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Profitability and Crisis in the South African Economy

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3 January 2017

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Abstract

Based on new quarterly estimates of the general rate of profit over 1960-2016, this paper shows that the South African economy experienced two phase changes in the pace and rhythm of capital accumulation. The rate of profit exhibits a cyclical tendency to fall, mainly driven by the tendency of capital intensity to rise. The economy experienced a crisis of absolute overproduction of capital in the mid-1980s. This crisis was not only characterised by stagnation in the mass of profits, it was also characterised by a halt in capital accumulation. Thereafter, the rate of profit recovered primarily because of the fall in the capital-output ratio but it failed to reach the levels seen in the 1970's. We estimate that in 2012, the South African economy entered a new and on-going crisis of overproduction of capital characterised by stagnant profits and prolonged overaccumulation, which makes it impossible for economic growth to recover.

Keywords: falling rate of profit, capital intensity, overproduction of capital, overaccumulation.
JEL Codes: B5, E11, O5

1. Introduction

This paper develops a profitability-based framework to analyse phase changes of the South African economy. The South African economy is characterised by high levels of unemployment, income and wealth inequality and poverty. Estimates provided by Terreblanche (2001) show that in 1970 the expanded unemployment rate in South Africa was 20.2% and by 2000 it had increased to 45.8%. As of 2015, the expanded unemployment rate stood at 33.8%.

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In terms of income inequality, Terreblanche also reports that in 1975 the poorest 40% of the households, accounted for 5.2% of total income. In 2001 the poorest 40% accounted for 3.3% of total national income. Over the same period, the top 19% of households experienced an increase in their national income share from 70.9% to 72.2%. These challenges can be traced to centuries-old institutions that systematically oppressed and super-exploited South Africa's African majority. These institutions were an integral part of the historical trajectory of South African capitalism, its phases and rhythms of accumulation.

In many respects, the patterns of development that characterised South African capitalism under apartheid continue to be reproduced under conditions of democracy. The dominant perspective in South Africa is that the historical challenges that have been inherited from the apartheid period can be resolved within the framework of capitalism. However, one of the key factors that determines the ability of capitalism to deliver social progress is the trajectory of capital accumulation. Tsoulfidis and Tsaliki (2014) point out that the evolution of the rate of profit "determines the 'general health' and 'vitality' of the system and defines the stage of accumulation as expanding or contracting" and it "determines the rhythm of capital accumulation". Therefore, without understanding the evolution and the dynamics of the rate of profit, it would be difficult to understand the reasons behind the persistently high unemployment and the poor growth outcomes that characterise the South African economy. In addition, as noted by Duménil and Lévy (1993:314), the behaviour of the rate of profit is also the prime engine behind the major historical institutional changes that characterise capitalist economies.

Very few studies exist that examine the rate of profit in South Africa and to analytically and empirically link the rate of profit to the rate of capital accumulation. Nattrass (1989, 2014) appear to be the only studies that conduct an analysis of South African profitability. However Nattrass (2014) conducts her study for the period 1960-1989, which is clearly dated. A related study is Heinz (2002), which investigates the impact of political and economic institutions on capital accumulation. Both these authors conclude by stating that a profitability-based approach to understanding the path of South African capitalist accumulation is problematic. According to Nattrass (2014) the profit-based approach has limitations, whereas Heinz (2002) says that it is

misleading. As if anticipating the statement by Tsoulfidis and Tsaliki (2014), Nattrass in particular says there are "limitations to using trends in wages, productivity and profitability as indicators of the health of capitalism".

Contrary to these conclusions, this paper argues that the profitability-based provides a more sound explanation of the phases and rhythms of capital accumulation in South Africa. Indeed, at a fundamental level of analysis, it may be argued that it is the neglect by policymakers of the role played by the rate of profit in the capitalist mode of production which explains the numerous disappointing growth and unemployment outcomes which systematically deviated from the publicly announced targets. For instance in 1996 South African policymakers adopted a macroeconomic framework called the Growth, Employment and Redistribution (GEAR) in which they targeted an average growth rate of 4.2% over the period 1996–2000, but the actual growth rate was 2.5% (Streak, 2004). The next programme was adopted in 2006, called the Accelerated Shared Growth Initiative of South Africa (AS-GISA). It targeted a growth rate of 6% between 2010–2014. However the economy grew on average by 2.5%. In 2012 the government adopted the National Development Plan (Vision 2030), and set a growth target of 5.4% over the period 2012-2020. So far the economy is on average hovering below 2% and teetering on the brink of a recession.

It is clear that the analytical framework that South African policymakers use to set targets for policy is not capable of detecting the actual pace and rhythm of capital accumulation. The contribution of this paper is to formulate a profit-based approach to analyse these phases and rhythms of capital accumulation in South Africa. In relation to existing literature, our approach builds on the one first put forward by Grossman (1992), and later elaborated by Shaikh (1992) and Tsoulfidis and Tsaliki (2016). These authors assume that the rate of profit tends to fall at a certain rate until it hits a point where the mass of profits are stagnant. At this point, according to Marx (Capital III: 251), there is a crisis of overproduction of capital. In his framework, Shaikh proceeds from the general classical political economy view that the rate of capital accumulation is proportional to the rate of profit. He then posits that private investment equals capitalist savings from profits. We extend Shaikh's approach in that we derive a time-varying rate of profit at which there is overproduction of capital by fully specifying the macroeconomic balance. This extension provides a natural way through which the

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effects of macroeconomic policies on the course of capital accumulation can be evaluated.

Empirically, the paper contributes to the very limited Marxist literature on the South African economy and it contributes to the growing empirical literature that extends Marxist analysis to emerging markets. Attempts at a South African profitability analysis by Nattrass (2014) rely on data ending in 1989. The second empirical contribution is that we present new estimates of the quarterly fixed capital stock which cover the period 1960-2016, based on the perpetual inventory method proposed by Shaikh (2016: 847). We then use these estimates to calculate the quarterly rate of profit. The resultant quarterly rate of profit exhibits a tendency to fall, in a manner articulated by Marx in Capital III Part III. The main driver of the fall in the rate of profit is the increase of capital intensity of production. This finding is consistent with the results from recent empirical Marxist research on a number of economies (e.g. Maniatis and Passas (2013) for Greece and Marquetti et al.(2010) for the case of Brazil). Further analysis also reveals that over the sample period, the South African economy experienced two phases of crisis.

This paper is structured as follows: section 2 outlines the theoretical framework that we use to analyse the dynamics of the rate of profit and to determine the phases of capital accumulation, section 3 presents the empirical method of calculating the quarterly fixed capital stock and analyses the pattern of the rate of profit, section 4 provides econometric evidence and derives a time-varying threshold for the rate of profit below which the economy experiences a crisis and identifies the phases of capital accumulation in South Africa, section 5 discusses possible policy interventions during the crisis and their limitations, and section 6 is the conclusion.

2. Theoretical framework

2.1 The dynamics of capitalist accumulation

Before outlining the theoretical framework, it is important to explain three crucial rates of profit that are at the centre of our analysis. The first rate of profit, which we call the critical rate of profit, traces points at which the capital-output ratio or capital intensity, is constant. Once the actual rate of profit hits this critical rate from above, capital intensity stops rising. The second rate of profit corresponds to the point where the rate of capital

accumulation is zero, i.e. once the actual rate of profit hits this crisis rate from above, capital accumulation comes to a halt. Such rate of profit traces points at which the economy enters a crisis of the first type, i.e. it is a crisis where the capital stock is stagnant. The third rate of profit traces points which correspond to what we call the crisis of the second type, i.e. the point where the mass of profits is stagnant. It is the second type of crisis that is the subject of most recent Marxist empirical literature, beginning with Shaikh (1992).

What follows is a systematic derivation of these rates of profit, which we will later compare with the actual rate and through such comparisons, explain the phases of capitalist accumulation. The starting point of our analysis is the macroeconomic balance, which states that gross capital formation is financed by private savings, public sector savings and the balance on the current account (see Mariolis, 2014). We therefore write gross capital formation as follows:

$$\dot{K} + \delta K = S + (T - G) + (Z - X), \tag{1}$$

where δ is the rate of depreciation, S is aggregate savings, $(T - G)$ is the government's primary budget balance with T denoting taxes and G denoting government spending, $(Z - X)$ is the trade balance with Z denoting imports and X exports. Dividing both sides by K, we obtain the following equation:

$$\frac{\dot{K}}{K} = -\delta + s_c r + s_g - x, \tag{2}$$

where s_c is the savings propensity of capitalists, r is the rate of profit, s_g is the the ratio of the budget surplus to the capital stock, and x is the net exports-capital ratio. For simplicity we have assumed that workers do not save. Furthermore, eq.(2) can be viewed as the extended version of capital accumulation hypothesised in Shaikh (1992) and Tsoulfidis and Tsaliki (2014) in that it explicitly specifies the government budget balance and the balance on the current account. We further assume that the level of output depends on the level of the capital stock and the state of technology. Therefore the growth rate of output is:

$$\frac{\dot{Y}}{Y} = \theta + \alpha \frac{\dot{K}}{K}, \tag{3}$$

where Y denotes gross value added, θ is represents the "durable" rate of technical progress and $0 < \alpha < 1$ is the elasticity of output with respect to changes in the capital stock. Marx's theory of capitalist accumulation is premised on the observation that in the capitalist mode of production, capital accumulation drives the increase in the organic composition of capital. According to Marx (Capital I, 589), "the accumulation of capital, though originally appearing as its quantitative extension only, is effected, as we have seen, under a progressive qualitative change in its composition, under a constant increase of its constant, at the expense of its variable constituent". This qualitative change in the composition of capital leads to a progressive increase in the capital intensity of production. Accordingly, we write the growth rate of capital intensity as follows:

$$\frac{\dot{V}}{V} = \gamma \frac{\dot{K}}{K} - \theta, \tag{4}$$

where V is the capital-output ratio, $\gamma = (1 - \alpha) > 0$ and $\theta \geq 0$. Eq.(4) says that there is a critical rate of capital accumulation, given by $\frac{\theta}{\gamma}$, beyond which capital intensity will rise and below which it will fall. In the extreme case where $\theta = 0$, capital intensity will rise as long as the rate of capital accumulation is positive. Therefore, the lower is this critical rate of accumulation, the more the tendency of capital intensity to rise will take effect. By inserting eq.(2) into eq.(4), we now write the growth rate of the capital-output ratio as:

$$\frac{\dot{V}}{V} = \gamma s_c r - (\theta + \gamma \delta) - \gamma (x - s_g), \tag{5}$$

Eq.(5) states that the rate of profit positively affects the growth rate of capital intensity. Furthermore, austerity measures, which raise s_g will raise the capital-output ratio and thereby put doward pressure on the rate of profit. A surplus on the current account will slow down the increase in the

capital-output ratio and therefore put upward pressure on the rate of profit. Now, the rate of profit above which capital intensity is increasing and below which it is decreasing is:

$$r_c = \frac{\theta}{s_c \gamma} + \frac{\delta}{s_c} + \frac{(x - s_g)}{s_c} \tag{6}$$

We refer to this rate of profit as the "critical" rate of profit. Note that since according to Marx the tendency of the rate of profit to fall corresponds to the tendency of capital intensity to rise, it should be the case that, by the time the rate of profit reaches r_c, the capitalist economy should already be in a crisis of overproduction of capital. Otherwise, the capitalist economy will never reach this crisis point, since capital intensity would fall, thereby raising the rate of profit. Therefore any development that raises r_c will mute the tendency of the rate of profit to fall by preventing capital intensity from rising. The policy implications are clear from eq.(6). Austerity measures, which are aimed at increasing s_g, will decrease r_c thereby facilitating a further increase in capital intensity. Austerity measures therefore tend to put downward pressure on the rate of profit. A surplus on the current account will raise r_c thereby preventing an increase in capital intensity.

2.2 The crisis of absolute overproduction of capital

Marx provides two definitions of the crisis of overproduction of capital. Regarding the first type of crisis he states: "There would be absolute overproduction of capital as soon as additional capital for purposes of capitalist production=0" (Capital III: 251). By this definition, absolute overproduction of capital occurs when capitalist accumulation grinds to an absolute halt. In the second type of crisis, the crisis of absolute overproduction of capital occurs when additional capital "produced just as much, or even less, surplus value than it did before its increase" (Capital III: 251). To determine the point of absolute overproduction of capital of the first type we set $\dot{K} = 0$ in eq.(2). This yields the following crisis rate of profit:

$$r^* = \frac{\delta}{s_c} + \left(\frac{x - s_g}{s_c} \right), \tag{7}$$

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To determine the point of absolute overproduction of capital of the second type, recall that we can write aggregate profits as the product of the profit share and gross value added. Therefore we write the growth rate of the mass of profits as follows:

$$\frac{\dot{\Pi}}{\Pi} = \frac{\dot{\pi}}{\pi} + \theta + \alpha\frac{\dot{K}}{K}, \tag{8}$$

where Π is the mass of profits and π is the profit share. Now, the crisis of overproduction of capital is reached when $\dot{\Pi} = 0$. Note that even if the economy has reached a crisis of the first type, i.e. $\dot{K} = 0$, the mass of profits can still continue to rise because of technical progress and the increase in the profit share. It is therefore perfectly possible for capital accumulation to be stagnant, which is a crisis of the first type, while the mass of profits is rising. Substituting the rate of capital accumulation using eq.(2) we can write the growth rate of the mass of profits as follows:

$$\frac{\dot{\Pi}}{\Pi} = \frac{\dot{\pi}}{\pi} + \theta - \alpha\delta + s_c\alpha r + \alpha\left(s_g - x\right). \tag{9}$$

Since the crisis of overproduction of capital is reached when $\dot{\Pi} = 0$, this means that the rate of profit that corresponds to the crisis of the second type is:

$$r^{**} = \frac{\delta}{s_c} - \frac{1}{s_c\alpha}\left(\theta + \frac{\dot{\pi}}{\pi}\right) + \frac{(x - s_g)}{s_c}. \tag{10}$$

Any development that raises r^* or r^{**} brings the crisis point forward. For example, an increase in government budget deficits will hasten the onset of the crisis by reducing the rate of capital accumulation and hence the growth rate of the mass of profits. Austerity measures will therefore postpone the crisis, but they will not resolve it, since capital intensity will rise and the rate of profit will once again fall. Similarly a surplus on the current account will raise the crisis rate of profit all else being the same. The suppression of

the wage below the value of labour power and relative over population would increase the growth rate of the profit share, which would postpone the onset of the crisis.

Note that eqs.(10) and (7) imply that, whether $r^* \lessgtr r^{**}$ depends on whether the profit share is rising or falling sufficiently. If the profit share is falling, it is possible that $r^* < r^{**}$, in this case the mass of profits becomes stagnant before the rate of capital accumulation grinds to a halt. Otherwise, if the profit share is rising or constant then it is possible that $r^* > r^{**}$, the mass of profits become stagnant after the rate of capital accumulation grinds to a halt. Figure 1 illustrates how the economy reaches a point of overproduction of capital and then transits into an overaccumulation crisis.

Figure 1: The dynamics of overproduction and overaccumulation crisis
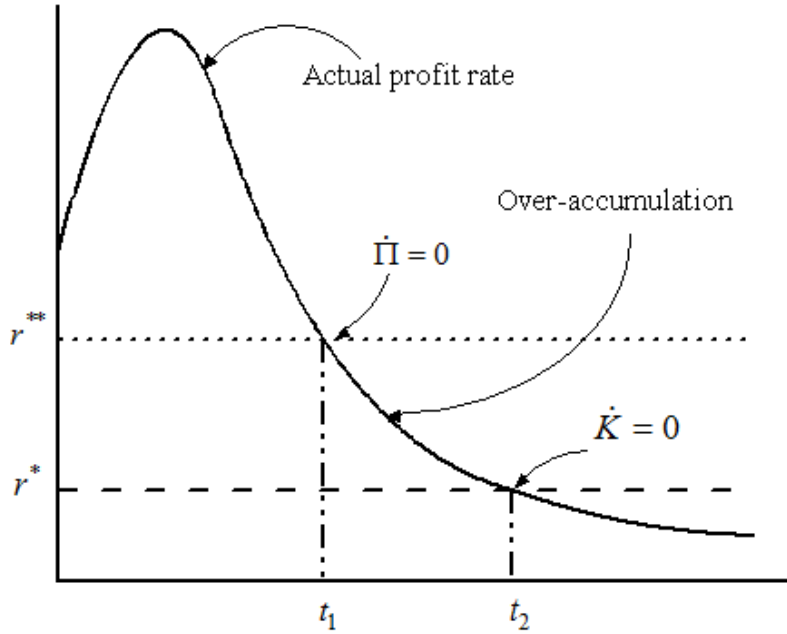
In Figure 1 the economy enters a crisis of stagnation in the mass of profits before capital accumulation grinds to a halt. In this case the term $\left(\theta + \frac{\dot{\pi}}{\pi}\right) < 0$ at the point where $\dot{\Pi} = 0$, which means that the profit share must be falling at a rate greater than θ in absolute terms. However, since $r^{**} > r^*$, the

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rate of capital accumulation remains positive. Thus, between time t_1 and t_2, the economy experiences an "overaccumulation of capital", since capital accumulation continues, despite the fall in the mass of profits. An alternative case is when $\left(\theta + \frac{\dot{\pi}}{\pi}\right) > 0$. In this case we have $r^* > r^{**}$, which means that the mass of profits continues to rise while net investment is zero or even negative.

It is this alternative case which led Nattrass (2014) to erroneously reject the profitability-based approach when she states: "Despite a real growth in the net operating surplus of 2.3% p.a., real investment plummeted by 4.1% p.a. as the economy stagnated...This illustrates the importance of factors beyond immediate profitability in driving the investment decision – and the limitations to using only trends in wages, productivity and profitability as indicators of the health of capitalism". Our argument is that while factors such as political unrest and conflict are conjuncturally important, it is the underlying rate of profit that explains the path of capital accumulation. Furthermore, as pointed out by Duménil and Lévy (1993:314), it is the movement of the rate of profit, as it passes through its crisis levels which defines turning points in the historical development of capitalist economies.

In relation to the dynamics of capital intensity in the phase of crisis, it is important to note that $(r_c - r^*) = \frac{\theta}{s_c \gamma} > 0$. This means that capital intensity will stop rising first before capital accumulation grings to a halt. This further implies that the fall in the rate of profit after capital intensity has stopped rising will come from the decline in the profit share. Also note that $(r_c - r^{**}) = \frac{\theta}{s_c}\left(\frac{1}{\gamma} + \frac{1}{\alpha}\right) + \frac{1}{s_c \alpha}\left(\frac{\dot{\pi}}{\pi}\right) \gtrless 0$. Thus, if $\frac{\dot{\pi}}{\pi} > 0$ capital intensity will stop rising before the mass of profits becomes stagnant. However if $\frac{\dot{\pi}}{\pi}$ is sufficiently negative, then the mass of profits will stagnate before the increase in capital intensity stops.

3. Empirical analysis

3.1 Estimates of the capital stock

Shaikh (2016:243) argues that elements of the rate of profit should be valued at current prices so that the rate of profit does not contain a spurious relative price ratio (see also Weisskopf, 1979). Therefore as a starting point, we present two variations of the perpetual inventory method for estimating

the nominal fixed capital stock as an accumulation of past nominal gross investment. Ths stock-flow accumulation rule is as follows:

$$P_t^k K_t = (1 - \delta_t) P_t^k K_{t-1} + P_t^i I_t, \tag{11}$$

where K_t is the real fixed capital stock, I_t is the real gross fixed capital formation, P_t^k is the price of fixed capital, P_t^i is the price of new fixed capital at time t and δ is a time-varying average rate of depreciation. Note that a further restatement of eq.(11) yields the following equation:

$$P_t^k K_t = (1 - \delta_t) \left(\frac{P_t^k}{P_{t-1}^k} \right) P_{t-1}^k K_{t-1} + P_t^i I_t \tag{12}$$

Eq.(12) is similar to generalised perpetual inventory rule proposed by Shaikh (2016:821). Let $\left(1 + \pi_t^k \right) = \left(\frac{P_t^k}{P_{t-1}^k} \right)$, then the stock-flow accumulation rule can be written as follows:

$$P_t^k K_t = \left[(1 - \delta_0) \left(1 + \pi_0^k \right) \right]^t P_0^k K_0 + \sum_{j=0}^{t-1} \left[(1 - \delta_{t-j}) \left(1 + \pi_{t-j}^k \right) \right]^j P_{t-j}^i I_{t-j}, \tag{13}$$

where $P_0^k K_0$ is the initial nomonal fixed capital stock. For sufficiently long series of gross fixed capital formation, it is clear that as long as $(1 - \delta_0) \left(1 + \pi_0^k \right) < 1$, then as n becomes large, the effect of the initial value of the nominal fixed capital stock on the current nominal fixed capital stock disappears. This implies that the estimate of the nominal fixed capital stock becomes less sensitive to the choice of the initial value as the time series becomes long.

In order to operationalise eq.(13) I need a proxy for π_t^k, δ_t and $P_0^k K_0$. For π_t^k, I will assume that this is the same as π_t^i, which means that the ratio $\left(\frac{P_t^i}{P_t^k} \right)$ is constant. While we assume $\delta_t = \delta$ to be a constant, we take π_t^k as time-varying as in the data. Regarding the initial nominal fixed capital stock, we follow Nehru and Dhareshwar (1993) and run a regression of the

natural log of nominal gross fixed capital investment on a constant and a time trend. We then take the co-efficient on the time trend and use it to estimate the initial capital stock, on the basis of the following equation:

$$P_0^k K_0 = \frac{P_1^i I_1}{(1 + g_0^I) - \left[(1 - \delta)\left(1 + \pi_0^k\right)\right]}, \tag{14}$$

where g_0^I is the coefficient of the time trend in the regression of the natural log of gross fixed capital investment on a constant and a time trend. Note that eq.(14) is based on eq.(12). The regression results show that $g_0^I = 0.03$. With respect to the inflation rate of the price index of the fixed capital stock, we calculate it to be $\pi_0^k = 0.02$. Therefore in order for the nominal fixed capital stock to converge, the requirement is that $\delta > 0.02$. We set the rate of depreciation to be 0.0225, which makes the annual rate of depreciation to be 0.09. As Shaikh (2016:846) illustrates, the effect on the initial capital stock dissipates over the long path as long as $(1 - \delta)\left(1 + \pi_0^k\right) < 1$.

With these ingredients in hand, the estimate of the real fixed capital stock for the aggregate economy is depicted in Figure 2. As can be observed, there was a slowdown in the accumulation of real fixed capital from the mid-1980s to the mid-1990s. Figure 2 also suggests that during this period there was a crisis in a sense that there was no additional capital for purposes of capitalist production. Prinsloo and Smith (1997) note that "a contributing factor to the decline in the growth in real fixed capital stock during the 1990s is that the increase in gross fixed investment fell short of the growth in the depreciation allowance from 1989 to 1993". In Marxist terms, the crisis rate of profit was above the actual rate of profit, i.e. $r^* > r$; the economy was experiencing an overaccumulation crisis.

Figure 2: Real fixed capital stock
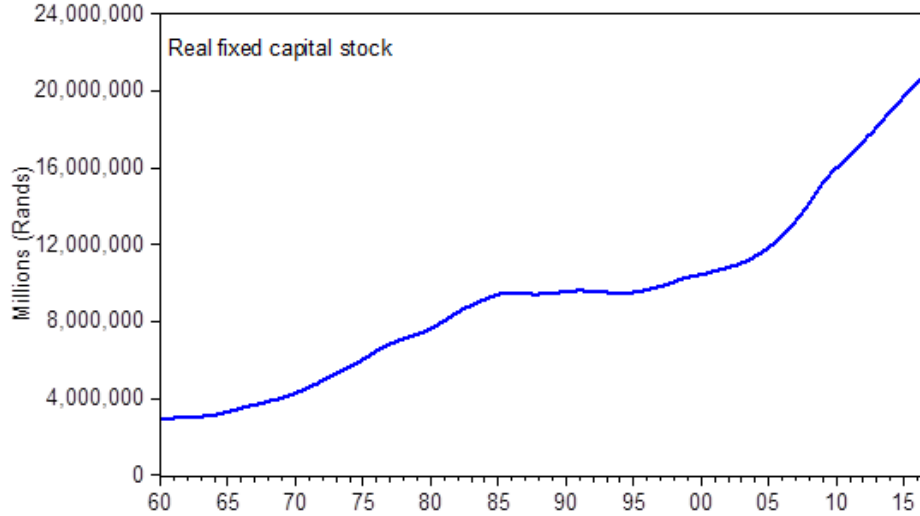
3.2. Empirical patterns of profitability

The appropriate measurement of the rate of profit requires that profits be measured using the same deflator as that of the capital stock. This is important so as to remove the spurious effect of the ratio between the price of output and the price of capital. Figure 3 illustrates the pattern of the rate of profit based on the estimated fixed capital stock. The profile of the rate of profit is consistent with the one found in other countries. In the 1970's the rate of profit fell. The neoliberal period is characterised by the recovery of the rate of profit from 1983 to 2006. Beyond 2006 the rate of profit declines, leading up the great recession which began in 2008.

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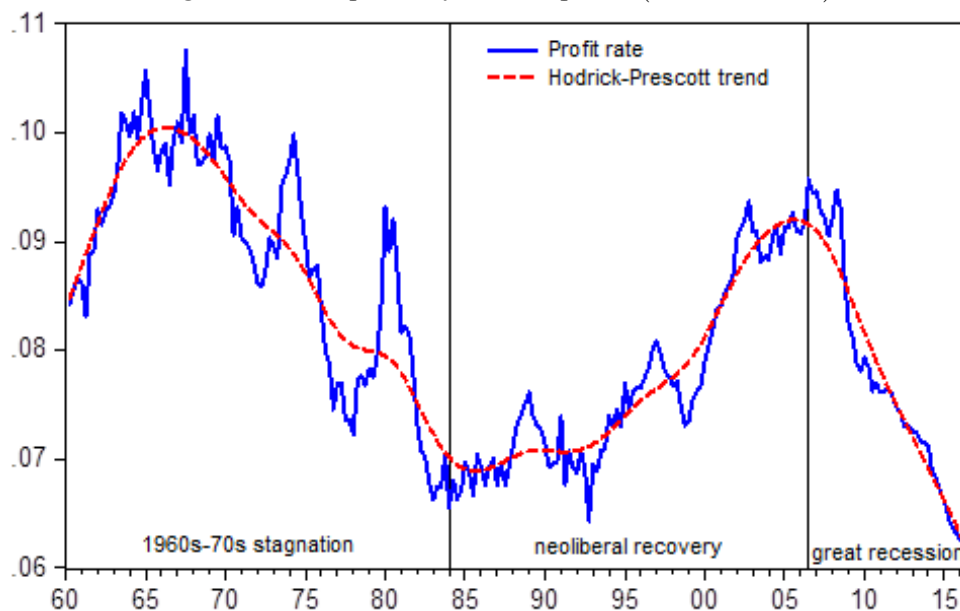Figure 3: The quarterly rate of profit (1960:1-2016:2)

Figure 4 illustrates the behaviour of capital intensity (capital-output ratio) and the profit share in order to assess which of the components of the rate of profit are responsible for its behaviour. We have used the 2010Q4 values, which are 6.43 for the capital-output ratio and 0.495 for the profit share, as base values. Between 1960Q1 and 1998Q4 the profit share remained fairly constant, fluctuating around 0.495. Thereafter the profit share rose sharply in the early 2000s and started declining after 2007. On the other hand, from the early 1960's to the mid-1980s, the capital-output ratio rose persistently. It is therefore the increase in capital intensity which explains most of the decline in the rate of profit between 1960 and 1984. This observation is similar to the one made by Nattrass (1989).

During the neoliberal phase, the profit share remained fairly constant on average, but the capital-output ratio fell. Once again the recovery of the rate of profit over this period is largely explained by changes in the capital-output ratio. From 2002Q4 to 2006Q4 the profit share remained constant but the capital-output ratio continued to fall. During the great recession, the economy experienced both the fall in the profit share and the increase in capital intensity. The sharp increase in capital intensity at the onset of the

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great recession can be explained by the fact that the recession led to a sharp drop in output, which led to a sharp increase in the capital-output ratio.

Figure 4: Capital intensity and the profit share (2010=1)
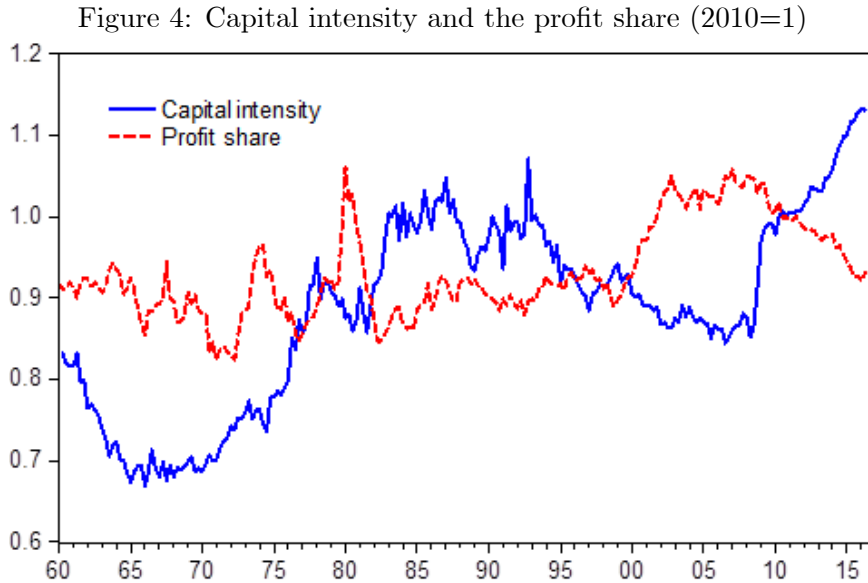
The configuration of the components of the rate of profit after 2010 is similar to the one between 1982 and 1995. During this period, section 4 shows that the South African economy experienced a crisis of absolute overproduction of capital. The historical minimum rate of profit that prevailed in 1984Q1 was 6.6%, the same rate of profit prevailed in 2014Q4. Nevertheless there is an important difference between these two periods. During the crisis in the 1980s the profit share was slightly rising, i.e. $\frac{\dot{\pi}}{\pi} > 0$. However during the current crisis we have $\frac{\dot{\pi}}{\pi} < 0$, i.e. the profit share is falling.

Lastly, we report the normal rate of profit, which removes the effects of capacity utilisation from the rate of profit. The normal rate of profit is therefore the "long-run" rate of profit that would prevail if all capacity were fully utilised. To estimate this rate of profit, we apply the same method as Shaikh (2016: 826) to obtain the rate of capacity utilisation. We then divide the rate of profit depicted in Figure 3 by this rate of capacity utilisation. The results are depicted in Figure 5. Having controlled for fluctuations in capacity utilisation, it can be seen that the neoliberal recovery occurs in

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the early 1990's, corresponding to the beginning of the democratic period in South Africa. The extent of the recovery did not lead to as high a peak in the normal profit rate as in the 1960s.

Figure 5: The normal quarterly rate of profit (1960-2016)
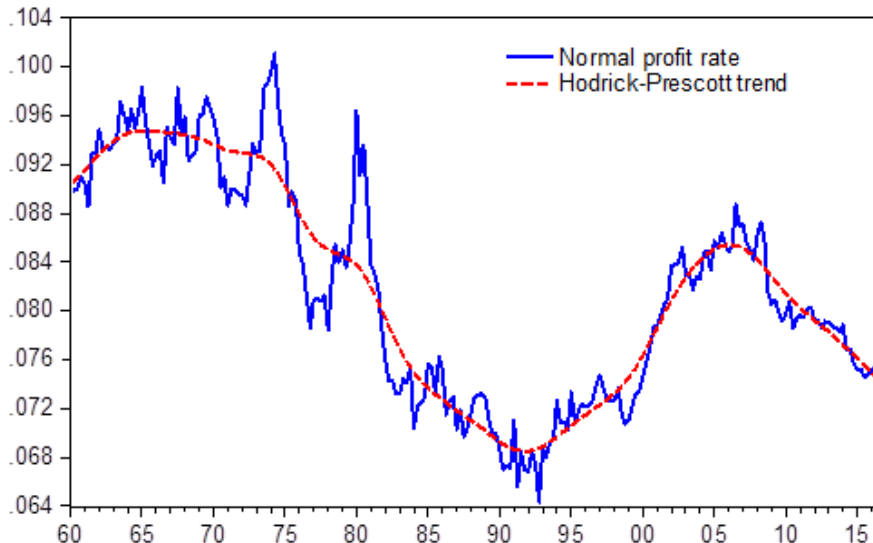
Figures 3 and 5 also show that the South African rate of profit contains a downward trend. There are two large shocks to the normal profit rate. These two shocks are associated with a combination of conjunctural events. The first shock occurred between 1972 and 1976. In the beginning of 1972 there was an increase in the price of gold, which was one of the major exports for the South African economy. However, as pointed out by Terreblanche (2002: 305), in 1973 there was a strike, which depressed profits. In 1974 there was a coup in Portugal, which posed a serious threat to the apartheid regime because this coup opened prospects for the independence of neighbouring Mozambique and Angola. This served to depress the investment environment, which was further depressed by the 1976 student uprisings.

The second shock in 1980 is due to the sharp increase in the gold price. Furthermore, in 1980 there was an increase in workers' strikes, which also decreased profits. Terreblanche (2002: 342) says that "the number of strikes and working days lost increased considerably from 1980 onwards and reached

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a new high point in 1982, when almost 400 strikes took place and 365 000 working days were lost". The sharp changes in the normal rate of profit therefore correspond to conjunctural political events that characterise the turbulence of the South African socio-economic formation. However, the underlying trend in the rate of profit remained downwards, and this falling trend in the rate of profit ultimately choked the growth of the mass of profits and, as Prinsloo and Smith (1997) note, capital accumulation became insufficient to cover depreciation between 1989 and 1993.

4. Econometric evidence on cyclical crises

In this section, we provide econometric specifications and estimations of the equations that have been outlined in the theoretical framework. The relevant equations to be estimated are eqs.(2), (5) and (9). We treat these equations as expressing "long run" relations, so that our preferred estimation strategy specifies lags of the dependent variable in order to capture the short-run dynamic properties of the data. We begin with an econometric specification of eq.(2), the rate of capital accumulation:

$$
\begin{aligned}
g_t^k &= \underset{(0.01)}{1.63} g_{t-1}^k - \underset{(0.01)}{0.66} g_{t-2}^k + \underset{(0.01)}{0.06} r_{t-1} - \underset{(0.02)}{0.04} x_t + \underset{(0.03)}{0.01} s_t^g - \underset{(0.00)}{0.004} \\
\overline{R}^2 &= 0.99,\ DW = 2.04,
\end{aligned}
\tag{15}
$$

where $g^k = \frac{\dot{K}}{K}$ is the annualised growth rate of real fixed capital. In eq.(15) we observe that the government budget surplus is not a statistically significant driver of the rate of capital accumulation. The rate of profit and the current account balance play a significant role. We can derive r^* by setting $g_t^k = 0$. This yields a series of r^*, which is depicted by the dotted line in Figure 6.

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Figure 6: Profitability and the overproduction crisis $(\dot{K}=0)$
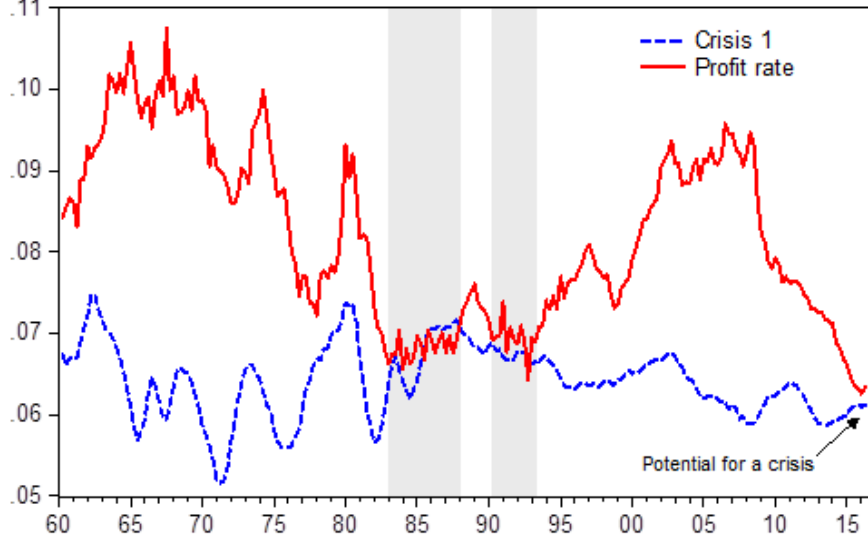
The first shaded portion of the graph, which lies between 1983Q1–1988Q1, shows the first episode in the sample, where the economy experienced a crisis of overproduction of capital. The second shaded portion also depicts a crisis period between 1990Q2–1993Q1. The second shade corresponds to the period where Smith and Prinsloo (1997) say "gross fixed investment fell short of the growth in the depreciation allowance". Figure 6 shows that the crisis of stagnation in the rate of capital accumulation lasted for approximately 10 years, from 1983Q1–1993Q1.

The next crisis rate of profit that we derive is the one which is associated with a stagnant mass of profits. In this connection, we specify and estimate eq.(9) as follows:

$$g_t^{\Pi} = \underset{(0.04)}{0.44}g_{t-1}^{\Pi} + \underset{(0.07)}{1.05}g_t^{\pi} + \underset{(0.22)}{0.48}r_t + \underset{(0.69)}{1.51}s_t^g - \underset{(0.39)}{0.04}x_t - \underset{(0.02)}{0.03}$$

$$\overline{R}^2 = 0.80, \ DW = 1.33, \tag{16}$$

where $g^{\Pi} = \frac{\dot{\Pi}}{\Pi}$ and $g^{\pi} = \frac{\dot{\pi}}{\pi}$ are annualised growth rates. We observe that the government budget surplus is statistically significant while the current

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account is not significant. The size of the coefficient on the growth rate of the profit share is 1.05, which is close the theoretical value of 1. We can then derive r^{**} by casting eq.(16) in the long run and then setting the growth rate of profits to zero. The result is illustrated in Figure 7. The first crisis of overproduction of capital in the sample period occurred between 1984Q1–1986Q3. The second crisis started in 2012Q4 and is still on-going. Note that after 2015Q1 the crisis rate of profit began exceeding the actual rate of profit, which means that during this period the mass of profits is in decline.

Figure 7: Profitability and the overproduction crisis ($\dot{\Pi}=0$)
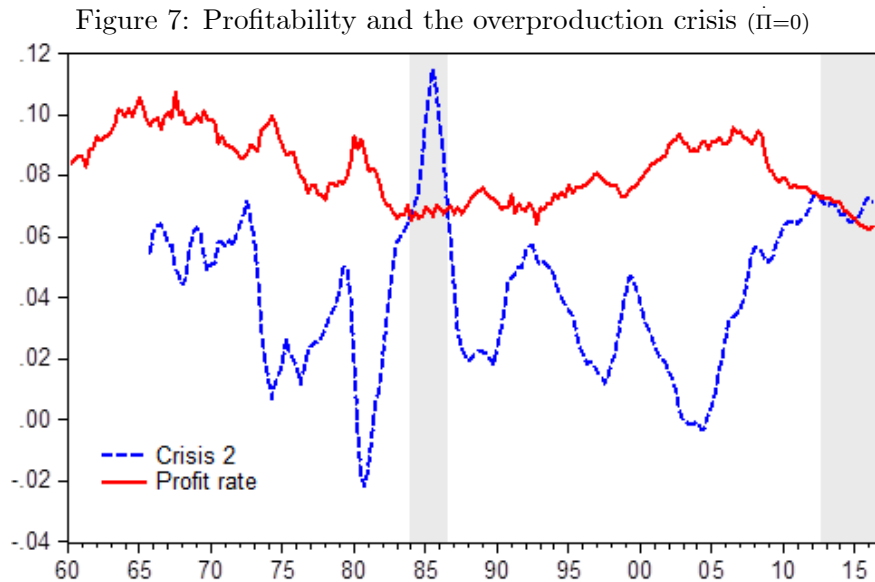
Looking at Figures 6 and 7, both the crisis rates of profit concur that the South African economy experienced an overproduction of capital crisis in the mid-1980s. It is precisely during this period that a major political turning point occurred in the struggle against apartheid. The formation of the anti-apartheid United Democratic Front (UDF) in 1983 was followed by the formation of the trade union federation, the Congress of South African Trade Unions (COSATU), in 1985. These major developments strengthened the political opposition to apartheid, which culminated in the release of political prisoners in the late 1980s and the ultimately the unbanning of the national liberation movements in 1990.

In a similar fashion, the current crisis, which in our framework began in 2012Q3, was also accompanied by some political changes and developments. The first important political development was the massacre of mineworkers on the platinum mines of Marikana on 20 August 2012 by the state. This was followed by the divisions in the Congress of South African Trade Unions, which ultimately led to the expulsion of the second largest union in the country, the National Union of Metalworkers of South Africa (NUMSA) in 2014 and the decision by the Food and Allied Workers Union (FAWU) to leave the trade union federation in 2016. Another development was the establishment of the Economic Freedom Fighters (EFF) in 2013, which is largely composed of a breakaway from the ruling African National Congress (ANC). All these developments were coupled with sharpening divisions within the ruling ANC, and they contributed towards the poor electoral performance of the ANC in the 2016 local government elections.

Lastly, it is important to check if the scope for the increase in capital intensity still exists. If such a scope exists, then we expect the rate of profit to continue falling below r^{**}, thereby deepening the crisis of overproduction of capital. If the profit share also continues to fall and the deficit on the current account declines, then by eq.(10) r^{**} would increase, thus worsening the crisis. In estimating eq.(5) we were confronted with a puzzle in that the sign on the rate of profit was negative, instead of being positive. In order to get around this problem, we estimate an econometric specification of eq.(4) in order to derive the critical rate of capital accumulation that is consistent with a stationary capital intensity. The econometric specification for eq.(4) is given by:

$$
\begin{aligned}
g_t^V &= \underset{(0.07)}{0.52}g_{t-1}^V + \underset{(0.07)}{0.15}g_{t-2}^V + \underset{(0.08)}{0.29}g_t^k - \underset{(0.00)}{0.01} \\
\overline{R}^2 &= 0.51, \; DW = 2.01,
\end{aligned}
\tag{17}
$$

where $g^V = \frac{\dot{V}}{V}$ is the annualised growth rate of capital intensity. By setting $g^V = 0$, we obtain the critical rate of capital accumulation to be $g_c^k = 0.028$, at which capital intensity is stationary. The results are illustrated in Figure 8.

Figure 7: The dynamics of capital intensity and the crisis
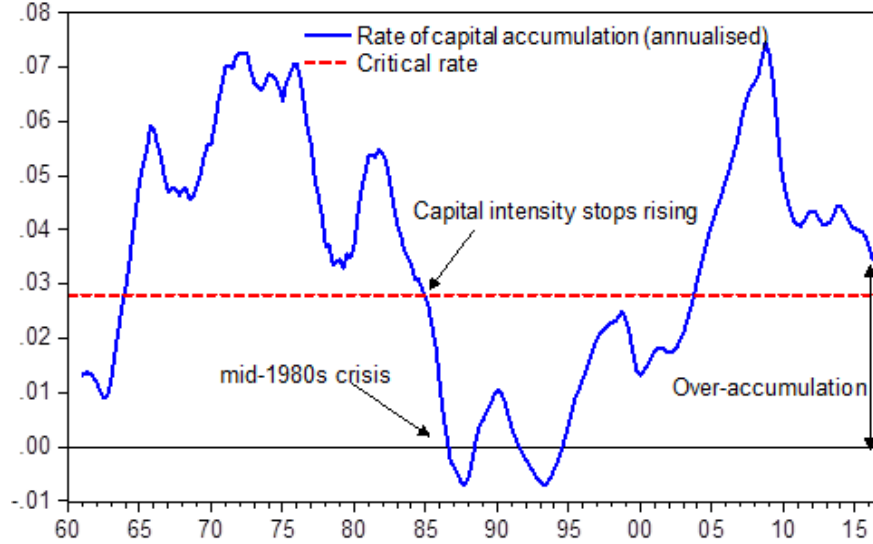
In the mid-1980s capital intensity stopped rising after 1985Q1, a year after the crisis of overproduction of capital. Thereafter the rate of capital accumulation plummeted and fluctuated around zero. The overaccumulation crisis lasted for roughly two years. While the current crisis of overproduction of capital started at least from 2012Q3, there is still a substantially positive rate of capital accumulation, which signals a much more prolonged overaccumulation crisis than in the 1980s. However since the crisis rate of profit ultimately rose above the actual rate in 2015Q1, we expect that the rate of capital accumulation would collapse sharply. In addition, since the rate of capital accumulation remains slightly above the critical rate, we expect the rate of profit to continue falling since capital intensity would rise slightly. The prospects of a recovery in the light of this configuration of the rate of capital accumulation and the rate of profit are therefore non-existent.

5. Policy responses to the crisis

Eqs.(6), (7) and (10) show that fiscal austerity measures will reduce the critical and crisis rates of profit. Given the actual rate of profit, this will lead to a recovery in the mass of profits and in the rate of capital accumulation. Econometric evidence from eqs.(15) and (16) suggests that fiscal policy is more effective in driving the growth rate of the mass of profits than it is in

driving the rate of capital accumulation. Therefore the crisis of overaccumulation cannot be effectively tackled using fiscal policy, however the crisis of overproduction of capital, the need to raise the mass of profits, can be effectively tackled using fiscal policy. Fiscal austerity would however mean that public spending on meeting the needs of the working class may have to be curtailed, which may lead to a political crisis.

It should be noted that fiscal austerity measures are contradictory, because they also reduce the critical rate of profit below the actual rate, which soon leads to an increase in capital intensity and puts downward pressure on the rate of profit. This dynamic may explain the observation made by Tsoulfidis et al.(2016) in the context of Greece. These authors state that "after five years of relentless austerity, the Greek economy is far from recovering. Contrary to the stated aims of the austerity package, the Greek economy remains trapped in a debt-deflation spiral that has precipitated the collapse of its productive base".

As part of the package to get out of the crisis, Tsoulfidis et al.(2016) propose that Greece "focuses on the revitalization of economic activity through demand-side polices, as well as institutional, industrial and banking sector reforms". From the standpoint of fiscal policy such measures would entail an expansionary fiscal stance. Deficit spending would prevent capital intensity from rising, which would facilitate a recovery in the rate of profit given the profit share. However deficit spending would raise the crisis rates of profit. Overall the mass of profits and the rate of capital accumulation will not recover. In the light of this, the tax base will not grow and the public sector is likely to be in a debt-trap.

An alternative is to adopt measures that directly affect the current account. What is clear from the equations is that a current account deficit would reduce the crisis rates of profit. The econometric evidence suggests that current account oriented policies will likely be more effective in tackling the overaccumulation crisis than the crisis of overproduction of capital. Therefore policies that promote current account deficits will ease the crisis. However such policies are not sustainable, because persistent deficits on the current account will lead to an increase in foreign debt and ultimately, a balance of payments crisis.

The mechanism by which the mass of profits can recover without bringing

to the fore the contradictory effects that we have outlined is to increase the profit share. This can be achieved, as Marx (Capital III: Chapter XIV) notes, by either suppressing the real wage below the value of labour power, increasing the intensity of exploitation, and increasing relative overpopulation (unemployment) all of which are linked to the weakening of worker militancy. The more direct political intervention would be to weaken working class organisations, especially progressive trade unions. If some measure of deficit on the current account is to be accommodated, it should be due to the importation of cheaper elements of constant and variable capital. However if a surplus on the current account is maintained during the crisis, it should be that economies of scale exist and are sufficiently exploited to reduce unit costs, while expanding production.

6. Conclusion

The South African economy is characterised by a number of challenges, key of which are high levels of unemployment, poverty and inequality. A series of studies, expert panels and commissions have been undertaken with a view to provide long-lasting solutions to these challenges. To date, none of these initiatives have borne any tangible results. While there is a general view that this lack of results is due to government's inability to implement recommendations and policies, there has been very little consideration of the role of profitability in constraining and relaxing the parameters of successful state intervention within the logic of the capitalist mode of production.

This paper proceeds from a Marxist perspective in order to identify the phase changes of capitalist accumulation in the South African economy. By constructing a new series of the quarterly fixed capital stock, we estimate an appropriately deflated quarterly rate of profit of the South African economy and find that the rate of profit displays a tendency to fall in a cyclical manner. This tendency is more striking for the normal rate of profit, which controls for fluctuations in capacity utilisation. The main driver of the rate of profit to fall is the tendency of capital intensity to rise.

We also derive time varying rates of profit which correspond to stationary capital intensity, zero capital accumulation and stagnant mass of profits. Consistent with other international studies cited by Tsoulfidis and tsaliki (2014), we find that the period of the mid-1980s constitutes a phase change in the path of capital accumulation in South Africa. In relation to the current

crisis, we identify the period after 2012Q3 to constitute a phase change in capital accumulation. However two differences stand out between the current phase change and the one on the 1980s.

Firstly, during the 1980s crisis, the profit share was rising whereas during the current crisis, the profit share is falling. Secondly in the 1980s, the economy experienced the "overaccumulation crisis" between 1982Q4 and 1987Q2, which is almost five years. During the current crisis, the economy has already entered its overaccumulation phase for almost four years. Yet, despite the continuing stagnation in the mass of profits, the gap between the actual profit rate and the rate of profit that is consistent with a halt in capital accumulation remains large. We thus conclude that, unless the profit share rises, which is unlikely to happen without class struggles, the crisis of overaccumulation will continue until the actual profit rate has fallen to the level where capital accumulation grinds to a halt. This dims the growth prospects of the South African economy.

Our theoretical framework suggests that fiscal austerity measures would reduce the crisis rate of profit and permit the recovery in both the mass of profit and the rate of capital accumulation. However such measures would also reduce the critical rate of profit, which will permit the increase in capital intensity. Since the increase in capital intensity puts downward pressure on the rate profit, the economy would once again experience a fall in profitability. The other alternative is to adopt expansionary fiscal policy through deficit spending. However this alternative has its own limits. It will raise the crisis rates of profit, sink the economy deeper into crisis and raise public debt. The other option is to allow for imports to cheapen the elements of constant capital and the value of labour power, which would worsen the current account balance. This option too is not sustainable, since it may lead to foreign debt crisis.

It therefore appears that for the economy to resolve the current crisis on the capitalist basis, measures that raise the profit share and a slowdown in the accumulation process would be necessary to decrease the crisis rates of profit and to support the recovery of the rate of profit. Such measures would entail an attack on the working class. The slowdown in the rate of capital accumulation would increase the unemployment rate, which would suppress the growth rate of real wages below the value of labour power.

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