The Rate of Surplus Value, the Composition of Capital, and the Rate of Profit in the Chinese Manufacturing Industry: 1978-2004

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ABSTRACT

This paper extends the empirical analysis of the movement of the rate of profit in the case of Chinese economy for the period 1978-2004. The rate of profit of manufacturing displays a declining tendency from the year 1978 to 1988, which precipitates in the period 1989-1998, and the tendency of the rate of profit becomes rising during the period 1999-2004. The rate of profit is viewed as the fundamental determinant of the rhythm of capital accumulation, and in the case of the Chinese economy the empirical evidence lends support to the idea that the movement of the rate of profit is consistent with the growth rate of output.

Key words**:** *Profit rate, Marxian economics, Chinese economy.*
JEL classifications**:** *C82, E24, O51.*

INTRODUCTION

In neoclassical economics, the overall level of rate of profit plays a negligible role in the determination of the dynamics of a capitalist economy. More specifically, in the long-run the growth rate of a typical capitalist economy is determined by some exogenous factors: in Solow-type models it is the exogenous technological progress that contributes to growth for the most part, while in the so-called new growth theories the exogenous parameters which reflect the subjective preferences and the technology to produce some accumulable factors (such as human capital, the diversity of products, the knowledge) play the dominant role (Barro and Sala-i-Martin, 1995; Glyn, 1997). Also in the short-run the fluctuations in the level of economic activity of a capitalist economy are governed by some exogenous technological shocks, according to the real business cycle approach, or that the aggregate demand differs from that expected in both the labour and product markets, according to the new classical approach or, finally, simply by market imperfections such as asymmetric information, monopolistic factors etc. as it has been argued by the new Keynesian approach (cf., Kydland and Prescott, 1982; Lucas, 1977; Mankiw and Romer, 1994).

Contrary to this tradition, the overall level of rate of profit occupied a central role in the determination of the dynamics of a capitalist economy in classical economics and especially in Marxian theory (Glyn, 1997; Howard and King, 1990, Tsoulfidis, 2006). Marx wrote that: 'the rate of profit is the compelling power of capitalist production, and only such things are produced as yield a profit' (Marx, 1976). The rate of profit influences the dynamic process of the economy through three main

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routes. Firstly, the rate of profit reflects the capacity of the capitalist class to accumulate capital: if the profit rate is considerably high, the capitalists gain more from the past investment and given the propensity to consume there are more funds to invest in the next period; if the profit rate is relatively low, the capitalists get less from past investment and given the propensity to consume there are less funds to invest in the next period. Consequently and according to Marxian theory, the rate of profit governs capital accumulation, which in its turn is the main determinant of the economic-social dynamics of the capitalist economy.

Secondly, the level of the rate of profit affects the accessibility of firms to credit. If the level of the profit rate is relatively high, the firm has easier access to credit from the financial system and then have greater potential for expansion. Conversely, if the level of the profit rate is relatively low, it is hard for the firm to get credit from the financial institutions.

Thirdly, as in the Keynesian tradition, the rate of profit influences the expectations of the capitalists. If the profit rate is relatively high, the capitalists will be optimistic and given the surplus drawn from business they will increase their investment, thus leading to the acceleration of capital accumulation; if the profit rate is relatively low, the capitalists will form pessimistic expectation about the future and, therefore, they will reduce their investment thereby decelerating the rate of capital accumulation leading to stagnation.

In Marxian theory, therefore, the performance of capitalist economies depends above all on the overall level of the rate of profit. When the rate of profit is relative high, the capitalist economy is prosperous: business investment is high, unemployment is relatively low, and the living standards of workers generally rise. However, when the rate of profit is low, prosperity turns into stagnation and depression: investment is low or nonexistent, unemployment is high, and living standards decline (Moseley, 2003).

AN OVERVIEW OF PREVIOUS STUDIES

Since the overall level of the rate of profit plays such an important role in the dynamics of the capitalist system, it comes as no surprise that generations of Marxist economists have paid generous attention to the long-term movement of the rate of profit. We can roughly divide those studies into two categories: theoretical studies and empirical studies, although often the demarcation line between them is not clear enough.

Theories of the Movement of Rate of Profit

In order to make our review more distinct in what follows we review some basic arguments of Marxian theory.

i. Value-transfer and value-creation: in the analytic framework of Marxian theory, there are two kinds of movement of value in the production process, one is the value-transfer process in which the value embedded in the means of production and raw materials is transferred into the new products, and another is the value-creation process in which the workers create new value through their use of labour power. The newly created value is distributed between capitalist and workers, with the share distributed to workers corresponding to their expended labour power, while the share distributed to capitalists corresponds to profit. Thus we can divide the value of the

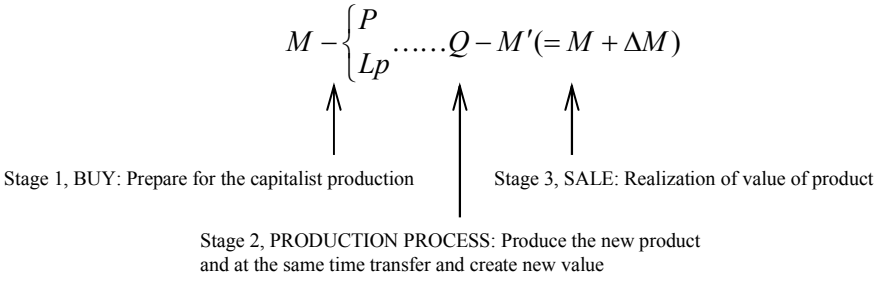
new product into three parts: The first one represents the consumption of the means of production and raw materials the value of which is transferred wholly into the new product during the production process. Marx calls this part of capital constant because it does not increase the value of the new product. The second part corresponds to the use of labour power and is called variable capital by Marx. This is so because the commodity labour power has the singular capacity to create more value than the portion of value, which is necessary for its own reproduction. Finally, the third part is that extra- portion of value created by labour during the production process, which is appropriated by capitalists as profit and which Marx calls surplus value. In a more complex capitalist system surplus value is also the source of other kinds of payments, such as interest, corporate taxation, and dividends.

ii. Surplus value, namely the profit of the capitalist class, is solely created by the use of labour power in the capitalist production process. In order that this process is performed, the capitalist must firstly buy means of production, raw materials and labour power in the market.

iii. The purpose of capitalist production is the expansion of profit as a purpose in itself. After the purchase of means of production, raw materials and labour power and the completion of the production process, the capitalist must sell the produced commodities and realise their value in the market. If this value however (including the surplus value) is not realised, then the capitalist not only will not have the necessary funds to finance the expansion of his activities, but may also not be able to recover the value of the materials used up in the production process or pay wages to the workers. And because the value is quality-indifferent and only quantity-different, the capitalist who acts as the anthropomorphized-capital has to reinvest the surplus value into the capitalist production again.

iv. There are inherent contradictions contained in the process described above. Firstly, the capitalist must compete with workers in the fields of labour market and of the production process. Secondly, the capitalists must compete with each other in the fields of factor markets and product markets. And thirdly, the capitalists of each nation have to compete with the state and foreign capitalists. All these kinds of competition can affect the production and realization of surplus value (profit).

We can summarise those points in the framework of the diagram of the circuit of capital:



In order for capitalists to draw profits they must pass successfully through the different phases of the circuit of capital. In fact, different theories of the movement of the rate of profit emphasize the problems in each of the three phases of the circuit of capital.

Rising Organic Composition of Capital as the Main Cause of Falling Rate of Profit

In Vol. III of Capital, Marx discussed the general movement of the rate of profit in a pure capitalist economy. And 'the law of the tendency of the rate of profit to fall' may be 'in every respect the most important law of the modern political economy and the most essential one for understanding the most complicated relationship. It is the most important law from the historical standpoint' (Marx, 1857). Marx focused his argument on the second stage of the circulation of capital, i.e. the production stage. It is consistent with Marx's method that production plays a crucial role in a social system.

Marx's argument is as follows: in the capitalist system, the most essential relationship is that between the capitalist class and the working class and this relationship is essentially antagonistic. This antagonistic relationship stems from the nature of the capitalist production process, which is oriented towards the extraction of the maximum possible profit. The way to extract profit is through the use of workers' labour power, which is the only source of the newly created value, and what the capitalists get is just what the workers create in excess of their value of labour power. This exploitation relationship can be cast in terms of modern game theory, where the problem of dividing-new-created-value is a zero-sum game. To be dominant in the process of dividing the newly created value, the capitalist must control the production process. And this effort leads to a progressive mechanization of the process of production.[1] In terms of Marxian theory this process is called the rising organic composition of capital.[2] And this causes the rate of profit to fall: if we define the rate of profit as the ratio of the surplus value (S) to the value of advanced capital (K), we get:

$$r = \frac{S}{K} \tag{1}$$

All variables are measured in values, relation (1) can be stated as follows:

$$r = \frac{S/V}{K/V} \tag{2}$$

Where the term (S/V) is the rate of surplus value, and (K/V) is the measure of the organic composition of capital. Given the rate of surplus value, a rise in the organic composition of capital leads the rate of profit to fall. In terms of growth rates, we get:

$$\hat{r} = (\hat{S/V}) - (\hat{K/V}) \tag{3}$$

This means that the movement of the rate of profit is governed by the relative movement of the rate of surplus value and the organic composition of capital. Even if the rate of surplus value increases with the process of mechanization, the rate of profit will decline if the organic composition of capital increases faster than the rate of surplus value.[3]

Marx himself also enumerates six factors, which act as counteracting factors to the falling tendency of the rate of profit, such as the cheapening of the elements of the

constant capital, the rising rate of exploitation, the depression of wages below their value, the rise in industrial reserve army, and the expansion of foreign trade. Marx argued that those factors can only counteract the influence of the rising organic composition of capital on the rate of capital, while this dominant influence will eventually overcome all counteracting tendencies and lead to the fall in the rate of profit.

So we can classify Marx's argument, which emphasizes the rising organic composition of capital as one which focuses on the structural change that takes place during the process of the second stage of the circulation of capital.[4]

Profit-Squeeze as the Main Cause of the Falling Rate of Profit

The argument of theories of profit-squeeze shifts its focus from the second stage of the circulation of capital to the first stage of the circulation, i.e. from the area of production to the area of distribution.[5] The logic of those theories is essentially simple. Starting from the definition of the rate of profit as the ratio of the total profit (R) to the value of capital advanced:

$$r = \frac{R}{K} \tag{4}$$

After some algebraic arrangements, we get a new formula:

$$r = \frac{R}{Y} \cdot \frac{Y}{K} = \left(\frac{Y - W}{Y} \right) \cdot \frac{Y}{K} = \left(1 - \frac{W}{Y} \right) \cdot \frac{Y}{K} \tag{5}$$

in which W and Y denote the total income of the workers and the total value-added in the process of production. Thus W/Y is the share of the workers in the national income and Y/K can be interpreted as the "productivity" of capital. From the above it follows that the rate of profit is inversely related to the wage share in income, W/Y, and directly related to the "productivity" of capital, Y/K.

From the two variables, W/Y and Y/K, which can affect the rate of profit, the theories of profit-squeeze argue that the raising W/Y is the main cause of the falling rate of profit. And this raising W/Y is rooted in the increase of the relative strength of the working class. This relative increase in the strength of working class is based on the change of the social-economic structure of the capitalist system.

In the framework of Marxian theory, the wage share in the national income is not simply determined by the exogenous given preferences of rational agents and technology used in the production. Rather it is determined by a complicated social-economic process, and many social factors influence it, such as: (a) the reserve army of labour, which means that if there exists an abundance of unemployed workers, the relative strength of the working class is low, thus relative wage share in the national income is also low; (b) the solidarity of the working class. If the working class unites firmly, its relative strength increases and, therefore, the wage share in the national income also increases; (c) the cost of job loss.[6] The larger the cost, the relatively weaker the strength of the working class, and the relatively lower the share of wages in the national income will be. However with the rising strength of working class, the working class forces the distribution of income to move along a more favourable direction to its interests. And if the growth of the share of the wage bill in the national income overcomes the growth rate of the "productivity" of capital, the rate of profit will inevitably fall**.**

Realization Problem as the Main Cause of Falling Rate of Profit

The third effort to explain the movement of the rate of profit focuses on the third stage of the circulation of capital, i.e. the realization of the created value. As we have mentioned above failure to sell the produced commodities in the market on their value will have severe consequences: on the one hand, the value transferred from the used raw materials and depreciated machines and the advanced wage bills may not be recovered, on the other hand, the newly created surplus value, which is contained in the products will not be realized and this will cause the income of the capitalist and subsequently the rate of profit to fall. We can elucidate this argument as follows:

Let us redefine the rate of profit as the rate of realized surplus value to the total capital advanced:

$$r = \frac{\theta \cdot S}{C + V} \tag{6}$$

in which θ is the proportion of products that has been sold. It is clear that the rate of profit increases with the raising of θ.

The above kind of argument will have to explain why θ will fall below 1. We can divide those explanations into two categories. One is the underconsumption theory and the other is the coordination failure theory. Both of them can be traced directly to Marx himself. For example, in the case of underconsumption Marx stated that "always remains the poverty and restricted consumption of the masses as compared to the tendency of capitalist production to develop the productive force in such a way, that only the absolute power of consumption of the entire society would be their limit." (Marx, 1867). To make the effective demand equal to the ever-growing production, their growth rates will have to be the same. But in the capitalist system the individual capitalist always tends to lower the growth rate of the wage bill and thus limit the growth rate of employment, and this inevitably leads to the fall of the effective demand of society below the needed aggregate demand.[7]

As far as the coordination failure Marx in volume two of *Capital*, constructs simple two-department schemes of reproduction to illustrate the conditions that must be fulfilled so as to guarantee the operation of the capitalist system. And since the character of a typical capitalist system is that the individual capitalist acts quite independently from the others. This suggests that there are no any mechanisms in place to guarantee that the required conditions will be achieved automatically. Since the capitalist production has the internal impulse to expand as a purpose in itself, this may cause the output of some sectors, which serve as input to other sectors, to fall short of the input requirements of these sectors and, therefore, this output will not realize the full value embodied in it. This further leads those sectors to decrease their demand on machines, raw materials and labour power, and eventually causes the fall of rate of profit.[8]

The Increasing Use of Unproductive Labour as the Main Cause of the Falling Rate of Profit

This kind of explanation of the movement of the rate of profit focuses on the structure of the circulation of capital as a whole. The concepts of productive land unproductive labour are based on the labour theory of value of Marxian economics.[9] According to Marx, only the labour which is involved in the capitalist production can

be accounted as productive labour, and "capitalist production" refers to those activities which produce, transport or store commodities. In the framework of Marxian theory, only productive labour is capable of transferring the value embedded in the production materials and of creating new value (including surplus value). Unproductive labour on the other hand involves circulating and supervising activities and these kinds of activities do not transfer old value or create new value. The value of those materials and the labour power involved in those activities must be recovered by the surplus value transfer from the productive sectors.

To simplify the analysis we assume that the only factor needed by unproductive activities is labour power and that the wage bills are paid after the value of the commodities has been realized. Thus we redefine the rate of profit as

$$r = \frac{R}{C} = \frac{S - U}{C} \tag{7}$$

where R denotes the conventional profit received by the capitalist class as a whole, and it is equal to the total surplus value created by productive labour (S) minus the value to recover the labour power consumed in unproductive activities (U). Dividing numerator and denominator by the variable capital in the productive sectors (V), we get

$$r = \frac{(S/V) - (U/V)}{(C/V)} \tag{8}$$

It is clear that given the rate of surplus value and organic composition of capital, the rate of profit will decline with the rising ratio of unproductive labour to productive labour. Generally, the works of Moseley (1992; 2003), Shaikh and Tonak (1994), and Mohun (2005) do not provide more details on why the ratio of unproductive labour to productive labour has to rise in a capitalist economy. But we can give this argument a reasonable explanation in the framework of Marxian theory:

(1) Since essentially the production relation between the capitalist and the workers is antagonistic, in order to extract more surplus value from the production process, the capitalist tries to control this process through more and more detailed divisions of labour in the factory system. Generally this takes place in two directions: in landscape orientation he divides the whole production process into a system of successive pieces of tasks; in longitudinal direction he tries to construct a bureaucratic-ladder.[10] And this inevitably leads the supervision cost and management cost to increase.

(2) Since the capitalist system is characterized by an automatically self-regulating mechanism system during most of the period of its development, as mentioned above, realizing produced value and financing further investment become more and more important to the capitalist class and so more and more resources are invested into circulating activities and financial services.

Marxian Empirical Investigations on the Movement of the Rate of Profit

Although the movement of the rate of profit plays such a central role in the determination of the dynamics of a capitalist economy, only after the 1970s, that is, when the postwar prosperity came to an end, Marxist economists started the empirical investigation of the long-term movement of the rate of profit and its constituent components.[11] In what follows we review the main difficulties associated with the empirical estimation of Marxian categories and also we critically evaluate the main empirical conclusions drawn from the previous studies.

Some Difficulties to Put the Marxian Law into Test

When the Marxian economists try to use available official data to investigate the movement of the rate of profit and its causes, they face several difficulties:[12]

(1) *Labour time or Money:* there is no problem when we restrict ourselves in the area of theoretical discussions. In Marxian theoretical literatures all variables are measured in the value unit, which is determined by the standard labour time.[13] But actually in the national accounting system every variable is expressed in money through market prices. It is therefore questionable to map those money-measured variables into labour-time-measured ones.

(2) *Only capitalist production or all of production*: there is also no problem when we restrict ourselves in the field of theoretical discussions. What Marxian economics is concerned with are the dynamics of a "pure" capitalist system. But there is no pure capitalist economy at all. There are non-capitalist production activities (including government production, household production and simple commodity production) as well as capitalist ones. Should we account for non-capitalist production when we measure corresponding variables? Actually there is no generally accepted method especially when one is concerned with government production and simple commodity production. It will cause more difficulties when we measure corresponding categories of developing and transitional countries (such as China).

(3) *Should we distinguish unproductive activities from productive activities*: the answer to this question is crucial for the definition of surplus value, profit, variable and constant capital. To our purpose the main problem is whether the wage bill of workers of unproductive sector is considered as variable capital or as a part of surplus value. As is the case with problem (2), different researchers have different methods in empirical studies and this leads to quite different conclusions.

(4). *How to define variable capital*: the answer to this question is not as simple as it looks. For example, should the taxes imposed on the workers be considered as part of variable capital? Should the subsidies to workers be counted as part of variable capital? Fortunately taxes and subsidies are both relatively small and do not affect our results in any empirical significant way.

Some Important Empirical Estimation

Most of the empirical studies concentrate on the experiences of advanced capitalist economies in the post-war period. We do not attempt to review all this literature but to cover some representative studies.

(1). *Marxian Consensus*

All of those studies share similar findings and maybe we can call them the stylized-facts in Marxian theory about the dynamics of capitalist economies:

i. All of those studies agree that the dynamics of the capitalist economy are determined by the overall level of the rate of profit. When the rate of profit is relatively high, the growth rate of the capitalist economy is high; when the rate of profit is relatively low, the growth rate of it is also low.

ii. All of those studies agree that the stagnation and depression of the capitalist world after the 1970s is not as sudden as it looks, in contrast to the neoclassical theories, which alleged that it was the consequence of some sudden shocks, such as the

oil supply shock, the mistakes of the monetary authority etc. According to Marxists it was the consequence of the long-run decline of the overall level of the rate of profit. Recently the relative resurgence of advanced capitalist economies is also stimulated by the relative recovery of the rate of profit at the cost of the benefit of the working class.

iii. To those studies, which tempt to explain the Great Depression, it was also the long-term decline of the rate of profit that caused the economic tragedy.

Those findings give Marxian theory strong empirical support.

(2) *The different strands under the common consensus*

As we have described above there are several different theories to explain why the profit rate would eventually decline. Each of them received some empirical supports.

i. Lipietz (1986), Duménil and Lévy (1993, 2002b) may be the main authors who emphasized that the rising organic composition of capital (the decline of productivity of capital) was the main contributor to the post-war falling rate of profit. Michl (1988) has also argued that the decline of the profit rate during the period 1972-1986 was mainly caused by the decline of the productivity of capital.

ii. James Devine (1983) explained the Great Depression of 1930s by the declining share of profit, which caused the rate of profit to fall. Glyn and Sutcliffe (1972), Weisskopf (1979), Bowles, Gordon, and Weisskopf (1986) argued that the decline of the share of profit in national income is the main cause of the post-war dynamics of advanced capitalist economy. More specifically, according to Bowles et al. (1986) argued that the fall in the profit share and the rate of profit are caused by the weakening of the post-war social structure of accumulation. Furthermore, the recent resurgence of the capitalist world is attributed to the rising strength of the capitalist class that managed to increase the profit share Kotz (2003) and Wolfson (2003).

iii. The underconsumption theory received nearly little support by Marxian economists except Paul Sweezy (1942). Duménil, Glick and Rangel (1987) argued that the main cause of the Great Depression (1929-1933) was the underconsumption of society, which was caused by a rising share of profit that undermined the consumption capacity of the working class.

iv. However, Moseley (1992; 1997), Shaikh and Tonak (1994) and Mohun (2005) advanced the idea that the distinction of productive/unproductive labour (activities) is of extreme importance in Marxian theory. According to these authors, the main contributor to the decline of rate of profit is the increasing ratio of unproductive to productive labour during the post-war period, while the increasing organic composition of capital is also an important factor in the explanation of the fall in the rate of profit. The recent upward trend of the rate of profit is mainly caused by the increasing rate of surplus value, but the trend is also offset by the continuous increase of the ratio of unproductive labour to productive labour.

v. As mentioned above almost all empirical studies were focused on the experience of advanced capitalist economies, especially the experience of the post-war U.S. economy. There are several studies concentrated on developing countries or on transitional economies. All of them show that the Marxian theory is a powerful tool in understanding the experiences of those economies.[14]

EMPIRICAL INVESTIGATION ON THE CHINESE ECONOMY (MANUFACTURING INDUSTRY) IN THE FRAMEWORK OF MARXIAN THEORY

The Methodological Problems in Applying Marxian Theory to Analyze the Chinese Economy

In applying Marxian theory to analyze the dynamics of the Chinese economy, we face some methodological problems. The main one is whether we can use those traditional Marxian categories, such as the rate of surplus value, the rate of profit, the value of labour power et al., to analyze a Socialist economy, such as China? Our argument is that after nearly 30 years of economic reform since 1978, China has established a market-oriented economic system in which the law of value of course is valid (Sun, 1979).

Secondly, the development experience of China since 1978 is two-folded: on the one hand, China has to fulfil the task of industrialization which is characterized by transforming itself from an economy in which the traditional agricultural sector occupied the dominating position to an economy, where modern industrial and informational sectors are the main actors; on the other hand, China has to transform from a traditional central planning system to a market-oriented economy. Thus the Chinese economy is characterized as a dual one in which some of its important components are not profit-oriented production, such as most part of agricultural production, the government production and provision of services. This is the reason why the focus of the present paper is on the industrial sector of the economy and in particular the formal one.

Thirdly, as mentioned above, there are several concepts which have special meanings to Marxian analysis, such as the distinction between productive labour (activities) and unproductive labour (activities), but we have to neglect them due to the lack of appropriate statistical data in the manufacturing sector and at the level of the economy as a whole.

The Analytical Framework and Definitions of Corresponding Variables

According to the theoretical review of the previous section, the dynamics of the economy are mainly determined by the overall level of the rate of profit, and the rate of profit is further determined by some underlying variables: the rate of surplus value, the organic composition of capital, the share of profit in the newly created value. In this section we give those variables a more rigorous definition.

The rate of profit is defined as the ratio of profit to the total capital:

$$r = \frac{\pi}{K} = \frac{\pi}{p_k \cdot k} \tag{9}$$

in which k is the capital stock in manufacturing industry valued in constant prices, p_k is the price deflator of capital, K is capital stock valued in current price, π is the total profit valued in current price.

The rate of surplus value is defined as the ratio of total profit to total compensation of workers

$$s = \frac{\pi}{W} = \frac{\pi}{w \cdot l} \tag{10}$$

In which W is the total worker compensation, w is the average labour income for worker, and l is total employment in the manufacturing industry. We can decompose the rate of surplus value into three factors

$$s = \frac{\pi}{W} = \frac{\pi}{V} \cdot \frac{V}{W} = \frac{\pi}{V} \cdot \frac{1}{w} \cdot \frac{V}{l} \tag{11}$$

In which V is the value-added. The first term is the share of profit in all newly created value, the second term is the inverse of average worker compensation, and the third term is a measure of the productivity of labour.

The definition of organic composition of capital is more complex. It may be one of the most difficult concepts among Marxian categories. On the one hand, it is defined as the ratio of constant to variable capital, all in value terms, on the other hand it is quite different from the value composition of capital and its movement is determined by the change of technology of production process. We just simply define the ratio of constant capital to variable capital evaluated in current prices as organic composition of capital, and the ratio of constant capital to variable capital evaluated in constant prices as technical composition of capital

$$\eta = \frac{K}{W} = \frac{p_k \cdot k}{w \cdot l} \text{ and } \rho = \frac{k}{l} \tag{12}$$

In which η and ρ are organic and technical composition of capital, respectively. The organic composition is not only affected by the technical composition of capital, and also is affected by the relative price of constant capital and labour power.

From those definitions we can get one basic equation that can help us in the understanding of the movement of the rate of profit in the Marxian framework

$$r = \frac{l}{k} \cdot \frac{w}{p_k} \cdot s \tag{13}$$

The first term is the inverse of technical composition of capital, the second is the reverse of the relative price of capital and labour and the last is the rate of surplus value.

Trend of the Rate of Profit, Growth Rate of Real GDP and Value-added in Manufacturing Industry[15]

(1) *The trend of the rate of profit*

The trend of the rate of profit is shown in Figure 1. We can divide the movement of the rate of profit into three periods. The first period is from 1978 to 1988. In this period, the rate of profit had a slightly downward trend. In fact it fluctuated slightly around 35% in those years. The second period is from 1989 to 1998 in which the rate of profit declined relative sharply. More specifically, it declined from 26% in 1989 to 13% in 1998. The third period is from 1999 to 2004 in which the rate of profit increased sharply but did not reach the level of 1978. In fact, the rate of profit increased from 13% to 31%, which is near its peak level of 1978.

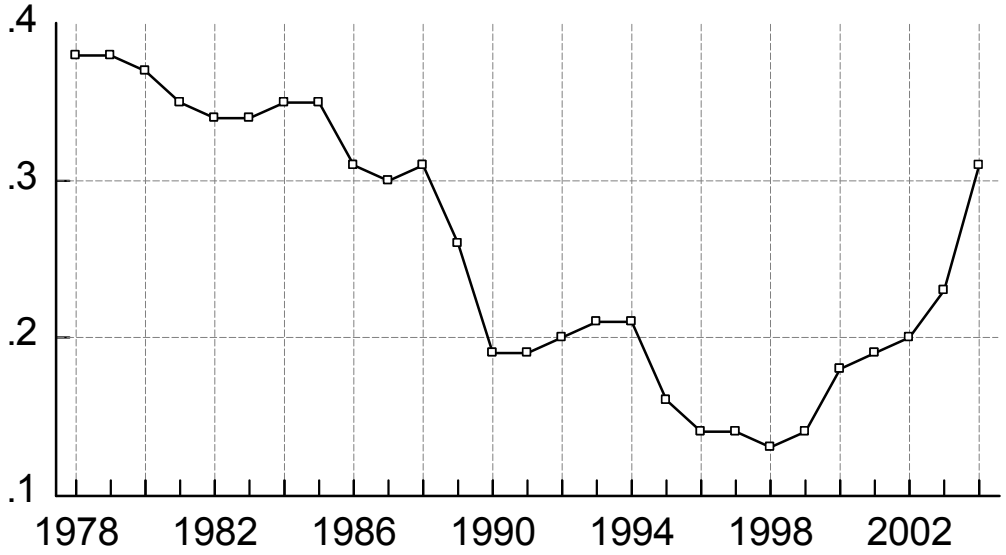


Figure 1: The Trend of the Rate of Profit, 1978-2004

(2) *The Trends of the Rate of Profit and of the Growth Rate of Real GDP*

According to Marxian theory, the dynamics of the economy are mainly determined by the overall level of rate of profit. This argument received many empirical supports from the experiences of advanced capitalist economies, developing capitalist economies and transitional economies. Is it valid for a market-oriented Socialist economy? The trends of the rate of profit and of the growth rate of real GDP are shown in Figure 2.

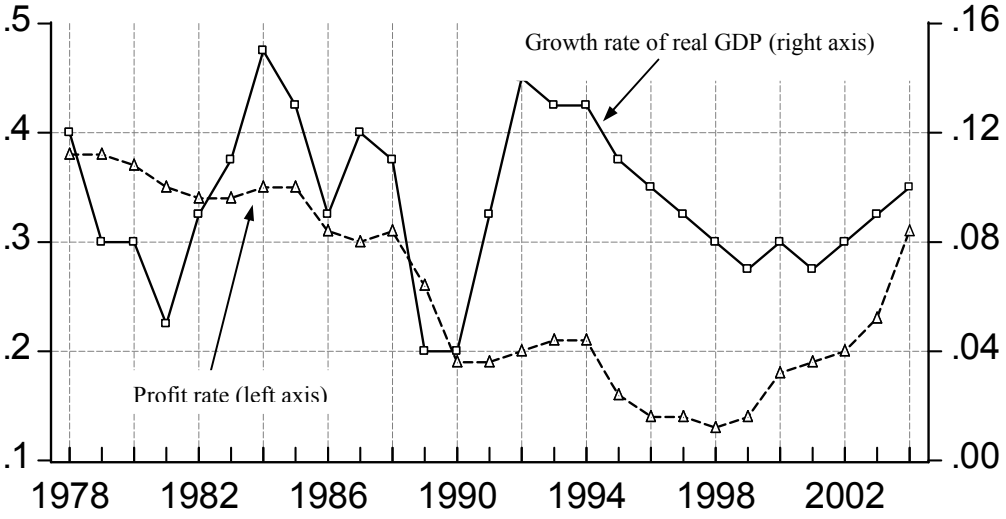


Figure 2: The Rate of Profit and the Growth Rate of Real GDP

From Figure 2 we observe that before 1984, i.e. the initial period of reform, the general level of the rate of profit had nearly no direct effect on the growth of real GDP. With the deepening of the economic reform process, the co movement between

the rate of profit and the growth of real GDP became more and more clear. And the movement of rate of profit keeps relatively ahead of the growth rate of real GDP.

In the period from 1984 to 1990, when the rate of profit declined from 35% to 19%, the growth rate of real GDP declined from 15% in 1984 to 4% in 1990. And in the period from 1993 to 1998 when the rate of profit decreased smoothly from 21% to 13%, the growth of real GDP declined from 13% to 8% in 1998 and 7% in 1999. When the rate of profit increased slowly in the late of 1990s, the overall growth rate also recovered steadily.

The movement of the rate of profit and the growth rate of real GDP lend support to the argument that the Marxian categories can be applied in order to analyze the evolution of the Chinese economy. Figure 2 displays the rate of profit and the growth rate of the Chinese economy. We observe that the trajectories of these two variables are consistent with the predictions of the theory according to which the movement of the rate of profit regulates the rhythm of capital accumulation.

The Deconstructing of the Trend of the Rate of Profit

This last section demonstrates the locus of the rate of profit and its effect on the fluctuations of the growth rate of real GDP. In this section we will try to explore the underlying factors, which affect the movement of the rate of profit in the framework of Marxian theory.

(1) *The technical and organic compositions of capital*

Despite the fact that Marx himself mentioned many factors, which can have an effect on the rate of profit, he did emphasize that the organic composition of capital played a central role among them. As showed in the equation (13), the rate of profit will decrease with the increase of organic composition of capital.

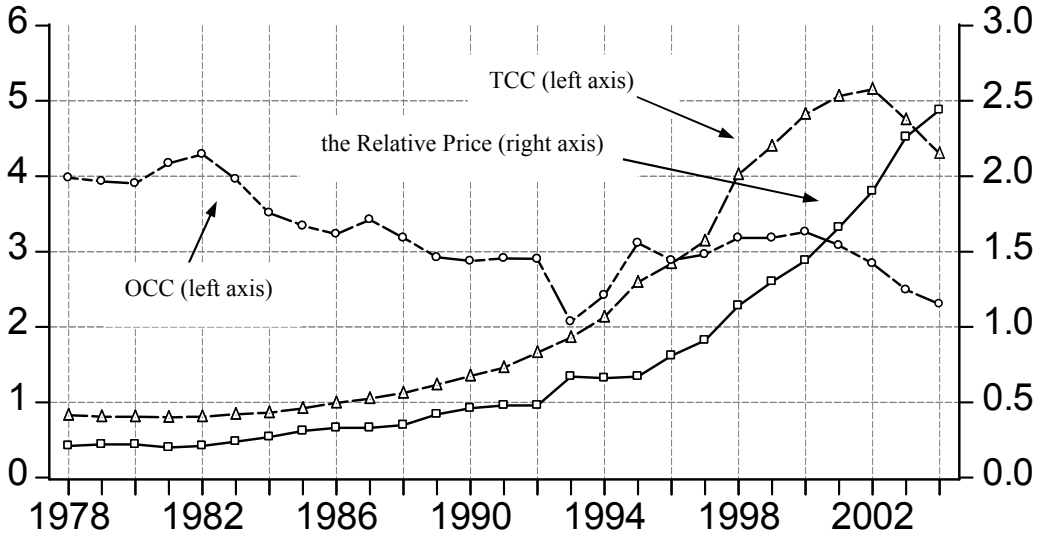


Figure 3: The Organic and Technical Composition of Capital, and the Relative Price, 1978-2004

As shown in Figure 3, the organic composition of capital has a slightly declining trend from 1978 to 2004. Especially in the period between 1990 and 2002, the organic

composition of capital fluctuated around 3 in a very small range. So the factor of organic composition of capital contributed little to the fluctuation of rate of profit during the period 1978-2004.

The organic composition of capital (OCC) is determined by two underlying factors, the technical composition of capital (TCC) and the ratio of relative price between labour and capital, in our definition. And from 1978 to 2004, the level of industrialization of China increased dramatically. This can be clearly found in Figure 3. The trajectory of the technical composition of capital increased steadily in this period, except for the last two years. But the effect of an increasing technical composition of capital is offset by an increasing ratio of average worker compensation to the inverse of the deflator of capital. This leads us to focus on the trend of the rate of surplus value.

(2) *The Rate of Surplus value and its decomposition*

The movement of the rate of surplus value and the rate of profit is shown in Figure 4.

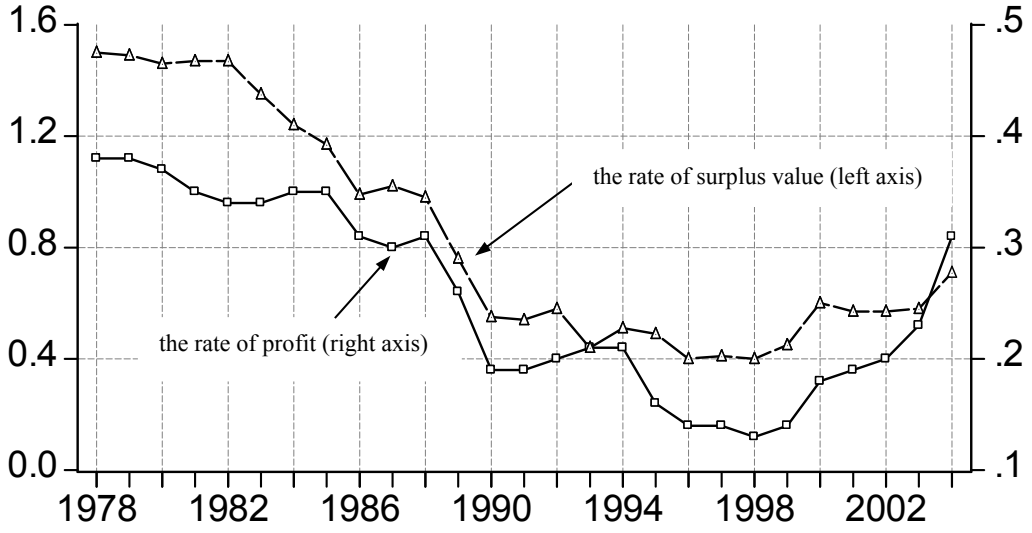


Figure 4: The Rate of Surplus and the Rate of Profit from 1978-2004

It is shown that the trajectories of those two variables display approximately the same shape. Clearly, there are two distinct phases: the first during the period 1978-1998 where the rate of surplus value falls from approximately 1.5 in the years 1978-1982 to 1.35 in the year 1983 and then drops to all times low of 0.4 in the year 1998. The second phase characterises the period 1998-2004 where the rate of surplus value increases rather rapidly. The rate of profit follows the same trend with that of the rate of surplus value.

Since the fluctuations of the rate of profit are attributed mainly to the ups and downs of the rate of surplus value, how was the rate of surplus value itself affected by the underlying factors? The above analytical framework shows that the rate of surplus value is determined by three underlying factors: the share of profit in value-added (positive effect), the average worker compensation (negative effect), and the productivity of labour (positive effect). The trends of the constituent components of the rate of surplus values during this period are portrayed in Figure 5.

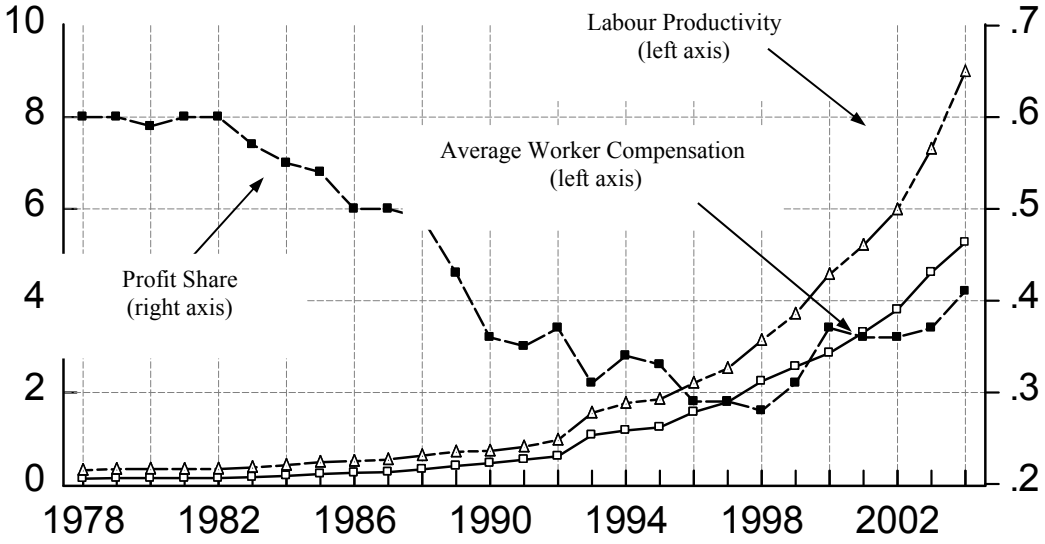


Figure 5: Profit Share, Average Worker Compensation and Labour Productivity, 1978-2004

We observe that the productivity of labour and average worker compensation both increased steadily, but the divergence between them became more and more pronounced. We distinguish three periods in the movement of the profit share: the first from 1978 to 1983 where the profit share remained approximately constant; the second period from 1983 to 1998 during of which the profit share dropped from 57% to 28%; the third period from 1998 to 2004 the profit share increased gradually from 28% to 41% and recovered nearly a half of its previous decline.

Then the question is what are the factors that affect the movement of the rate of surplus value? From 1978 to the middle of 1990s, since the divergence between the productivity of labour[16] and the average worker compensation is negligible, the change in the rate of surplus value can be attributed mainly to the decline in the share of profit. In the subsequent period, the rise of surplus value can be attributed to two factors: firstly, in this period the tendency of the share of profit to fall was inversed and this contributed a great deal to the recovery of the rate of surplus value, and hence the rate of profit; while the divergence between productivity and labour compensation also contributed a large part to the rise in the rate of surplus value. From 1998 to 2004 productivity increased nearly by 187%, however the average worker compensation increased only by 134%.

CONCLUSIONS

The movement of the overall level of rate of profit determines the ups and downs of the level of economic activity. We know that within Marxian theory the movement of the rate of profit is attributed mainly to three sets of factors: (i) technical factors, such as the technical composition of capital and the productivity of labour (ii) distributional

and price factors, such as the share of profit and the average worker compensation (iii) structural factors, such as the ratio of productive labour to unproductive labour and the demand constraint. Different theories argue for different factors as the most essential in the determination of the movement of profitability.

In this paper we used the data of the Chinese manufacturing industry from 1978 to 2004 to test the movement of the rate of profit and its underlying determinants. Our main findings are the following:

(1). The rate of profit in manufacturing industry is a fairly good indicator for the growth rate of real GDP. We argue that this rate of profit is a fairly good substitute for the overall level of the rate of profit, which can not be estimated accurately for lack of appropriate macroeconomic data.

(2). In the period from 1978 to 1998, the rate of profit declined from 38% to 13%. And in the subsequent period, it resurged gradually.

(3). The organic composition of capital, which had no systematic trend in the period, contributed little to the fluctuation of the rate of profit. Despite this though the technical composition of capital increased sharply, however the relative decline of the price of capital offset its effect.

(4). The decline and sequential resurgence of rate of profit attributed to the change in the rate of surplus value.

(5). The decline of the rate of surplus value, hence the rate of profit from 1978 to 1998 is attributed mainly to the decline in the share of profit. But its resurgence from 1998 to 2004 was affected mainly by two factors: firstly, the increase in the share of profit which played the dominant role in this process; secondly, in this period the increase of the productivity of labour overcame the inverse-direction effect of rising worker compensation on the rate of surplus value.

The empirical investigation lends support to the Marxian argument that the rhythm of capitalist dynamics depends primarily on the overall level of the rate of profit. But it does not support other arguments of Marx himself, such as that the decline of the rate of profit is caused mainly by a rising organic composition of capital. On the contrary, the organic composition did not display any systematic trend and the fluctuations in the rate of profit are attributed mainly to the change in the rate of surplus value.

There are certain limitations to our analysis from which perhaps the most serious one is that it is restricted to manufacturing. Other limitations relate to the fact that we did not account for the difference between productive and unproductive labour, which is very important in the estimation of Marxian categories. Also, we do not account for the effect of effective demand on the rate of profit. Future research efforts should expand to include the economy as a whole and address the question of productive-unproductive labour as well as include the effects of the rate of capacity utilization.

NOTES

1. In the Communist Manifesto (1848), Marx wrote: " the bourgeoisie cannot exist without constantly revolutionizing the instruments of the production, and thereby the relations of production and with them the whole relations of society". In *Capital* he deepens this insight.

2. Marx said about the organic composition of capital: "The composition of capital is to be understood in a twofold sense. On the side of value, it is determined by the proportion in which it is divided into constant capital or value of the means of production and variable capital pr value of the labour-power, the sum total of wage. On the side of material, as it functions in the process of production, all capital is divided into means of production and living labour-power. This latter composition is determined by the

relation between the mass of the means of production employed, on the one hand, and the mass of labour necessary for their employment on the other. I call the former the *value-composition*, the latter the *technical-composition* of capital. Between the two there is a strict correlation. To express this, I call the value-composition of capital, in so far as it is determined by its technical-composition and mirrors the changes of the latter, the *organic composition* of capital."(Marx, 1867, p. 625) More details and an excellent discussion can be found in Saad-Filho (2002).

3. Shaikh (1978) provides another argument: the rate of profit, $r = s/(c+v)$, definitely has an upper limit $r_{\max} = s_{\max}/c$. If c increases infinitely, then $r_{\max}$ will fall. And then we can expect that the rate of profit will tend to fall. This argument was criticized by Van Parijs (1980) who claimed that a falling maximum rate of profit is consistent with a rising tendency of the actual rate of profit.

4. Like Marx's other famous arguments, the theory of rising organic composition of capital bears a lot of criticisms. One of the most important criticisms is termed as the Okishio theorem (Roemer, 1979; Bowles, 1981). The theorem states that it is impossible for a cost-reducing innovation to lower the rate of profit without simultaneously increasing the real wage. In order to defend Marx's argument, the orthodox Marxist economists extent the theorem and made it clear that under some conditions (such as joint production and the existence of a reserve army of labour) the profit rate will fall with the development of technology. (Shaikh ,1978; Salvadori,1981; Lipietz, 1986).

5. Profit-squeeze explanations of the falling rate of profit appeared mainly in the late 1970s (e.g., Glyn and Sutcliffe, 1972, Boddy and Crotty, 1975 and Weisskopf, 1979).

6. This factor is a measure of the dependence of workers on capitalists. And it is a function of many factors, such as unemployment rate, the probability to find another job after quitting from the old, the benefit from the government and insurance companies for unemployment, etc. Schor (1985).

7. Sweezy (1942) is the main supporter of underconsumption theory. According to him, the tendency of underconsumption will become more acute when the capitalist system transforms from being competitive to being monopolistic. The Marxian brand of underconsumption theory, which emphasizes the effect of the class structure on the effective demand, differs from the Keynesian one which emphasizes the effect of subjective propensity of the general consumers on the effective demand.

8. This kind of argument receives little support after World War Two.

9. This kind of argument receives more and more attention since the1990s with the works of Moseley (1992; 2003), Shaikh and Tonak (1994), and Mohun (2005), concerned with theoretical analysis and empirical estimations.

10. Marglin (1974) and Edwards (1979) are the best references in the field.

11. Maybe Gillman (1957) is an excellent exception. He uses official U.S. data to test the trend and influencing factors of the Marxian rate of profit.

12. Here, we will only treat of several main problems briefly. To those who want to know more details concerning this problem, Moseley (1992) and Shaikh and Tonak (1994), are good references.

13. The term "standard" refers to the notion that the commodity is produced under socially average technology and average labour intensity. See Marx, *Capital*, Vol. I.

14. Marina and Moseley (2000) for Mexico economy; Lianos (1992) and Maniatis (2005) for Greece; and Izyumov and Alterman (2005) for the Russian economy.

15. Because of lack of systematic data for the whole economy and even for the whole manufacturing industry, we have to use the data of those enterprises with an independent accounting system (before 1998) and above formal level (after 1999). All is available from the official website of the Bureau of Chinese Statistics. Constant capital is defined as the overall net value of fixed asset. Variable capital is defined as the overall worker compensation, including all wage bills and other fringe income from work. For lack of appropriate data, we have to estimate this variable by value-added minus the total

profit. Profit is defined as the sum of the sales taxes and extra charges, total profits and value-added taxes. In fact we should include the interest payment of the firms, but there exists no systematic corresponding data available from official statistics data. Profit rate is defined as the ratio of profit to the fixed capital stock.

16. The productivity of labour is defined as the ratio of total value-added to the total employment of the firms.

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