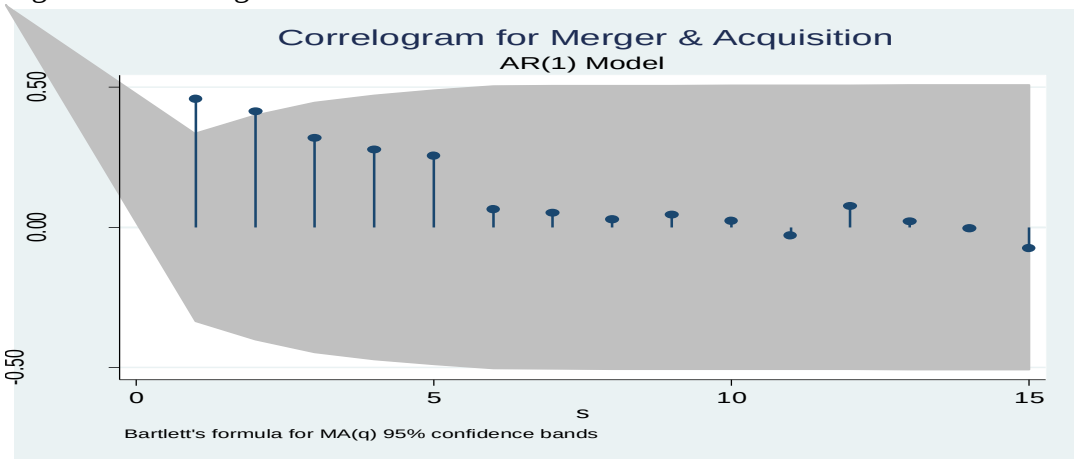


Fig. 7.12 Correlogram for Gov.Exp

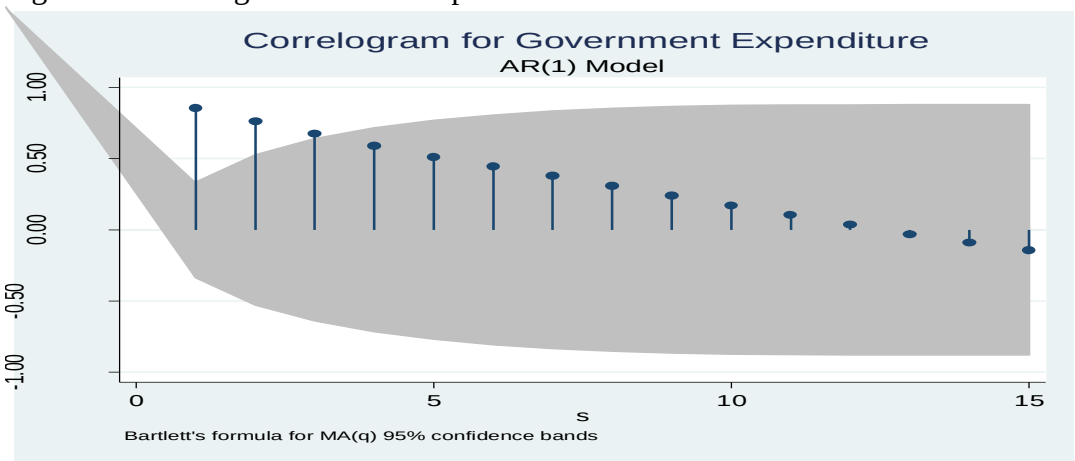


Fig. 7.13 Correlogram for Exp to EU

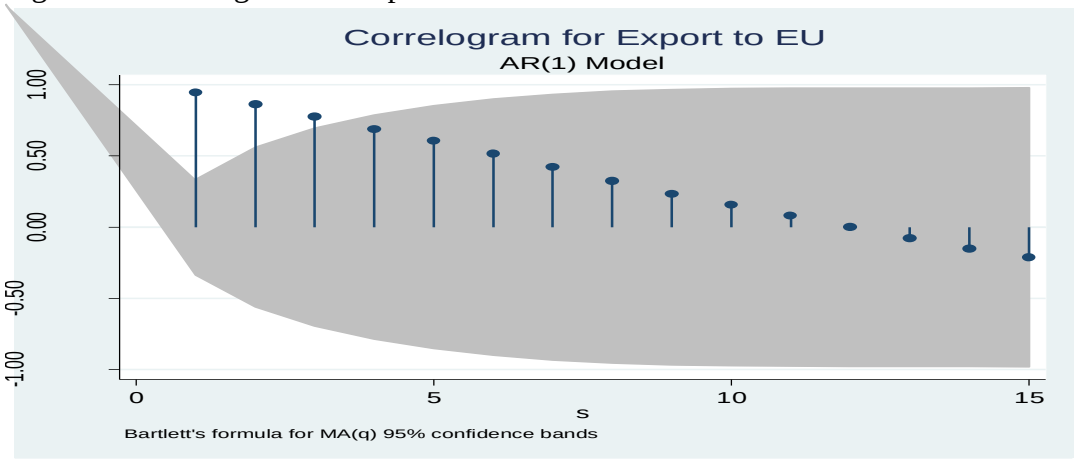


Fig. 7.14 Correlogram for Impfr EU

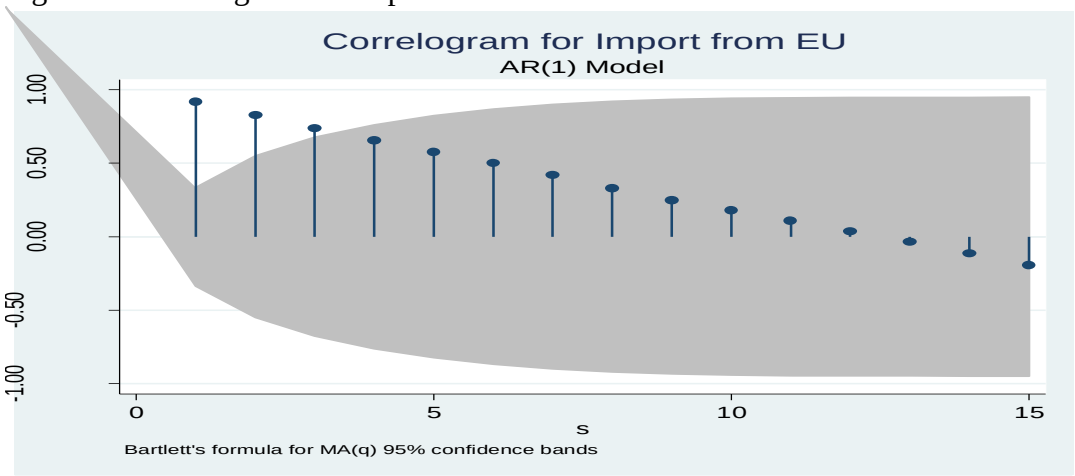


Fig. 7.15 Correlogram for TotalExp

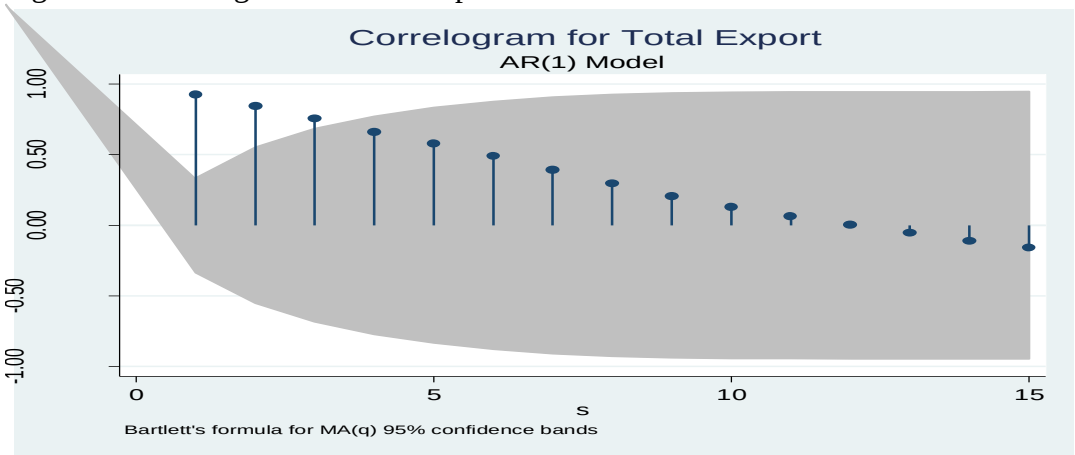


Fig. 7.16 Correlogram for TotalImp

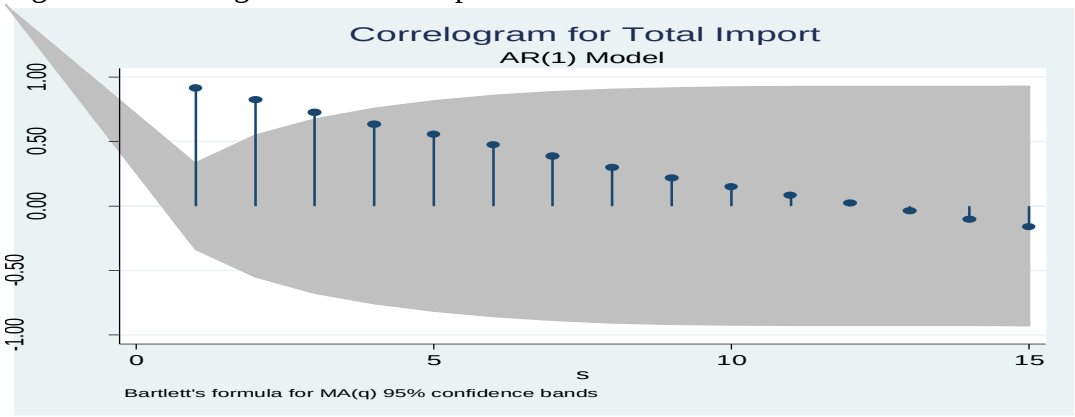


Fig. 7.17 Correlogram for CGExp

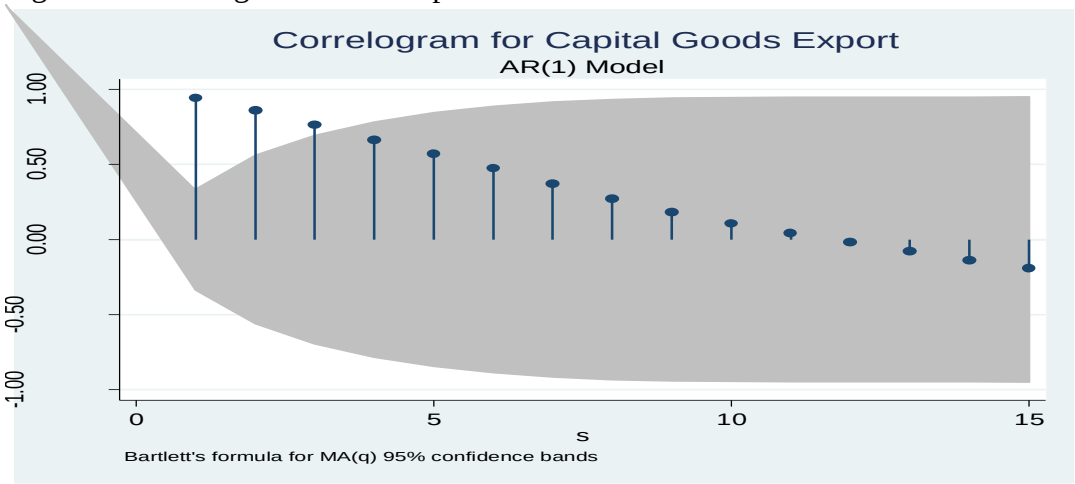
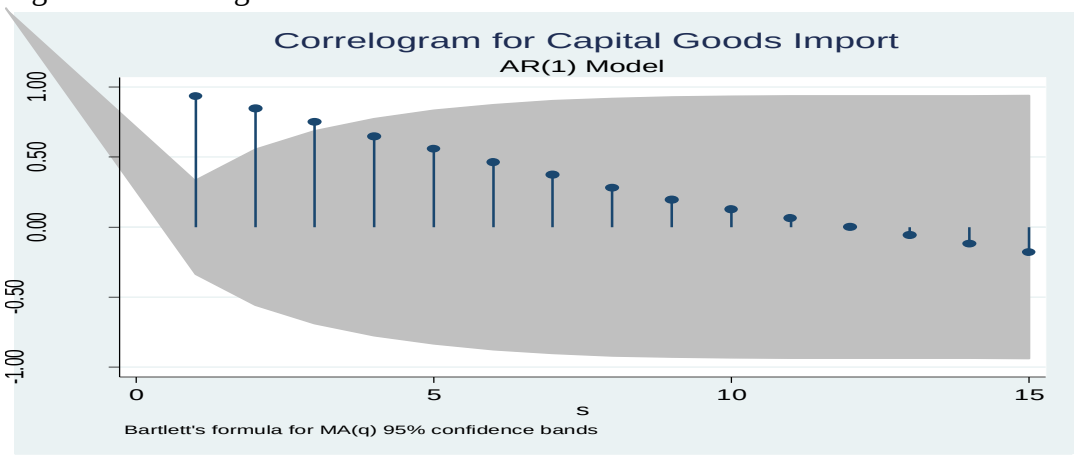


Fig. 7.18 Correlogram for CGIMP



7.6 Vector Autoregressive models

The results for VAR(1) and VAR(2) models have been summarised in Tables 7.9 through 7.12:

Table 7.9 Vector Autoregressions (1)

```
. var rop occ roe exp imp exptoeu impfromeu cgexp cgimp mavalue govexp, lags(1/1)

Vector autoregression

Sample:  1971 - 2003                        No. of obs      =        33
Log likelihood = -2266.061                  AIC             =   145.337
FPE            =  5.35e+49                  HQIC            =  147.3512
Det(Sigma_ml)  =  1.22e+46                  SBIC            =  151.3231

Equation           Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
rop                   12     .042661  0.6915   73.97401   0.0000
occ                   12     .473459  0.7373   92.59778   0.0000
roe                   12     .313586  0.7490    98.4744   0.0000
exp                   12     6785.56  0.9919    4019.08   0.0000
imp                   12     6325.44  0.9950   6618.123   0.0000
exptoeu               12     3489.04  0.9934   5001.547   0.0000
impfromeu             12     3751.22  0.9938   5248.289   0.0000
cgexp                 12     2817.77  0.9885   2842.719   0.0000
cgimp                 12     3118.48  0.9882   2765.336   0.0000
mavalue               12     17186.5  0.5159   35.17116   0.0002
govexp                12     6059.37  0.9944   5862.022   0.0000
------------------------------------------------------------------
```

Table 7.10 Results of estimates for VAR(1) model

	Dependent Variable ROP		**Dependent Variable OCC**		**Dependent Variable ROE**		**Dependent Variable EXP**		**Dependent Variable IMP**		**Dependent Variable Exp. To EU**	
	Coef.	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**
Intercept	0.23	0.1	0.0	4.93	1.61	0.1	15062	0.5	9267	0.7	(-6061)	0.6
ROP	0.4	0.4	(-8.07)	0.2	(-1.3)	0.7	(-478)	0.6	(-9112)	0.9	23627	0.6
OCC	0.01	0.7	(-0.35)	0.5	(-0.05)	0.8	(-3413)	0.6	2413	0.7	(-118)	0.9
ROE	(-0.20)	0.8	0.1	2.04	(0.66)	0.5	11368	0.6	(-4123)	0.8	(-1040)	0.9
EXP	(-0.00)	0.1	(-0.00)	0.5	(-0.00)	(-0.00)	1.14	.002	0.23	0.4	0.51	0.007
IMP	(-0.00)	0.6	(-0.00)	0.6	(-0.00)	0.7	(-0.75)	0.1	(-0.10)	0.8	(-0.49)	0.04
ExpToEU	(0.00)	0.6	(-0.00)	0.3	(-0.00)	0.7	(-0.32)	0.3	(-0.53)	0.09	0.02	0.8
ImpFromEU	(0.00)	0.1	0.00	0.3	(0.00)	0.1	0.43	0.2	0.53	0.1	0.57	0.003
CGExp	(0.00)	0.5	0.5	0.00	0.00	0.3	0.32	0.7	0.54	0.5	0.16	0.7
CGImp	(0.00)	0.6	0.6	0.00	0.00	0.8	0.59	0.6	1.21	0.2	0.24	0.6
M&Avalue	(0.00)	0.9	(-0.00)	0.8	(0.00)	0.9	(-0.03)	0.7	0.01	0.8	0.01	0.7
Gov.Expend	(-0.00)	0.3	(-0.00)	0.7	(-0.00)	0.5	0.35	0.05	0.40	0.01	0.13	0.1

(Continued) Table 7.10 Results of estimates for VAR(1) model

	Dependent Variable ImpEU		Dependent Variable CGExp		Dependent Variable CGImp		Dependent Variable M&A		Dependent Variable GovExp	
	Coef.	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**
Intercept	142	0.9	5458	0.6	(-4697)	0.6	11847	0.8	629	0.9
ROP	23947	0.6	(-10265)	0.8	37839	0.4	28204	0.9	(-43580)	0.6
OCC	1355	0.7	(-2270)	0.5	2776	0.4	5959	0.7	1503	0.8
ROE	(-6501)	0.6	4993	0.5	(-10524)	0.3	(-21113)	0.7	4773	0.8
EXP	0.12	0.5	0.31	004	(-0.01)	0.9	(-0.25)	0.7	(-0.71)	0.03
IMP	0.01	0.9	(-0.41)	0.03	(-0.15)	0.4	(-0.39)	0.7	0.78	0.06
ExpToEU	(-0.11)	0.5	(-0.05)	0.6	(-0.06)	0.69	(-0.12)	0.8	(-0.24)	0.4
ImpFromEU	0.87	0.00	0.21	0.17	0.20	0.2	0.44	0.6	(-0.36)	0.2
CGExp	(-0.25)	0.6	0.79	.06	0.96	0.04	2.22	0.4	(-0.34)	0.7
CGImp	0.16	0.7	0.33	0.4	0.27	0.6	0.56	0.8	0.30	0.7
M&Avalue	0.04	0.4	0.01	0.8	0.007	0.8	(-0.18)	0.4	(-0.10)	0.2
Gov.Expend	0.02	0.8	0.01	0.8	0.02	0.7	(-0.25)	0.5	1.28	0.00

Note: Critical value for P-Value is 0.05, any values more than that is not significant.

Table 7.11 Vector Autoregressions (2)

```
. var rop occ roe exp imp exptoeu impfromeu cgexp cgimp mavalue govexp, lags(1/2)

Vector autoregression

Sample:  1972 - 2003                            No. of obs      =        32
Log likelihood = -756.0423                      AIC             =  63.06514
FPE            =  4.09e+15                      HQIC            =  66.90639
Det(Sigma_ml)  =   9211799                      SBIC            =  74.65362

Equation           Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
rop                   23     .041839   0.8653   205.6193   0.0000
occ                   23     .488981   0.8766   227.3726   0.0000
roe                   23     .322076   0.8814   237.8485   0.0000
exp                   23     3170.21   0.9992   39468.61   0.0000
imp                   23     4819.99   0.9987   24438.49   0.0000
exptoeu               23     1695.59   0.9993   45565.48   0.0000
impfromeu             23     3436.06   0.9976   13389.89   0.0000
cgexp                 23     1695.93   0.9981   17128.08   0.0000
cgimp                 23     2080.86   0.9976   13584.81   0.0000
mavalue               23     7828.04   0.9564    701.691   0.0000
govexp                23     3067.69   0.9993   49062.22   0.0000
------------------------------------------------------------------
```

Table 7.12 Results of estimates for VAR(2) model

	Dependent Variable IMPfrEU		Dependent Variable CGEXP		Dependent Variable CGIMP		Dependent Variable M&A		Dependent Variable GOVExp	
	Coef.	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**	**Coef.**	**P-Val**
Intercept	21736	0.1	17764	0.02	25520	0.01	257657	0.00	(-50215)	0.001
ROP L1.	(-38255)	0.4	(-29340)	0.1	(-31656)	0.2	(-446696)	0.0	109825	0.007
ROP L2.	(-63562)	0.1	(-568)	0.006	(-7786)	0.002	(-602556)	0.0	102910	0.005
OCC L1.	(-3792)	0.2	(-4065)	0.01	(-2684)	0.1	(-41997)	0.0	8052	0.009
OCC L2.	(-4848)	0.1	(-3909)	0.02	(-3717)	0.08	(-44893)	0.0	1516	0.6
ROE L1.	14101	0.1	12027	0.01	8580	0.1	130374	0.0	(-25533)	0.006
ROE L2.	13945	0.1	13314	0.004	15124	0.008	140238	0.0	(-14994)	0.07
EXP L1.	0.30	0.5	0.13	0.5	0.08	0.7	5.31	0.0	(-0.69)	0.1
EXP L2.	0.74	0.01	0.76	0.00	0.83	0.00	4.11	0.00	(-0.72)	0.006
IMP L1.	(-0.77)	0.1	(-0.15)	0.5	(-0.40)	0.2	(-6.01)	0.00	1.39	0.006
IMP L2.	(-0.23)	0.3	(-1.00)	0.00	(-1.06)	0.00	(-5.72)	0.00	1.19	0.00
ExptoEU L1.	(-0.83)	0.1	(-0.42)	0.1	(-0.59)	0.1	(-4.71)	0.001	(-0.50)	0.3
ExptoEU L2.	(-0.21)	0.2	(-0.06)	0.4	(-0.21)	0.03	(-0.98)	0.01	0.31	0.03
ImpfrEU L1.	1.01	0.009	0.01	0.9	0.25	0.2	3.02	0.001	(-0.08)	0.7
ImpFrEU L2.	0.10	0.5	0.43	0.00	0.48	0.00	1.16	0.006	(-0.84)	0.00
CGEXP L1.	0.76	0.1	1.47	0.00	1.25	0.00	(-2.50)	0.06	(-0.73)	0.1
CGEXP L2.	(-2.86)	0.00	(-1.70)	0.00	(-2.02)	0.00	(-12.63	0.00	2.82	0.00
CGIMP L1.	1.38	0.06	0.67	0.07	0.75	0.1	9.46	0.00	(-1.46)	0.03
CGIMP L2.	1.37	0.03	1.40	0.00	2.57	0.00	18.69	0.00	(-2.48)	0.00
M&Aalue L1.	0.03	0.4	(-0.06)	0.005	0.00	0.9	(-0.53)	0.00	(-0.02)	0.5
M&Avalue L2.	0.04	0.2	(-0.08)	0.00	(-0.10)	0.00	(-0.79)	0.00	(-0.15)	0.00
GovExp L1.	0.45	0.2	0.50	0.008	0.25	0.2	4.28	0.00	1.19	0.001
GovExp L2.	(-0.08)	0.8	(-0.36)	0.05	(-0.01)	0.9	(-4.04)	0.00	(-0.26)	0.4

Note: Critical value for P-Value is 0.05, any values more than that is not significant.

If the coefficients are to be significant, their P-values should be less than 0.05. In VAR(1) model, we cannot find many significant P-values. There is only a significant relationship between the rate of profit and organic composition of capital. On a descriptive statistics level, I find that in the same model the R^2 for the rate of profit, organic composition of capital, rate of exploitation, export, import, export to EU, import from EU, capital goods export, capital goods import, mergers and acquisition and government expenditure are 0.69, 0.73, 0.74, 0.99, 0.99, 0.99, 0.99 0.98, 0.98, 0.51 and 0.99 respectively. However in our VAR(2) model the R^2 has improved to 0.86, 0.87, 0.88, 0.99, 0.99, 0.99, 0.99, 0.99, 0.99, 0.95 and 0.99 for the rate of profit, organic composition of capital, rate of exploitation,

export, import, export to EU, import from EU, capital goods export, capital goods import, mergers and acquisition and government expenditure respectively. VAR(2) model also gives us a better estimate of variables with respect to P-values of variables in the equations. The significant relationship between the rate of profit and other variables has been summarised in Table 7.13.

Table 7.13 The effect of lagged ROP on other variables

	ROP	OCC	ROE	EXP	IMP	CGEXP	CGIMP	Gov.Exp	Gov.Exp
P-Value ROP	0.03 Lag2	0.002 Lag1	0.04 Lag1	0.05 Lag2	0.04 Lag2	0.006 Lag2	0.002 Lag2	0.007 Lag1	0.005 Lag2

Export to EU, import from EU and mergers and acquisition did not have significant influence on the rate of profit at this stage of the enquiry. But the values of the rate of profit have been affected by a two-year time lag of the rate of profit itself, export, import, capital goods export, capital goods import and government expenditure and also one year time lag of organic composition of capital, rate of exploitation and government expenditure (as before) have influenced the current values of the rate of profit.

Finally, I carried out diagnostic tests, using Granger causality Wald tests for the two models. The main results are summarised in the following tables:

Table 7.14 Granger causality Wald tests for VAR(1)

	Equation ROP $\chi 2$		**Equation OCC** $\chi 2$		**Equation ROE** $\chi 2$		**Equation EXP** $\chi 2$
occ	0.07216	**rop**	1.3975	**rop**	0.08819	**rop**	0.23911
roe	0.03092	**roe**	1.6914	**occ**	0.01807	**occ**	0.15999
exp	1.9813	**exp**	0.29673	**exp**	1.7523	**roe**	0.25401
imp	0.17373	**imp**	0.22237	**imp**	0.10035	**imp**	2.4764
exptoeu	0.19719	**exptoeu**	0.95003	**exptoeu**	0.08391	**exptoeu**	0.96021
impfromeu	2.6596	**impfromeu**	0.89602	**impfromeu**	1.7828	**impfromeu**	1.2767
cgexp	0.39392	**cgexp**	0.44557	**cgexp**	0.91758	**cgexp**	0.0998
cgimp	0.15114	**cgimp**	0.1947	**cgimp**	0.05277	**cgimp**	0.26279
mavalue	0.0009	**mavalue**	0.04007	**mavalue**	0.00107	**mavalue**	0.1416
govexp	0.74929	**govexp**	0.14475	**govexp**	0.32318	**govexp**	3.7636

	Equation IMP		Equation ExptoEU		Equation ImpfrEU		Equation CGEXP
	χ^2		χ^2		χ^2		χ^2
rop	0.00998	**rop**	0.22058	**rop**	0.19602	**rop**	0.06384
occ	0.092	**occ**	0.00073	**occ**	0.08249	**occ**	0.41053
roe	0.03846	**roe**	0.00805	**roe**	0.27184	**roe**	0.28421
exp	0.48218	**exp**	7.2451	**exp**	0.36301	**exp**	4.1562
exptoeu	2.8809	**imp**	4.0989	**imp**	0.00208	**imp**	4.4184
impfromeu	2.2558	**impfromeu**	8.7278	**exptoeu**	0.40761	**exptoeu**	0.15219
cgexp	0.313	**cgexp**	0.09039	**cgexp**	0.19642	**impfromeu**	1.8668
cgimp	1.2713	**cgimp**	0.17104	**cgimp**	0.06884	**cgimp**	0.50075
mavalue	0.04196	**mavalue**	0.10464	**mavalue**	0.68691	**mavalue**	0.06352
govexp	5.7565	**govexp**	1.9836	**govexp**	0.05537	**govexp**	0.04917

	Equation CGIMP		Equation M&A		Equation GovExp
	χ^2		χ^2		χ^2
rop	0.70818	**rop**	0.01295	**rop**	0.24881
occ	0.50097	**occ**	0.076	**occ**	0.0389
roe	1.0308	**roe**	0.13659	**roe**	0.05615
exp	0.00415	**exp**	0.07547	**exp**	4.7327
imp	0.47597	**imp**	0.10778	**imp**	3.3966
exptoeu	0.15156	**exptoeu**	0.02311	**exptoeu**	0.65463
impfromeu	1.426	**impfromeu**	0.2093	**impfromeu**	1.1399
cgexp	4.0191	**cgexp**	0.70925	**cgexp**	0.13786
mavalue	0.02725	**cgimp**	0.03766	**cgimp**	0.08732
govexp	0.07879	**govexp**	0.30164	**mavalue**	1.5515

Table **7.15** Granger causality Wald tests for VAR(2)

	Equation ROP		Equation OCC		Equation ROE		Equation EXP
	χ^2		χ^2		χ^2		χ^2
occ	0.36458	**rop**	9.6044	**rop**	5.8119	**rop**	3.6089
roe	0.99448	**roe**	4.5856	**occ**	1.8042	**occ**	2.944
exp	13.883	**exp**	13.008	**exp**	18.034	**roe**	5.0034
imp	12.264	**imp**	9.8774	**imp**	15.203	**imp**	103.32
exptoeu	0.73461	**exptoeu**	11.128	**exptoeu**	6.0098	**exptoeu**	3.7831
impfromeu	4.0915	**impfromeu**	4.925	**impfromeu**	5.4986	**impfromeu**	6.7574
cgexp	1.5497	**cgexp**	3.7888	**cgexp**	3.6892	**cgexp**	46.467
cgimp	0.80663	**cgimp**	0.53219	**cgimp**	0.65198	**cgimp**	17.834
mavalue	1.0612	**mavalue**	0.02739	**mavalue**	0.38635	**mavalue**	66.378
govexp	15.964	**govexp**	17.285	**govexp**	22.85	**govexp**	51.318

	Equation IMP χ^2		Equation ExptoEU χ^2		Equation ImpfrEU χ^2		Equation CGEXP χ^2
rop	5.2399	**rop**	2.4528	**rop**	3.2101	**rop**	9.8624
occ	1.0205	**occ**	7.0109	**occ**	2.5099	**occ**	8.663
roe	3.7246	**roe**	11.318	**roe**	3.5729	**roe**	12.154
exp	14.178	**exp**	72.621	**exp**	7.0745	**exp**	28.976
exptoeu	11.594	**imp**	72.741	**imp**	2.9621	**imp**	67.193
impfromeu	10.408	**impfromeu**	32.131	**exptoeu**	4.0796	**exptoeu**	2.7916
cgexp	15.632	**cgexp**	136.77	**cgexp**	20.679	**impfromeu**	24.377
cgimp	18.06	**cgimp**	36.17	**cgimp**	4.9332	**cgimp**	22.808
mavalue	5.9572	**mavalue**	45.165	**mavalue**	1.8231	**mavalue**	28.832
govexp	30.143	**govexp**	58.943	**govexp**	7.949	**govexp**	9.6944

	Equation CGIMP χ^2		Equation M&A χ^2		Equation GovEXP χ^2
rop	11.36	**rop**	62.531	**rop**	15.937
occ	3.8121	**occ**	48.146	**occ**	6.849
roe	8.0498	**roe**	64.756	**roe**	9.6748
exp	22.311	**exp**	63.964	**exp**	10.686
imp	51.967	**imp**	130.19	**imp**	38.633
exptoeu	8.4535	**exptoeu**	20.949	**exptoeu**	4.6035
impfromeu	23.861	**impfromeu**	26.785	**impfromeu**	29.058
cgexp	37.32	**cgexp**	78.844	**cgexp**	25.198
mavalue	22.774	**cgimp**	185.78	**cgimp**	20.336
govexp	8.9288	**govexp**	23.795	**mavalue**	20.281

Here χ^2 is our measure of significance in the Granger causality Wald tests. χ^2 with one degree of freedom at 0.05 is 3.84, and χ^2 with two degrees of freedom at 0.05 is 5.99. Therefore, our χ^2 estimates should not be less than 3.84 for the VAR(1) and 5.99 for the VAR(2) models. Once again the VAR(1) model is not as good as the VAR(2) one. In the former one, we have only 7 coefficients with significant values, whereas in the latter model, we have 72 significant coefficients. It has been proven again that VAR(2), which has got a good explanatory power, is a better model.

As we are mainly concerned about the rate of profit variable, we want to see what variables influence or are the Granger cause of rate of profit. We could not see the same clarity in a multiple regression as the degree of causality could have been misleading when an important variable might not be present. Furthermore, there are a lot of regressions and it is not obvious

to observe which variable is the cause of the other one. For instance when you run a regression of Y = rate of profit on X = rate of exploitation, it is not possible to say that only increase in the rate of exploitation causes increase in the rate of profit, namely X causes Y. However, one may argue that Y causes X, since increase in the rate of profit will encourage capitalists to invest in the means of production, that is to say to purchase more efficient machinery, which reduces the waste of raw materials and minimises the cost. In return the volume of relative surplus value increases. Therefore the causality could run in both directions.

However, Our VAR(2) provides a framework for the notion of Granger causality by stating that, for example if the past values of rate of profit can help to explain the rate of exploitation. Then rate of profit Granger causes rate of exploitation, or in other words the past values of rate of profit have explanatory power for current and future values of the rate of exploitation. Having mentioned that, if Granger causality holds, it does not necessarily mean that X causes Y. In our example, it at least helps to understand that rate of profit might be causing rate of exploitation.

Here we do find evidence that export, import and government expenditure Granger cause rate of profit. Indicating that last year's export, import and government expenditure have strong explanatory power for the rate of profit. We also find that the rate of profit Granger causes organic composition of capital, capital goods export, capital goods import, merger and acquisition, government expenditure and almost the rate of exploitation (χ^2 is very close to the critical value). Granger causality Wald tests for VAR (2) exhibits that there are very strong Granger causality occurrence between the variables. This also means that these variables in our econometrics model are cointegrated. Past values of some variables significantly affect the present or future of the dependent variable in an equation in one way or another. Especially, export to EU, capital goods export, capital goods import, merger and acquisition and government expenditure have been influenced by almost the past values of all other variables. We can therefore predict that the future of these variables are affected by the past values of rate of profit, organic composition of capital, rate of exploitation, import, export, import from EU. They can also influence each other while they are in an explanatory variable position in an equation.

We have summarised the results of Granger causality in the following two figures and afterwards the cause and effect of the rate of profit and counteracting forces have been summarised in a circular flow.

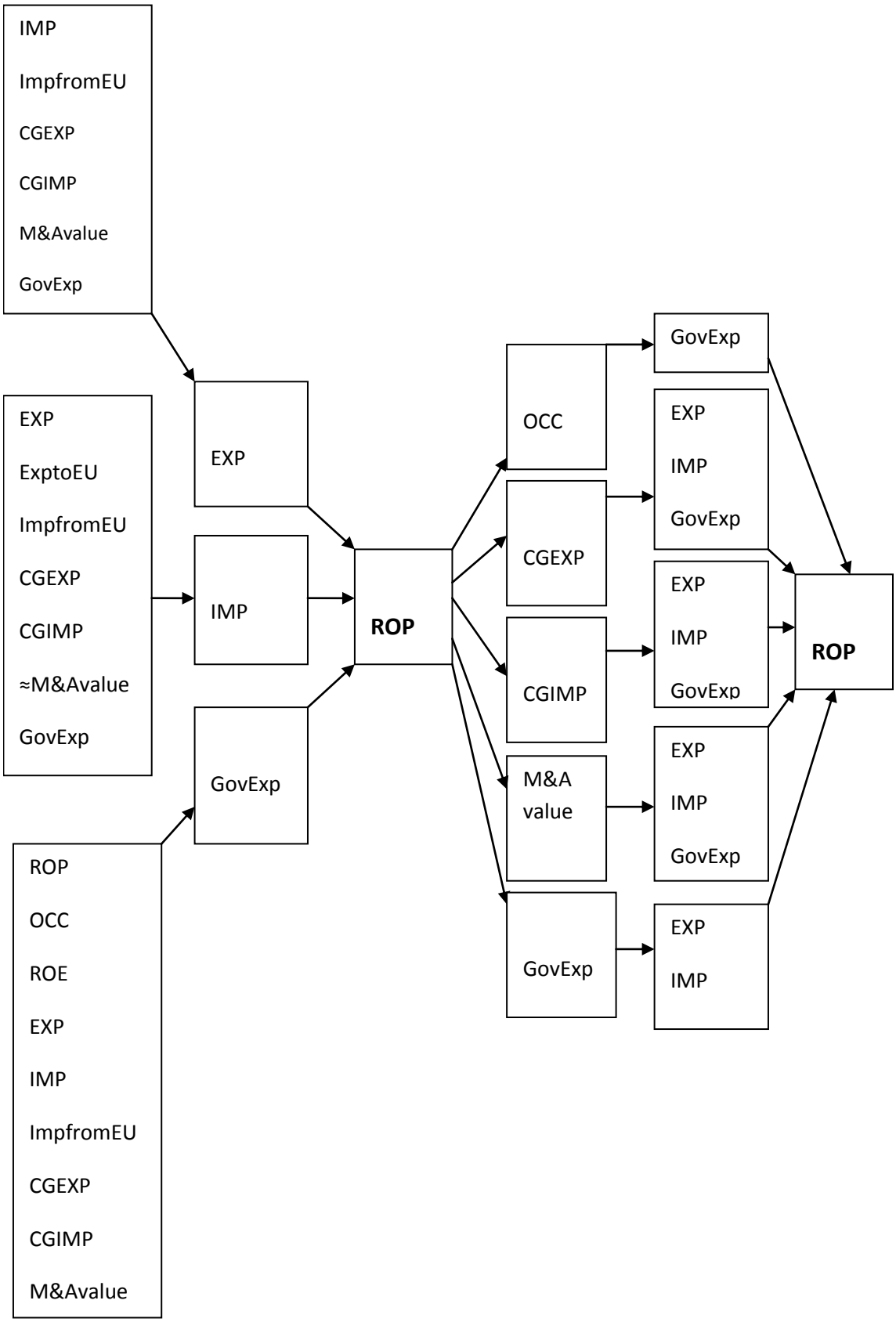


Fig 7.19 Granger causality of the rate of profit in relation to other variables

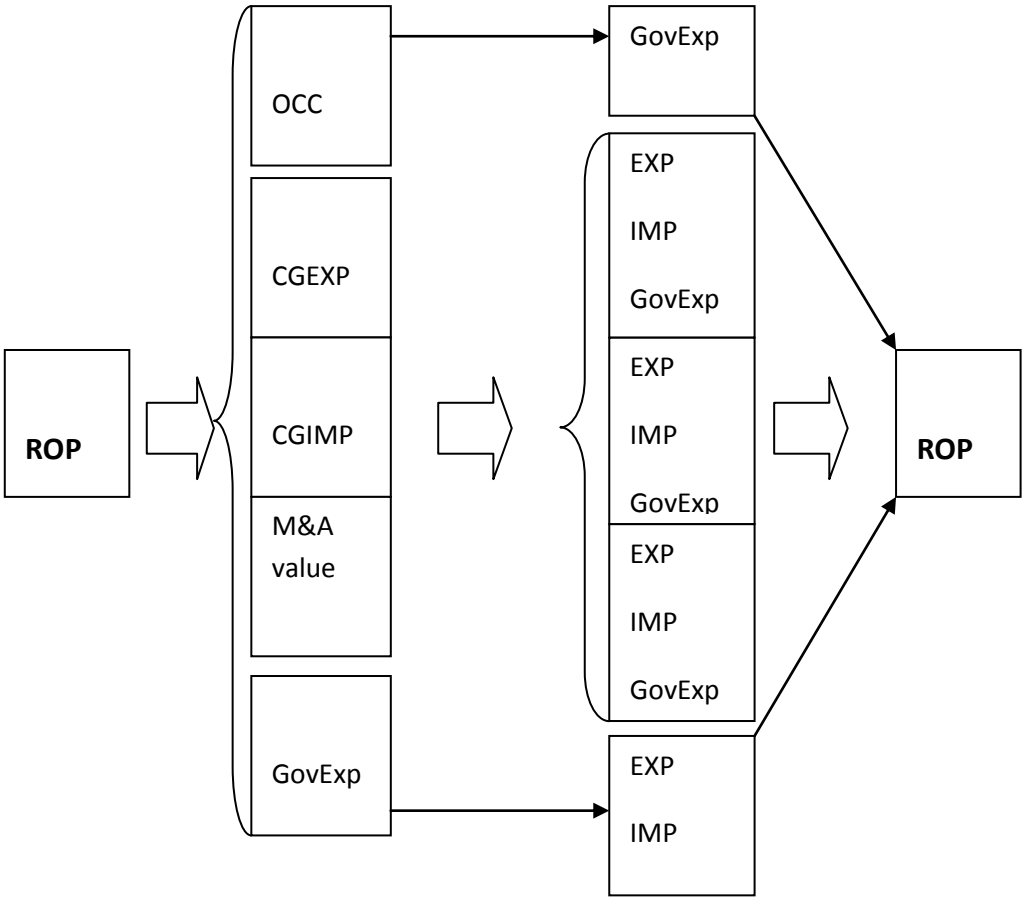


Fig. 7.20 Granger causality of the rate of profit and counteracting forces

From the above we can obtain the following circular flow of Granger causality.

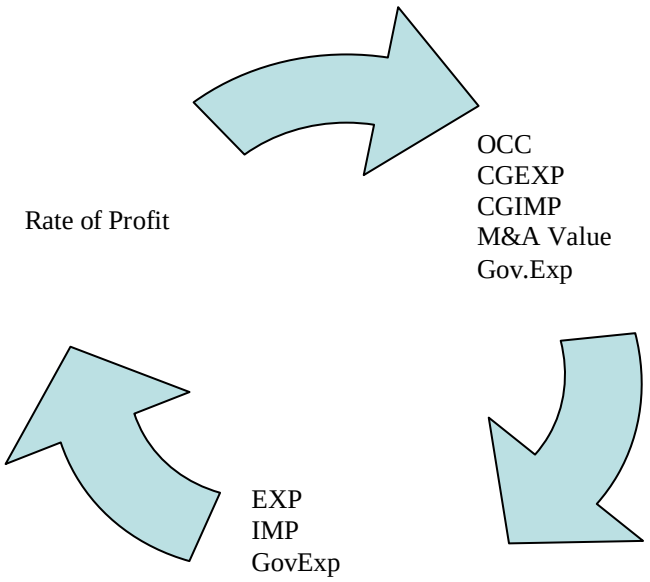


Fig. 7.21 Granger causality circular flow of the rate of profit and counteracting forces.

We can conclude the Granger causality by saying that if OCC, CGEXP, CGIMP, M&A Value are influenced by the rate of profit and if those variables influence EXP, IMP and GovExp which are granger cause of rate of profit, then OCC, CGEXP, CGIMP, M&A Value also influence the rate of profit. Having said that the government expenditure is the granger cause and the effect of rate of profit amongst the counteracting forces for the rate of profit to fall.

7.7 Conclusion

Now we are in a position to answer the questions proposed at the beginning of this chapter. We found that the empirical research shows that the rate of profit has been relatively stabilised especially after 1991 when the European Union consolidation, which influenced more than before the UK export to EU and import from those countries. In addition to other

counteracting forces, such as capital goods export, capital goods import, mergers and acquisitions and government expenditure.

In my estimates I used a time series model consisted of identification, estimation and diagnostic checking. VAR (2) seemed to be a suitable model for analysing our economic variables and related theories, after checking for the unit roots and cointegration. It is also a good model for forecasting the influence of the rate of profit on the other variables and also to be influenced by them. Our Granger causality flow diagram indicates the influence of the rate of profit on the counteracting forces for the falling rate of profit and vice versa.

Our contribution to the existing knowledge of the rate of profit estimates and counteracting forces as well as concluding remarks will be presented in the following chapter.

Chapter 8 Conclusions

The concluding remakes begins with my contribution to Marxian economics, both in theory and practice with regards to counteracting forces of the rate of profit to fall, in section one; section two focuses on the sources of my inspiration for writing this paper by Marx's economics and its relevance, with some adjustments, to current economic growth and crisis of capitalist mode of production; section three summarises empirical research influenced by Marx's 'the law of the tendency of the rate profit to fall' and section four puts forward some suggestions for the future research.

8.1 Contributions

This paper contributed to the existing knowledge of Marxian economics, especially with regards to counteracting factors of the profit rate. These new elements; mergers and acquisitions and government expenditure (plus capital goods export, capital goods imports – EU as the main partner of the UK) were influenced by the profit rate variable in the UK, exhibiting dynamism of capitalism in the new era, both in terms of economic growth and crisis. This research is the first attempt made to use VARs time series analysis with Granger causality diagnostic tests conducted for measuring Marxian categories of the rate of profit in the UK economy. It also revealed that Marxian economics is a dynamic theory which can explain uneven development of capitalism in the new epoch, as well as revealing incapability of orthodox and neoliberal theories in tackling the obstacles of the new phase of capitalist development.

8.2 Marx's relevance to 21st century political economy

One of the most important contributions to understanding capitalist development and its limits comes from Marx. In his method, which is from abstract to the concrete or from general to specific, he analysed capitalism as a system of production, distribution, exchange and consumption in a market place. The market is where the exchange takes place, in forms of money and price. Goods and services produced in the economy are exchanged as commodities. A commodity has the two characteristics of having use-value and exchange-value. Use-value is created by the concrete labour and exchange-value by the abstract labour.

Capitalist production occurs not directly for the sake of use-value but for its exchange-value. This exchange-value is the labour-time, which is socially necessary in a perfect competitive market to produce commodities. Marx defines it as the number of hours necessary to produce a commodity under the normal condition of production, with the average degree of skills, technique of production and intensity dominant at the time.

Although the 'golden age' of capitalism' had come to an end in early 1970s by going through a deep recession in the form of energy crisis in industrialised countries between 1974 and 1976, the emergence of the East Asia's "Tiger economies", and opening up the Eastern European markets gave hope for economic prosperity in the long term. But the uneven development of capitalism, the recent examples China and India, and economic crisis can be better explained by Marxian economic theories. Marx's insight says that capitalism creates economic growth, development and crisis, as we discussed in Chapters 1 and 2. We cannot see only one aspect of it and forget about the other. We cannot only argue about the progressive side of it without taking into account the negative side and fundamentally the destructive side of this system of production. That means we cannot forget about the economic crisis as a coherent part of a capitalist economy.

However, a capitalist system is a production orientated, not consumption one. In a free market economy capitalists compete against each other to produce more commodities with less exchange-value embodied in each unit of commodity produced in order to be able to increase their profit. This could be done by introducing before than other competitors a new technology in the production process (innovation). When other rivals use the same technology, their profit falls back to the same normal profits as other producers. Actually capitalists are forced by the pressure of competition to reinvest and accumulate capital, in order to survive. This use of machinery or the application of science to production causes the proportion of constant capital (c) to variable capital (v), or organic composition of capital (c/v) to increase throughout the time, which leads to concentration and centralisation of capital. Therefore, their profit, or surplus-value extracted from the productive labour employed by the capital, to be reduced due to this increases in the organic composition of capital. Marx related his theory of a rising the organic composition of capital to his "law" of the falling tendency of the rate of profit. However Marx emphasises that this is only a tendency of the rate of profit to fall. He puts forward counteracting tendencies that hinder the fall in the rate of profit, as discussed in Chapter 2. But Marx was mainly concerned about

counteracting tendencies in a domestic market. These counteracting forces could be developed mainly in an external market, especially in the era of monopoly capital when big corporate can benefit from lower organic composition of capital, cheap labour, land and raw materials in an underdeveloped country through unequal exchange, as it has been discussed by Marxist political economists.

8.3 Evaluating falling profit rate and counteracting forces' empirical research

To examine Marx's "law" of the falling rate of profit, some empirical analysis have been carried out by Marxian and neo-Marxian variants, discussed in Chapter 3 and in sections 2 and 3 of Chapter 7. Marxists in general have emphasised the sphere of production in the economy, and in the first place, the rise in the organic composition of capital. Neo-Marxists have concentrated on the sphere of circulation of capital, on the distribution of income and consumption. For instance some argue that 'profit squeeze' and 'class conflict' have affected the rate of profit to fall. 'Underconsumptionist' theories are also focus on the sphere of circulation by saying that the threat to profitability arises from difficulties in realisation of surplus-value, i.e. selling the produced commodities at profitable prices. In other words demand conditions prevent the capitalists from selling their output.

In general all different variants of Marxian and neo-Marxian crisis theory in relation to the falling rate of profit have emphasised only one aspect of capitalist mode of production. They have emphasised on the following spheres: production, distribution, exchange or consumption in relation to the falling rate of profit, rather than finding out the dialectical relationship between these spheres and economic crisis. Furthermore, they have tended to overlook the fact that a capitalist system of production is a dynamic system of production, which could overcome its crisis of profitability, though temporarily, by the use of counteracting tendencies of the rate of profit to fall.

Especially the government plays a crucial role by intervening when there is a substantial problem in the economy by increasing public expenditure, changing the tax and interest rates, using both fiscal and monetary policies. These in turn create their own problems of inflation, unemployment, stagflation that have become one coherent part of capitalist production, especially after the WWII. In the case of UK and Europe in general, their foreign policy is

towards more economic and political integration of Europe, and having a protectionist policy towards other countries and in the first place newly growing developing countries.

Having summarised empirical research in Marxian variables in relation to the falling rate of profit and counteracting tendencies, I carried out my own estimates in the UK economy. First of all I tried to apply Marx's theory to manufacturing industries for c, v, s, the organic composition of capital (occ) and the rate of profit (rop) after World War II. I found that variable capital (v) (productive labour), which is one major component of the organic composition of capital and the rate of profit has decreased 40 % from 1949 to 2004, in those industries. But the rate of profit increased by 78%. This magnitude of the rate of profit seems to be inconsistent with Marx's theory, even if taking into account the counteracting tendencies of the falling rate of profit. Therefore, I tried to find out an estimate of the rate of profit, which could explain more realistically the new phase of capitalist development and the crisis inherent in it.

So I conducted an alternative approach to manufacturing industries, by estimating the mentioned variables in production industries from 1949 to 2003, discussed in Chapter 7. However in this alternative approach, I found that the rate of profit has been more stable and steadier than that of the manufacturing industries. The rate of profit has been stabilised and fluctuated mainly around the index year in 1949. This could be explained due to the influence of the counteracting forces for the rate of profit to fall, I carried out VARs time series analysis with Granger causality Wald tests in production industries in measuring Marxian variables; mergers and acquisitions, government expenditure, capital goods export, capital goods import (EU as the main trading partner of the UK) are influenced by the rate of profit. The first two counteracting forces are new elements in addition to other factors discussed theoretically by Marx.

I also found that there is a strong correlation between the rate of exploitation and the rate of profit. That is as the rate of exploitation increases the rate of profit tends to increase as well. It could have been explained by Marx's theory as one aspect of counteracting tendency of the rate of profit to fall by increasing absolute and relative exploitation. However, we expect from Marx's theory as the organic composition of capital increases, the rate of profit tends to fall as one major tendency of the capitalist economy, which constitutes one of the most important foundations of capitalist economy in a long run, and eventually destroys a capitalist

mode of production. In my statistical time-series estimates, although there is a negative correlation between the rate of profit and the organic composition of capital, the coefficient is not a very strong one. Whereas the coefficient for the rate of exploitation, which shows a positive correlation between the rate of profit and rate of exploitation, is a very strong one. This could be explained in terms of monopoly capital and especially mergers amongst the firms**.** We have a lot of mergers and acquisitions between companies in the UK amongst themselves or other international companies in recent years especially from 1999 onwards.

This is not through competition and vertical expansion of the firms, but mainly through M&A and horizontal expansion, which does not necessarily increase very significantly the percentage of c/v (the organic composition of capital), which could lead to the rate of profit to fall. On the contrary it increases the monopoly power of a firm by securing more profits and therefore increasing the rate of profit.

Furthermore, UK trade with European Union, which has grown from 25 to 27 member states from May 2004 to January 2007, has had a positive effect on the rate of profit, discussed in Chapter 2 and section 5 in Chapter 6. In other words it has worked as another counteracting force against the rate of profit to fall.

In addition in a mixed economy the government intervention, as discussed above, is another major element for counteracting tendency of the rate of profit to fall. In this paper I have tried to answer the question of as to how unproductive capital and labour have been sustained and are expanding because of the government intervention in the economy, which is necessary for the survival of a capitalist system of production. This government intervention has an important role in the materialisation or realisation of surplus labour in the form of surplus products. This system of production based on commodity production, with monopolistic or oligopolistic power of companies over production, distribution, exchange, as well as consumption (for instance, investment in productive capital and also psychological warfare on consumers to buy newly produced, "fashionable" products, by the power of media and advertisement). Therefore, the production is not necessarily according to the needs of the society, but only for the sake of profits and accumulation. As companies cannot sell all their outputs, government would step in to help them out, by their expenditure on both consumer and capital goods, on military and so on, even by nationalisation of the firms which go bankrupt or about to go bankrupt. Therefore, an army of unproductive labour, which is

necessary for the survival of the capitalist system of production, is created mainly by the government intervention. In addition unproductive capital expands either for financing the government PSBR, or supply of abandon credit to the households.

Companies merged nationally and internationally across the globe in order to counteract the tendency of the rate of profit to fall. These companies could do this, because of their monopoly the power and the help of their governments, which gave them advantage over smaller firms with the lower organic composition of capital, to export to other countries, and have access to cheap land, raw materials and labour (increases absolute and relative surplus value). So they are in a position to obtain super profit from all over the world.

Mergers and acquisitions in the form of industries concentration ratio, plus UK trade with EU in general and capital goods in particular and to a lesser effect the function of government expenditure and interest rates have worked as counteracting forces against falling rate of profit in the UK economy; discussed in Chapter 2 and estimated econometrically in Chapter 7. Therefore, we observe that the profit rate instead of falling has been relatively stabilised, especially after 1991.

However this could not last forever, as the surplus product could not be absorbed nationally and internationally. Therefore, the government should intervene in order to stop social unrest, strikes, and political and economic transformation of the society to a new mode of production, in which production is not for the profit, but for the needs of the society. By this intervention as the representative of capitalist class, government redistributes some surplus-value (government revenue) which have been taken through income, corporate, VAT and all other direct and indirect taxes in order to reduce the falling rate of profit. But by doing this, the problem of profitability cannot be postponed forever. Other types of crisis in the form of inflation, unemployment, hyperinflation, stagflation or stock market crashes are appearing on the surface of the economy, which in turn lead to the expansion of unproductive labour and capital, which subsequently pushes the rate of profit to fall nationally and globally. This would happen nearer and nearer as the global market becomes smaller and smaller, and the government gets a bigger share of surplus-value as their revenue in order to be able to increase their expenditure to increase 'effective demand' to slow down the falling rate of profit and the collapse of the entire capitalist system of production. On the other hand we are witnessing the ever increasing unproductive labour and unproductive capital, that again

would cause the rate of profit to fall as the surplus-value or surplus-labour is not invested in the production sphere, which discussed in Chapter 4, as a productive capital. Consequently less productive labour is recruited, in other words more reserve army of unemployment created. This would remind us of the 1930s crisis but in a deeper and wider scale, namely in the total global economy.

8.4 further research

First of all, productive labour in the sphere of circulation, distribution and exchange needs to be identified defined and measured as soon as new national data set available. The dual function of unproductive capital as a means for realisation of surplus value, therefore as an element for the economic growth, as well as economic crisis to be defined in the sphere of distribution and exchange. Then putting together all spheres and show their interactions in a total capitalist mode of production.

New counteracting forces for the falling profit rate to be identified defined and measured, which influence both variable and constant capital, and in the first place also influencing our organic composition of capital and consequently Marxian profit rate estimate; for example military capital or exploitation of migrant workers by the advanced countries.

With regard to our empirical investigation, the measure of profit rate needs to be extended to the latest data set available in the UK economy. In addition, for an international comparative economics, the transformation of prices of production into values which developed in Chapter 5 for the UK economy to be calculated for various countries, in order to find out how the ratio of value to the prices of production varies according to different composition of capital, which could have been used as an indication of economic growth and development in those countries, as well as transfer of labour value from one country to another.

Appendix A

Input-Output Tables

Table 4, the commodity by commodity domestic use matrix has been employed for doing the foregone calculations. It contains the following industries:

1 Agriculture
2 Forestry and fishing
3 Coal extraction etc.
4 Extraction of oil and gas
5 Mineral oil processing
6 Electricity etc.
7 Gas
8 Water
9 Extraction of metal ores etc.
10 Iron and steel etc.
11 Aluminium etc.
12 Other non-ferrous metals
13 Extraction of stone etc.
14 Clay products
15 Cement etc.
16 Concrete etc.
17 Glass
18 Refractory and ceramic goods
19 Inorganic chemicals
20 Organic chemicals
21 Fertilisers
22 Synthetic resins etc.
23 Paints, dyes etc.
24 Special chemicals
25 Pharmaceuticals
26 Soap and toiletries
27 Chemical products nes
28 Man-made fibbers
29 Metal castings etc.
30 Metal doors, windows etc.
31 Metal packaging products
32 Metal goods nes
33 Industrial plant & steelwork
34 Agricultural machinery etc.
35 Machine tools
36 Engineers small tools
37 Textile etc. Machinery
38 Process machinery etc.
39 Mining etc. Equipment
40 Men power transmission equipment
41 Other machinery etc.
42 Ordnance etc.
43 Office machinery, computers etc.
44 Insulated wires and cables

45 Basic electrical equipment
46 Industrial electrical equipment
47 Telecommunication etc. Equipment
48 Electronic components
49 Electric consumer goods etc.
50 Domestic electric appliances
51 Electric lighting equipment
52 Motor vehicles and parts
53 Shipbuilding & repairing
54 Aerospace etc.
55 Other vehicles
56 Instrument engineering
57 Oil and fats
58 Slaughtering & meat processing
59 Milk and milk processing
60 Fruit, veg and fish processing
61 Grain milling and starch
62 Bread. Biscuits etc.
63 Sugar
64 Confectionery
65 Animal feeding stuffs
66 Miscellaneous foods
67 Alcoholic drink
68 Soft drink
69 Tobacco
70 Woollen and worsted
71 Cotton etc, spinning & weaving
72 Hosiery & other knitted goods
73 Textile finishing
74 Carpets etc.
75 Jute etc.
76 Leather and leather goods
77 Footwear
78 Clothing and furs
79 Household and other textiles
80 Timber and wood products
81 Wooden furniture etc.
82 Pulp, paper and board
83 Paper and board products
85 Rubber products
86 Processing of plastics
87 Other manufacturing
88 Constructions
89 Distribution etc.
90 Hotels, catering etc.
91 Railways
92 Road transport etc.
93 Sea transport
94 Air transport
95 Transport services

96 Postal services
97 Telecommunications
98 Banking and finance
99 Insurance
100 Business services etc.
101 Other services

Sources: HMSO Input-output tables, 1988, published in 1994.

A.1 Data Inputs

A_{ij} = {{2303, 0, 8701, 6, 331, 8, 38},
{613, 17063, 6467, 631, 2878, 1837, 1496}
{4160, 2721, 46663, 8859, 9345, 2643, 6082}
{92,14,384,8974,782,64,1370}
{376,674,6566,930,1656,900,842}
{225,1075,5032,512,2782,1977,1098}
{1380,2486,14760,5571,12188,1618,16499}
{1784,-15327,37173,-20349,2099,27304}};
CONE = {{2218, 10585,28474,2639,46022,3521,18809}};
GGFC = {{124,2375,9318,2562,3169,421,3728}};
GDFC = {{0,25,13287,26597,1417,577,2593}};
STOC = {{26,-1006,352,51,0,-49,-3}};
EX = {{1359,16708,48249,321,7892,6422,6796}};
IMP = {{1087,9490,29571,1837,1824,3109,1662}};
SFD = {{15,38,1235,122,113,108,208}};
TAX = {{-640,-973,2813,260,3231,-485,3086}};
IFE = {{1591,5736,48306,9524,26348,9202,33301}};
GP = {{3912,21348,9658,6622,8966,2612,20742}};

B_{ij} = {{2303,0,8701,6,331,8,38,1582}
{613,17063,6467,631,2878,1837,149,5916}
{4160,2721,4663,8859,9345,2643,6082,8905}
{92,14,384,8974,782,64,1370,771}
{376,674,6566,930,1656,900,842,2684}
{225,1075,5032,512,2782,1977,1098,3573}
{1380,2486,14760,5571,12188,1618,16499,7698}
{1784,-1554,-15327,37173,-20349,2099,27304,0}};

CC = {{1591,5736,48306,9524,26348,9202,33301,0}};
K = {{-534,7545,12901,20036,27644,-4992,-10739,0}};
WW = {{1591,5736,48306,9524,26348,9202,33301,0}};
SS = {{1503,25307,25693,-30169,32659,136,-3268,0}};

Appendix B: Data Tables

Table 1 – Estimate of variables in manufacturing industries[1]

	Line 1	Line 2	Line 3	Line 4
	(£m)	(£m)	(£m)	(£m)
Year	**wages and salaries of operative workers**	**Gross domestic fixed capital formation**	**Purchases of materials & fuels**	**Net output**
1949	1743.758	397	5963.883	3964.674
1950	1768.599	466	6522.264	4151.324
1951	2074.881	542	9198.876	5044.521
1952	2253.713	573	9157.584	5157.398
1953	2408.891	561	9351.796	5583.478
1954	2609.264	593	9746.296	6266.331
1955	2878.635	734	10872.064	6820.494
1956	3089.436	854	11514.257	7179.197
1957	3239.312	947	12026.764	7535.04
1958	3219.283	922	12935	7848
1963	3986	1200	14807	10820
1968	5280	1592	20571	15289
1970	6624.4	2130	25656.9	18531.2
1971	7083.1	2187	26871.7	20623.7
1972	7572	2044	28425.5	22785.1
1973	8787.8	2437	34510.4	26600
1974	10547.2	3145	49820.6	33047.8
1975	12683	3449	53760	36948
1976	14412.9	3891	67625.9	44434.2
1977	15863	4717	78581.3	50862.4
1978	17622.8	5611	83000.5	56834.2
1979	19749.5	6490	88173	64143.5
1980	21930.6	6445	90151.7	68474.7
1981	21372.2	5315	90144.2	70614.5
1982	21672.8	5183	117590.1	74817.5
1983	22109.1	5859	125877.6	80804
1984	23650.6	7382	117334.7	87809.7
1985	25168.2	8735	125626.7	94385.1
1986	26400.6	8831	124742.4	100229.1
1987	27795.8	9950	135893.2	111301.6
1988	30117.8	11431	151355.6	123868.8

Table 1 - Continued
Estimate of variables in manufacturing industries

		Line 5	Line 6
	(£m)	(£m)	(£m)
Year	**v**	**c**	**s**
1949	1743.758	6360.883	2220.916
1950	1768.599	6988.264	2382.725
1951	2074.881	9740.876	2969.64
1952	2253.713	9730.584	2903.685
1953	2408.891	9912.796	3174.587
1954	2609.264	10339.296	3657.067
1955	2878.635	11606.064	3941.859
1956	3089.436	12368.257	4089.761
1957	3239.312	12973.764	4295.728
1958	3219.283	13857	4628.717
1963	3986	16007	6834
1968	5280	22163	10009
1970	6624.4	27786.9	11906.8
1971	7083.1	29058.7	13540.6
1972	7572	30469.5	15213.1
1973	8787.8	36947.4	17812.2
1974	10547.2	52965.6	22500.6
1975	12683	57209	24265
1976	14412.9	71516.9	30021.3
1977	15863	83298.3	34999.4
1978	17622.8	88611.5	39211.4
1979	19749.5	94663	44394
1980	21930.6	96596.7	46544.1
1981	21372.2	95459.2	49242.3
1982	21672.8	122773.1	53144.7
1983	22109.1	131736.6	58694.9
1984	23650.6	124716.7	64159.1
1985	25168.2	134361.7	69216.9
1986	26400.6	133573.4	73828.5
1987	27795.8	145843.2	83505.8
1988	30117.8	162786.6	93751

Table 1 - Continued
Estimate of variables in manufacturing industries

	Line 7	Line 8	Line 9
Year	**c/v**	**s/v**	**s/(c+v)**
1949	3.64	1.27	0.27
1950	3.95	1.34	0.27
1951	4.69	1.43	0.25
1952	4.31	1.28	0.24
1953	4.11	1.31	0.25
1954	3.96	1.4	0.28
1955	4.03	1.36	0.27
1956	4	1.32	0.26
1957	4	1.32	0.26
1958	4.3	1.43	0.27
1963	4.01	1.71	0.31
1968	4.19	1.89	0.36
1970	4.19	1.79	0.34
1971	4.1	1.91	0.37
1972	4.02	2	0.39
1973	4.2	2.02	0.38
1974	5.02	2.13	0.36
1975	4.51	1.88	0.34
1976	4.96	2.08	0.34
1977	5.25	2.2	0.35
1978	5.02	2.22	0.36
1979	4.79	2.24	0.38
1980	4.4	2.12	0.39
1981	4.46	2.3	0.42
1982	5.66	2.45	0.36
1983	5.95	2.65	0.38
1984	5.26	2.71	0.43
1985	5.33	2.75	0.43
1986	5.05	2.79	0.46
1987	5.24	3	0.48
1988	5.4	3.11	0.48

Sources: See section 6.4 of the text on data sources and methods.

1. Census of production does not provide data for 1959-1962, 1964-1967 and 1969.

Table 2 - Employment in manufacturing industries[1]

Percentage of Employment in Manufacturing Industries

Year	Operative Workers / Total Employment[2]	Index	Other Workers[3] / Total Emp.	Index	Operative W+ Other W / Total Employment	Index
1949	0.25	100	0.05	100	0.3	100
1950	0.24	96	0.04	80	0.29	97
1951	0.26	104	0.05	100	0.31	103
1952	0.26	104	0.05	100	0.31	103
1953	0.26	104	0.05	100	0.32	107
1954	0.26	104	0.05	100	0.32	107
1955	0.26	104	0.06	120	0.032	107
1956	0.26	104	0.06	120	0.32	107
1957	0.25	100	0.06	120	0.32	107
1958	0.25	100	0.06	120	0.32	107
1963	0.23	92	0.07	140	0.31	103
1968	0.22	88	0.07	140	0.3	100
1970	0.23	92	0.08	160	0.32	107
1971	0.23	92	0.08	160	0.31	103
1972	0.22	88	0.08	160	0.3	100
1973	0.22	88	0.07	140	0.3	100
1974	0.22	88	0.08	160	0.3	100
1975	0.21	84	0.08	160	0.29	97
1976	0.21	84	0.08	160	0.29	97
1977	0.2	80	0.08	160	0.28	93
1978	0.2	80	0.07	140	0.28	93
1979	0.19	76	0.07	140	0.26	87
1980	0.17	68	0.07	140	0.25	83
1981	0.16	64	0.07	140	0.23	77
1982	0.15	60	0.07	140	0.22	73
1983	0.14	56	0.06	120	0.21	70
1984	0.14	56	0.06	120	0.21	70
1985	0.13	52	0.06	120	0.2	67
1986	0.13	52	0.06	120	0.19	63
1987	0.13	52	0.06	120	0.19	63
1988	0.12	48	0.06	120	0.19	63

Table 2 continued

Employment in production industries[1]

Year	Total Employment In the UK[2]	Operative Workers Total Employment	Index	Other Workers[3] Total Employment	Index
1949	23052(000)	0.3	100	0.05	100
1950	23229	0.28	93	0.05	100
1951	23588	0.3	100	0.06	120
1952	23519	0.3	100	0.05	120
1953	23636	0.3	100	0.06	120
1954	23987	0.3	100	0.06	120
1955	24280	0.3	100	0.06	120
1956	24458	0.3	100	0.07	140
1957	24491	0.3	100	0.07	140
1958	24221	0.29	97	0.07	140
1963	25248	0.27	90	0.08	160
1968	25303	0.25	83	0.08	160
1970	24753	0.26	87	0.09	180
1971	24398	0.25	83	0.09	180
1972	24391	0.24	80	0.08	160
1973	24971	0.24	80	0.08	160
1974	25060	0.24	80	0.08	160
1975	24932	0.23	77	0.08	160
1976	24766	0.23	77	0.08	160
1977	24874	0.22	73	0.08	160
1978	25014	0.22	73	0.08	160
1979	25393	0.2	67	0.08	160
1980	25327	0.19	63	0.08	160
1981	24346	0.18	60	0.08	160
1982	23908	0.16	53	0.07	140
1983	23610	0.16	53	0.07	140
1984	24060	0.15	50	0.07	140
1985	24360	0.15	50	0.07	140
1986	24335	0.14	47	0.06	120
1987	24763	0.14	47	0.06	120
1988	25577	0.13	43	0.06	120

Table 2 continued

Employment in production industries[1]

Year	Operative + Other Workers[3] / Total Employment[2]	Index
1949	0.35	100
1950	0.34	97
1951	0.36	103
1952	0.37	106
1953	0.37	106
1954	0.37	106
1955	0.37	106
1956	0.37	106
1957	0.37	106
1958	0.37	106
1963	0.35	100
1968	0.33	94
1970	0.35	100
1971	0.34	97
1972	0.33	94
1973	0.32	91
1974	0.33	94
1975	0.32	91
1976	0.31	89
1977	0.31	89
1978	0.3	86
1979	0.29	83
1980	0.27	77
1981	0.26	74
1982	0.24	69
1983	0.23	66
1984	0.23	66
1985	0.22	63
1986	0.21	60
1987	0.21	60
1988	0.2	57

Sources: Total employment has been taken from the Annual Abstract of Statistics. Operative and other workers extracted from the Census of Production.

1. Production industries constitute divisions 1 to 4 SIC, revised 1980. These are energy and water supply industries plus manufacturing industries.
2. Total employment includes civil employment, HM forces and women services.
3. Other workers are administrative, technical and clerical employees.

Table 3 – Index of Employment in Manufacturing & Production Industries

Year	Manufacturing Industries Index	Production Industries Index
1949	100	100
1950	97	97
1951	103	103
1952	103	106
1953	107	106
1954	107	106
1955	107	106
1956	107	106
1957	107	106
1958	107	106
1963	103	100
1968	100	94
1970	107	100
1971	103	97
1972	100	94
1973	100	91
1974	100	94
1975	97	91
1976	97	89
1977	93	89
1978	93	86
1979	87	83
1980	83	77
1981	77	74
1982	73	69
1983	70	66
1984	70	66
1985	67	63
1986	63	60
1987	63	60
1988	63	57
1989	73	68
1990	73	68
1991	70	65
1992	66	62
1993	66	60
1994	60	54
1995	60	54
1996	60	54
1997	56	51
1998	56	51
1999	53	45
2000	50	45
2001	46	42
2002	43	40

2003	43	37
2004	40	37

Table 4 - Estimate of variables in Production Industries

	OCC	ROE	ROP
1949	3.232834598	1.182756392	0.279424193
1950	3.491636833	1.246829032	0.277589012
1951	4.123669806	1.322841658	0.258182457
1952	3.795764179	1.183997133	0.246883935
1953	3.645454397	1.221607403	0.262968334
1954	3.559283232	1.299847641	0.285099121
1955	3.644180367	1.280132464	0.27564228
1956	3.61201486	1.250599958	0.271161303
1957	3.60682215	1.250484719	0.271441935
1958	3.874863707	1.35954341	0.278888496
1963	3.826668728	1.714270048	0.355166295
1968	4.118251898	2.189475368	0.427777962
1970	4.125527035	1.884237705	0.367618333
1971	4.052802307	1.999845532	0.395789388
1972	3.941594694	2.087643747	0.422463572
1973	4.120652997	2.056743105	0.401656411
1974	4.845615262	2.161727458	0.369803239
1975	4.39145339	1.992536206	0.369573112
1976	4.816782796	2.188887914	0.376305596
1977	5.109894749	2.314104795	0.37874708
1978	4.88305235	2.307757777	0.392272181
1979	4.688511378	2.309641314	0.40601858
1980	2.540698322	0.728263104	0.205683466
1981	2.592260522	0.838674703	0.233467116
1982	3.188315971	0.930240852	0.22210379
1983	3.339352255	1.014442454	0.233777392
1984	3.134435929	0.98400832	0.23800304
1985	3.071419892	1.038212119	0.255000011
1986	2.801167701	1.058313619	0.278418029
1987	2.997384693	1.149958987	0.287677838
1988	3.029955665	1.225237644	0.304032537
1989	3.443825697	1.690602981	0.380438635
1990	3.513012678	1.649615396	0.365524211
1991	3.418201581	1.554936792	0.351938852
1992	2.652629229	1.104042187	0.302259583
1993	2.741854978	1.149111309	0.307096698
1994	2.852328196	1.179065481	0.306065688
1995	2.991853757	1.174803165	0.294300151
1996	3.067021513	1.206454854	0.296643342
1997	3.043368157	1.188956585	0.294051033
1998	2.846754961	1.028512342	0.267371422
1999	2.774228077	1.020578867	0.270407311
2000	2.815532583	1.049351045	0.275020858
2001	2.804095906	1.045017527	0.274708512
2002	2.745324954	1.033542816	0.275955446
2003	2.730204653	1.061856726	0.284664469

Table 4 Continued
Index of Estimate of variables in Production Industries

Year	OCC	Index	ROE	Index	ROP	Index
1949	3.23	100	1.18	100	0.27	100
1950	3.49	108	1.24	105	0.27	100
1951	4.12	128	1.32	112	0.25	93
1952	3.79	117	1.18	100	0.24	89
1953	3.64	113	1.22	103	0.26	96
1954	3.55	110	1.29	109	0.28	104
1955	3.64	113	1.28	109	0.27	100
1956	3.61	112	1.25	106	0.27	100
1957	3.6	111	1.25	106	0.27	100
1958	3.87	120	1.35	114	0.27	100
1963	3.82	118	1.71	145	0.35	129
1968	4.11	127	2.18	185	0.42	156
1970	4.12	128	1.88	159	0.36	133
1971	4.05	125	1.99	168	0.39	144
1972	3.94	122	2.08	176	0.44	156
1973	4.12	128	2.05	174	0.4	148
1974	4.84	150	2.16	183	0.36	133
1975	4.39	136	1.99	169	0.36	133
1976	4.18	129	2.18	185	0.37	137
1977	5.1	158	2.31	196	0.37	137
1978	4.88	151	2.3	195	0.39	144
1979	4.68	145	2.3	195	0.4	152
1980	2.54	79	0.72	61	0.2	74
1981	2.59	80	0.83	70	0.23	85
1982	3.18	98	0.93	79	0.22	81
1983	3.39	105	1.01	86	0.23	85
1984	3.13	97	0.98	83	0.23	85
1985	3.07	95	1.03	87	0.25	93
1986	2.8	87	1.05	89	0.27	100
1987	2.99	93	1.14	97	0.28	104
1988	3.02	93	1.22	103	0.3	111
1989	3.44	106	1.69	143	0.38	140
1990	3.51	109	1.64	139	0.36	133
1991	3.41	106	1.55	131	0.35	129
1992	2.65	82	1.1	93	0.3	111
1993	2.74	85	1.14	97	0.3	111
1994	2.85	88	1.17	99	0.3	111
1995	2.99	93	1.17	99	0.29	107
1996	3.06	95	1.2	102	0.29	107
1997	3.04	94	1.18	100	0.29	107
1998	2.84	88	1.02	86	0.26	96
1999	2.77	86	1.02	86	0.27	100
2000	2.81	87	1.04	88	0.27	100
2001	2.8	87	1.04	88	0.27	100
2002	2.74	85	1.03	87	0.27	100
2003	2.73	85	1.06	90	0.28	103

Table 5 – Bankruptcies and M&A in the UK economy

Year	Bankruptcies	M&A(Numbers)	M&A(Values)(£m)
1970	8844	793	1122
1971	8489	884	911
1972	8267	1210	2532
1973	7286	1205	1304
1974	7927	504	508
1975	9849	315	291
1976	10727	353	448
1977	10048	481	824
1978	9294	567	1140
1979	9090	534	1656
1980	11594	469	1475
1981	13058	452	1144
1982	16893	463	2206
1983	14038	447	2343
1984	14327	568	5474
1985	15546	474	7090
1986	15080	842	15370
1987	12045	1528	16539
1988	9939	1499	22839
1989	11028	1337	2750
1990	15649	779	8329
1991	22626	506	10434
1992	25251	432	5941
1993	21417	526	7063
1994	17293	674	8269
1995	15086	505	32600
1996	14024	584	30742
1997	13200	506	26829
1998	13868	635	29525
1999	14955	493	26163
2000	15036	587	106916
2001	15674	492	28994
2002	17196	430	25236
2003	14958	558	18679

Sources: Office for National Statistics and Annual Abstract of Statistics.

Table 6 – Index of Bankruptcies and M&A in the UK economy

	Bankruptcies	M&A(Numbers)	M&A(Values)(£m)
1970	100	100	100
1971	96	111	81
1972	93	153	226
1973	82	152	116
1974	90	64	45
1975	111	40	26
1976	121	45	40
1977	114	61	73
1978	105	71	102
1979	103	67	148
1980	131	59	131
1981	148	57	102
1982	191	58	197
1983	159	56	209
1984	162	72	488
1985	176	60	632
1986	171	106	1370
1987	136	193	1474
1988	112	189	2036
1989	125	169	245
1990	177	98	742
1991	256	64	930
1992	286	54	529
1993	242	66	629
1994	196	85	737
1995	171	64	2906
1996	159	74	2740
1997	149	64	2391
1998	157	80	2631
1999	169	62	2332
2000	170	74	9529
2001	177	62	2584
2002	194	54	2249
2003	169	70	1665

Table 7 – UK government expenditure

YEAR	ROP	GDP (£m)	Gov. Exp(£m)	Gov. Exp % of GDP
1949	0.27	12732	2225	17.475651
1950	0.27	13285	2315	17.425668
1951	0.25	14793	2701	18.258635
1952	0.24	16023	3185	19.87767
1953	0.26	17147	3305	19.274508
1954	0.28	18148	3389	18.674234
1955	0.27	19505	3466	17.769802
1956	0.27	20966	3742	17.847944
1957	0.27	22111	3908	17.674460
1958	0.27	23050	3984	17.284164
1963	0.35	30366	5176	17.045379
1968	0.42	43530	7951	18.265564
1970	0.36	51523	9385	18.215166
1971	0.39	57469	10692	18.604813
1972	0.44	64342	12192	18.948742
1973	0.4	74020	13940	18.832747
1974	0.36	83793	17260	20.598379
1975	0.36	105864	23806	22.487342
1976	0.37	125203	27877	22.265440
1977	0.37	145663	30439	20.896864
1978	0.39	167905	34483	20.537208
1979	0.4	197438	39991	20.254966
1980	0.2	230800	50298	21.792894
1981	0.23	253154	56899	22.476042
1982	0.22	277198	61970	22.355861
1983	0.23	302973	67329	22.222772
1984	0.23	324633	71351	21.978973
1985	0.25	355269	75471	21.243339
1986	0.27	381782	81200	21.268682
1987	0.28	420211	87147	20.738866
1988	0.3	469035	93925	20.025158
1989	0.38	514921	101646	19.740115
1990	0.36	558160	112414	20.140103
1991	0.35	587080	123787	21.085201
1992	0.3	611974	131562	21.497972
1993	0.3	642656	133641	20.795106
1994	0.3	680978	138112	20.281418
1995	0.29	719747	142898	19.853920
1996	0.29	765152	148626	19.424375
1997	0.29	811194	150554	18.559555
1998	0.26	860796	156409	18.170275
1999	0.27	906567	169520	18.699114
2000	0.27	953227	181851	19.077407
2001	0.27	996987	194503	19.509080

2002	0.27	1048767	212464	20.258455
2003	0.28	1110296	267530	24.095376

Source: The Blue Book

Table 8 – UK total Imp & Exp, UK Exp to EU & Imp from EU (£m)

Year	ROP	Total Exp	Exp to EU	Total Imp	Imp from EU
1949	0.27	1787.4	421	2277.5	456
1950	0.27	2174.2	596	2606.6	573
1951	0.25	581.6	703	3901.9	924
1952	0.24	2584.2	731	3477	738
1953	0.26	2582	760	3342.9	678
1954	0.28	2649.9	348.1	3359.2	390.6
1955	0.27	2876.7	374.5	3860.8	484.9
1956	0.27	3143.3	427.9	3861.5	492
1957	0.27	295	459.5	4043.7	491
1958	0.27	3176.2	418.9	3747.5	533.2
1963	0.35	4364.9	940.8	4983.4	790.8
1968	0.42	6433.9	1295.6	7897.5	1551.5
1970	0.36	8061.1	17531.1	9036.8	1822.4
1971	0.39	9290	2721.7	9980.1	2985.7
1972	0.44	9906.1	2999.2	11300.7	3586.7
1973	0.4	12657.4	4105.6	16067	5291.2
1974	0.36	16910	5617.7	23513.3	7802.3
1975	0.36	20198.4	6509.9	24431.2	8875.7
1976	0.37	26162.2	9304.5	31584	11526.3
1977	0.37	33330.9	12156.1	36978.2	14173.1
1978	0.39	35380.3	13620.8	39533	16547.1
1979	0.4	40637	17479.4	46924.9	20887.6
1980	0.2	47357.1	20542.6	49772.9	20574.2
1981	0.23	50998.1	21119.1	51168.6	21718
1982	0.22	55557.8	23123.6	56978.2	25269
1983	0.23	60684.3	26508.8	66101.1	30104.1
1984	0.23	70488.3	31506.7	78967.4	35159.3
1985	0.25	78391.8	36233.8	85027	39004.8
1986	0.27	72782	38393	85658	49532
1987	0.28	79760	43079	94043	55021
1988	0.3	82073	45324	106559	62020
1989	0.38	93725	52007	121826	70674
1990	0.36	103691	59789	126087	72802
1991	0.35	104819	63823	118872	67471
1992	0.3	108507	65465	125870	71931
1993	0.3	119145	66550	136177	72758
1994	0.3	135143	71644	146269	76082
1995	0.29	153577	83271	165600	87323
1996	0.29	167196	89124	180918	93503
1997	0.29	171923	89504	184265	93507
1998	0.26	164056	89241	185869	95466
1999	0.27	166166	91771	195217	99258
2000	0.27	187936	101464	220912	105678
2001	0.27	190055	103493	230703	113842
2002	0.27	186517	103250	233192	122706
2003	0.28	187846	99159	235136	121485

Source: Annual Abstract of Statistics

Table 9 - UK Exports & Imports of Capital Goods

Year	UK Exports (£m)	UK Imports (£m)
1949	357.9	50.9
1950	400.8	49.4
1951	505.8	68.5
1952	580.5	122.7
1953	569.9	107.9
1954	577.8	90.8
1955	649.4	115.3
1956	718.5	133.7
1957	785.8	151.2
1978	787.5	166
1959	857.2	203.5
1961	1071.5	315.1
1962	1110.7	324.9
1963	1204.4	346.3
1964	1207.8	454.1
1965	1298.7	496.8
1966	1429	580
1967	1428.1	696.2
1968	1733	869.5
1969	1945.9	947.4
1970	2235.8	1192.3
1971	2623.6	1274.1
1972	2752.8	1585.9
1973	3269.7	2414.5
1974	4255.8	3001.5
1975	5782	3337.9
1976	6993.4	4304.8
1977	8332.2	5294.8
1978	9220.7	6332.2
1979	9801.3	7426.6
1980	11464.2	7725.1
1981	11887.4	8880
1982	12958.4	10870.8
1983	12890.7	13231
1984	15435.6	16341.2
1985	18019.5	18371.3
1986	18316.8	19392.4
1987	20183	22254
1988	22917	26177
1989	26690	30383
1990	29619	30519
1991	29581	29434
1992	30694	31788
1993	35812	35769
1994	41595	40375
1995	49962	48127
1996	54158	53329
1997	56581	52829
1998	57159	60156
1999	57900	59736

2000	64821	71498
2001	66241	69460
2002	61410	68818
2003	54882	62607

Source: Annual Abstract of Statistics

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