Reproduction and Crisis in Capitalist Economies

Deepankar Basu

The Oxford Handbook of Karl Marx
Edited by Matt Vidal, Tony Smith, Tomás Rotta, and Paul Prew

Abstract

An economic crisis in capitalism is a deep and prolonged interruption of the economy-wide circuit of capital. Crises emerge from within the logic of capitalism's operation, and are manifestations of the inherently contradictory process of capital accumulation. The Marxist tradition conceptualizes two types of crisis tendencies in capitalism: a crisis of deficient surplus value and a crisis of excess surplus value. Two mechanisms that become important in crises of deficient surplus value are the rising organic composition of capital and the profit squeeze: two mechanisms that are salient in crises of excess surplus value are problems of insufficient aggregate demand and increased financial fragility. This chapter offers a synthetic and synoptic account of the Marxist literature on capitalist crisis.

For Marx, capitalism was an inherently crisis-prone system of social production. In his account, crises emerged from within the very logic of capitalism and were a manifestation of the inherent contradictions of the system. Using modern parlance, we can say that Marx conceived crisis as being endogenously generated by the functioning of capitalist systems. From this line of thinking comes the important conclusion that capitalism cannot exist without crises. The corollary is that any theory of the dynamics of capitalism must incorporate a theory of crisis as one of its integral components.

In adopting this viewpoint, Marx not only differed sharply from later-day neoclassical economists but also from major political economists of his time, including David Ricardo, who thought of crises as accidental phenomena, not related to the essential logic of capitalism. In modern parlance, Ricardo could probably be paraphrased as asserting that economic crises in capitalism were caused by exogenous factors. Developing the logic of the endogenous conceptualization of crisis, and implicitly contrasting it with the diametrically opposed viewpoint that understands crisis as caused by exogenous factors,

provides a good entry point into Marxist analyses of capitalist crisis. But before we take that up, a small detour is in order.

To the extent we know on the basis of the extant literature, Marx did not leave behind a systematic analysis of capitalist crisis. This has been noted by later Marxist scholars, including Sweezy (1942), Foley (1986), and Heinrich (2012). While Marx (and Engels) referred to the phenomenon of capitalist crisis as early on in their political life as 1848 (in *The Communist Manifesto*), his comments on the topic are mostly fragmentary. In fact, they are not even collected together in one work but are instead scattered in various places in multiple texts. Many of these texts were not published during his lifetime like the *Notebooks of 1857-58* (the *Grundrisse*), the *Theories of Surplus Value* (written between 1861 and 1863) and Volumes II and III of *Capital* (written between 1863 and 1865). Hence, it seems clear that Marx never got the chance to return to these texts and fully work out his ideas on capitalist crisis.

Even though Marx's writings on capitalist crisis are incomplete and scattered, they can still be a source of important insights if approached with care. The key point to keep in mind when engaging with Marx's writings on capitalist crisis is that one can have a theory of capitalist crisis at two very different levels of abstraction. On the one hand, there can be a general theory of capitalist crisis at a high level of abstraction. Such a theory tries to demonstrate, using political-economic reasoning, why crisis is built into the very logic of capitalism and why capitalism cannot be conceived without at the same time thinking about crisis. On the other hand, there can be theories of capitalist crisis at lower levels of abstraction. Such theories delineate specific economic mechanisms that can push a capitalist economy toward a crisis in a particular situation.

The main body (and most systematic part) of Marx's writings on capitalist crisis are of the first type; they are comments on a general theory of capitalist crisis, on the nature of economic crisis in capitalist economies understood at a high level of abstraction. While one can find scattered comments on specific mechanisms that generate crisis in capitalism, with the most developed one being a discussion of the law of the tendential fall in the rate of profit in Volume III of *Capital*, these are mostly incomplete and unsystematic. It is only later scholars and activists who have picked up one or the other of Marx's comments on specific mechanisms and converted them into all-encompassing theories, or *the* theory, of capitalist crisis. Proponents of each of these theories have, then, spent inordinate amounts of time and energy in arguing why other theories are wrong or un-Marxian. One important task of this chapter is to show that most of these controversies are unnecessary. A synthesis of Marxist theories of crisis can accommodate each of the important strands within one unified framework.

The rest of the chapter is organized as follows. Section 1 discusses a general theory of capitalist crisis based on Marx's writings. Sections 2 and 3 discuss in greater detail specific mechanisms that generate crisis tendencies in capitalist economies, drawing on the writings of Marx and later Marxist scholars. To organize the discussion of specific mechanisms identified by the Marxist tradition as causes of crisis in capitalism, this

article offers a typology in terms of two broad types of crises tendencies: a crisis of deficient surplus value, and a crisis of excess surplus value. Section 2 discusses the first type of crisis—the crisis of deficient surplus value. Section 3 discusses the second type of crisis—the crisis of excess surplus value. The discussion concludes in section 4 with some comments about important controversies in the Marxist literature on capitalist crisis. Some arguments developed in the chapter have been expressed in mathematical form in Proposition 1 and 2. In Appendix A, I provide proofs of both these propositions. In Appendix B, I present details of a critical investigation of some variants of the underconsumptionist view of capitalist crises.

1. The Nature of Capitalist Crises

1.1 Definitions

A convenient starting point for a Marxist analysis of crises in capitalism is the economy-wide circuit of capital, M-C-- (P) -- C'-M', which is an abstract representation of the flow of value in the capitalist economy. Using the circuit of capital, one can conceptualize the capitalist economy as starting with a sum of money, M, and using it to purchase commodities, C, which includes both means of production and labor-power. The two are then combined in the process of production, (P), with the output being the flow of finished commodities, C'. The circuit completes itself when the finished commodities are sold in the market for a sum of money, M'. The difference between M' and M is surplus value, which is generated in production and realized through sale. When there is large scale and long-lasting interruption of the process of generation and realization of surplus value, a capitalist economy enters a period of structural economic crisis.

> Definition 1. *A structural crisis of capitalism is a deep and prolonged interruption of the economy-wide circuit of capital.*

A structural crisis of capitalism always manifests itself, first and foremost, as a *crisis of overproduction* (i.e., an accumulation of unsold and unsalable commodities). The rupture starts in the last phase of the circuit of capital (i.e., in the stage represented by C'-M', and quickly develops into a situation marked by the paradoxical coexistence of unused productive capacity and unmet human needs). To understand why the capitalist system gets caught in crises of overproduction so often, Marxist political economy offers insights at two levels of abstractions, a general theory of crisis at a high level of abstraction and specific mechanisms of crisis at lower levels of abstraction.

1.2 A General Theory of Crisis

Marx's general theory of capitalist crisis is developed in the most systematic manner in chapter 17 of Book II of the *Theories of Surplus Value* (Marx 2000) and in section 2 of the chapter on capital in the *Grundrisse* (Marx [1953] 1993). In the *Theories of Surplus Value*, we find a detailed critique of the acceptance by orthodox economics of Say's Law, the

proposition that generalized overproduction is not possible in capitalism.[1] In this text, Marx is critical of one-sided arguments of both supply-siders such as Ricardo and demand-siders such as Sismondi. Instead, he offers a more wholistic approach and argues that the denial of the possibility of overproduction—the key characteristic of capitalist crisis—rests on two conceptual fallacies: ignoring money and abstracting from capitalism.

In a barter economy, the possibility of rupture of the process of circulation (of the goods and services produced) is minimal. This is because every sale is immediately also a purchase. But with money mediating exchange of commodities, the coincidence of sale and purchase is broken, and so sale and purchase can be separated—both in time and in space. The fact that capitalism is a specific form of a commodity producing system, where labor-power has also become a commodity, means that most transactions are mediated through money. Hence, the mere recognition of the central role of money in capitalist commodity production is enough to demonstrate the *possibility* of a crisis of overproduction in capitalism. But Marx goes further.

Capitalist commodity production, represented by the circuit of capital, is ultimately governed by the logic of generation and realization of surplus value. But capitalist firms are interested not so much in the absolute amount of surplus value as they are in the amount of surplus value in relation to the amount of capital they advanced to begin the circuit. The ratio of surplus value and the capital advanced is the rate of profit. Thus, the key motivation and driver of the capitalist system is the need to continuously increase the rate of profit, and absent an increase, certainly to prevent it from falling.

When the average rate of profit falls below some threshold, capitalist firms drastically reduce investments or even stop investing altogether. If the reduction in capital outlays is large in magnitude and affects significant portions of the capitalist economy, it will lead to an immediate fall in aggregate demand in the whole economy. The reduction in capital outlays will also entail laying off currently employed workers or drastic reductions in hiring of new workers, which, in either case, will imply a fall in wage incomes. The fall in wage incomes will lead to a reduction in consumption expenditure by working-class households and cause a further fall in aggregate demand, worsening the initial problem. If capitalist firms react to the decline in aggregate demand (and the emergence of excess capacity in key sectors) with a second round of reductions in capital outlays, this could very well be the beginnings of a deep and prolonged interruption of the economy-wide circuit of capital.

This gives us the proximate cause of crisis in capitalist economies: a decline in the rate of profit.

> Definition 2. *The proximate cause of structural economic crisis in capitalism is a fall in the average rate of profit.*

The rate of profit can fall in two different, and mutually exclusive, ways. These offer us a typology of economic crises in capitalism.

The first way in which the rate of profit can fall is when the economy is marked by a chronic insufficiency of demand, so that the commodity is sold at a price that is below its value (or price of production). Hence, the sale of the commodity does not realize the full surplus value (or the average rate of profit), and the *realized* rate of profit falls below the "normal" rate of profit (which prevailed previously). This scenario is identified in this entry with a "crisis of excess surplus value" (because more surplus value was produced than could be realized through sale).

The second way in which the rate of profit can fall is when, despite the commodity selling at its full value (or price of production), the realized rate of profit declines. Thus, in this case, the problem is not one of realization of the surplus value embedded in commodities, but rather points to the production of insufficient surplus value. This scenario is identified in this paper with a "crisis of deficient surplus value" (because the system produces less surplus value than is necessary to ensure a normal rate of profit).[2]

2. Crisis of Deficient Surplus Value

In a crisis of deficient surplus, the rupture in the economy-wide circuit that is proximately caused by a fall in the rate of profit rests on two different mechanisms: (a) the rising organic composition of capital (Marx, [1894] 1991; Mattick, 1981; Shaikh, 1978; Kliman, 2011), and; (b) the profit squeeze (Marx, [1867] 1990; Glyn and Sutcliffe, 1972; Boddy and Crotty, 1975). The easiest way to grasp the logic of these two mechanisms is to start with the definition of the rate of profit and decompose it in terms of the rate of exploitation and the organic composition of capital.

2.1 The Rate of Profit

Let C and V represent constant capital and variable capital advanced, and S represent the surplus value generated, in the production of commodities. The value of commodities, W, is given by the sum of the three: W=C+V+S. We can define two ratios with respect to the production process:

$$Q=cv$$

(1)
represents the organic composition of capital, and

$$e=sv$$

(2)
represents the rate of exploitation. The rate of profit, r, is defined as the ratio of surplus value and total capital advanced (sum of constant capital and variable capital), and can be expressed in terms of the rate of exploitation and the organic composition of capital as follows:

$$r=SC+V=(SV)(CV)+1=e1+Q.$$

(3)

Equation (3) shows that the rate of profit will fall if either of the following obtains: (a) the rate of exploitation falls, with the organic composition of capital remaining unchanged; and (b) the organic composition of capital rises, with the rate of exploitation remaining unchanged. These two routes for the possible fall in the rate of profit provide primary motivations for the two mechanisms that can lead to crises of deficient surplus value: the former is referred to as the profit squeeze mechanism, and the latter as the rising organic composition of capital mechanism.

Before discussing these mechanisms, one issue needs to be addressed: the possibility of a functional relationship between the rate of exploitation and the organic composition of capital. The validity of both the profit squeeze mechanism and the rising organic composition of capital mechanism rests on the specific nature of such a relationship, if it exists at all.

When we consider a causal effect running from changes in the rate of exploitation to the organic composition, the relationship is likely to be negative. For instance, when changes in labor market conditions, like the depletion of the reserve army of labor or rapid unionization, increase the bargaining power of workers vis-a-vis capitalists, it is likely to translate into upward pressure on real wages, implying a fall in the rate of exploitation. Capitalists are likely to respond with, among other things, the active search for and adoption of new techniques of production that save on the costly input (i.e., labor power). Adoption of such labor-saving technical change can, under some conditions, lead to an increase in the organic composition. Hence, in this case, we would expect a negative relationship between the rate of exploitation and the organic composition of capital. Thus, if there is an *exogenous* fall in the rate of exploitation, the organic composition of capital will, as a result, rise.

On the other hand, when we consider a causal effect running from the organic composition to the rate of exploitation, the relationship is likely to be positive. This is because an increase in the organic composition is likely to reflect the increasing mechanization of the production process. The adoption of such capital-intensive techniques of production is likely to increase the productivity of labor, and if real wages do not move up one for one, the rate of exploitation will increase. Thus, if there is an *exogenous* rise in the organic composition of capital, the rate of exploitation will, as a result, rise.

2.2 Profit Squeeze

The profit squeeze mechanism was elaborated by Marx in chapter 25 of Volume I of *Capital* (Marx, [1867] 1990), and referred to again in chapter 20 of Volume II of *Capital* (Marx, [1885] 1992) and in chapter 15 of Volume III of *Capital* (Marx, [1894] 1991). While it has been used by Dobb (1945) as a general theory of economic crisis in capitalism, it was also used by many Marxist scholars to offer an explanation of the crisis of the 1970s (see, for instance, Glyn and Sutcliffe, 1972; Boddy and Crotty, 1975; Bowles, et al. 1983).

The underlying logic of the argument is straightforward. As capitalist economies emerge from business-cycle recessions, capital outlays by capitalist firms pick up. With the growth in capital outlays comes the growth in the demand for labor power. If the pace of capital outlays and capital accumulation remains high for several years, the labor market starts tightening and the reserve army of labor—what Marx calls the relative surplus population—starts depleting. As the reserve army becomes smaller, the bargaining power of workers increases, reflecting the decline in the "cost of job loss": if a worker is laid off, he or she can find alternative employment relatively easily. The increase in the bargaining power of workers translates into higher real wages. If there are constraints of the ability of firms to raise prices (due, for instance, to international competition), the growth rate of real wages might outpace the growth rate of labor productivity, leading to a squeeze on profits. The fall in the rate of profit chokes off capital outlays, setting off a crisis.

While theorists who used, or still use, the profit squeeze mechanism for explaining capitalist crisis did not pay much attention to the possible effect of the fall in the rate of exploitation on the organic composition of capital, doing so will only strengthen the argument. If the rate of exploitation falls, capitalist firms will have a strong incentive to replace workers with machines. If successful, that will increase the organic composition of capital. Using (3), we can see that the rise in the organic composition of capital, as a response to the fall in the rate of exploitation, will depress the rate of profit further and might lead to a deeper crisis.

2.3 Rising Organic Composition of Capital

In chapter 13 of Volume III of *Capital*, Marx discussed the rising organic composition of capital mechanism under the title of the "law of the tendential fall in the rate of profit" (Marx, [1894] 1991). The starting point of Marx's argument is the recognition of an important characteristic of capitalist production—that is, it's growing mechanization—whereby the same quantity of labor power works with a growing mass of raw materials and machinery. Hence, the volume of constant capital advanced (i.e., the money used to purchase the non-labor inputs into production, rises with respect to the volume of variable capital advanced (i.e., the money used to purchase labor power). The result is an increase in the organic composition of capital. If the rate of surplus value remains unchanged, the average rate of profit will fall.

There are at least two possible questions that arise with respect to this celebrated argument of Marx.[3] First: can we justify the assumption that the rate of exploitation remains unchanged even as the organic composition of capital increases exogenously? Second: can we offer a convincing explanation of why the organic composition of capital *must* rise over time?

2.3.1 Responsiveness of the Rate of Exploitation to the Organic Composition

The answer to the first question has already been indicated above: we *cannot* justify the claim that the rate of exploitation remains unchanged when the organic composition of capital increases. There is sound economic reasoning to suggest, as we have argued

above, that exogenous increases in the organic composition increases the rate of exploitation. In fact, there is much evidence that, in various parts of the three volumes of *Capital,* Marx himself made that same argument.[4] Once we take the positive relationship between the rate of exploitation and the organic composition into account, we can no longer agree with Marx's assertion about the law of the tendential fall in the rate of profit. This is because the rate of exploitation might rise to nullify the effect of the rise in the organic composition on the rate of profit. But we can still make a weaker claim: if the elasticity of the rate of exploitation with respect to the organic composition of capital is not too high, then an increase in the latter will lead to a fall in the rate of profit.

> *Proposition 1: Let Q denote the organic composition of capital. If the elasticity of the rate of exploitation with respect to the organic composition of capital is less than Q*/(1 + Q), *then any increase in the organic composition will lead to a fall in the rate of profit.*

What is the intuition for this result?[5] The elasticity of the rate of exploitation with respect to the organic composition is the percentage change in the former that is caused by a 1% change in the latter. It measures the responsiveness of the rate of exploitation to changes in the organic composition of capital. Recall that the rate of profit is the ratio of the rate of exploitation and the organic composition of capital. Thus, if the rate of exploitation is not "too responsive" to the organic composition of capital then an increase in the latter does not cause "too large" a change in the former. Hence, in this case, the effect of the increase in the organic composition will not be nullified by the effect of the increase in the rate of exploitation, so that the rate of profit will fall.[6]

2.3.2 Value or Physical Quantities

The second question is more difficult to answer: why must the organic composition of capital rise with capital accumulation? Marx's argument, developed in chapter 25 of Volume I of *Capital* and in chapter 13 in Volume III of *Capital*, and elaborated by later scholars such as Mattick (1981) and Shaikh (1978), starts from the recognition that capital accumulation is mediated and enforced in capitalist economies through the competitive struggle between capitalist firms. The process of competition between capitalist firms creates strong incentives for finding and adopting cost-reducing methods of production. This is because reduction in the cost of production can increase profits and expand market shares. Since cost of labor-power is an important component of the total cost of production, the search for cost reduction often ends up in the adoption of labor saving technical change (i.e., mechanization). Thus, with the progress of capitalist production, the ratio of machines to workers rises. This is why, these authors would argue, the process of capital accumulation is accompanied by a rise in the organic composition of capital.

While it is true that capital accumulation leads, on the whole, to an increasing mechanization of the production process, this does not imply that the organic composition of capital rises. The increasing mechanization of the production process is manifested as each worker working with more machines and converting more raw materials into

finished products. Thus, in purely physical terms, the ratio of non-labor and labor inputs in production *might* rise because "an ever growing mass of means of labour" is used by each worker. But this does not imply that the organic composition of capital also rises. This is because the organic composition of capital is a value magnitude. It is the ratio of the value of constant capital and the value of variable capital. The fact that the physical ratio of non-labor and labor inputs in production might rise does not imply that the corresponding value ratio will also rise. There are two complications to consider.

First, the process of technological change reduces the value of all commodities, including the value of means of labor. Thus, even when each worker works with a larger *mass* of means of labor, the fall in the value of each unit of the means of labor might very well imply a fall, rather than a rise, in the organic composition of capital. Second, one of the implicit assumptions hidden in the argument is that the only way to reduce the cost of production is by the replacement of labor with machines. But that is not necessarily true. The search for cost reduction by capitalist firms might also lead to the replacement of existing machines with better quality machines or in a more economical use of the existing means of labor. Both these arguments rule out the conclusion that the organic composition of capital *must necessarily rise* with capital accumulation.

There is an additional, and probably deeper, issue to consider. If capital accumulation and the accompanying technological progress leads to a fall in the rate of profit, then why would profit-maximizing capitalist firms undertake technological innovations and accumulate capital *in the first place*? While this issue has drawn enormous scholarly attention since the justly famous contribution of Okishio (1961), the essential issue had been raised earlier by Ladislaus von Bortkiewicz in 1907 and Kei Shibata in the 1930s.[7]

2.3.3 The So-Called Okishio Theorem

The primary motivation for the adoption of new techniques of production by capitalist firms, argued Okishio (1961), is to reduce costs. This implies that capitalist firms will only adopt new techniques of production that reduces the cost of production. But reduction in the cost of production implies an increase in the rate of profit. Hence, argued Okishio (1961), the process of technical change and capital accumulation will increase the rate of profit, not reduce it, as Marx had claimed.

There are two problems in Okishio's (1961) argument. First, he seems to implicitly suggest that profit-maximizing behavior of capitalist firms is incompatible with a decline in the average rate of profit. Second, his conclusion about the rise in the rate of profit rests on a specific, and questionable, assumption about the movement of the real wage rate.

Let us start with the first problem. Is it not possible for the adoption of a new technique of production to increase the rate of profit of the innovator (the first firm to adopt the new technique) and yet to lead to a fall in the average rate of profit? The answer is in the affirmative. In fact, that is precisely how Marx had described the dynamics of technical change under capitalist relations of production in chapter 12, Volume I of *Capital* (Marx,

[1867] 1990:433–437). The innovator firm, by searching for and adopting a new technique of production, is able to produce the relevant commodity at a cost that is lower than the social average. Since the value of the commodity is determined by the social conditions of production, it remains unchanged when one capitalist firm adopts a new technique of production. Hence, by selling the commodity at its ruling price (which is its value in the context of Volume I of *Capital*), the innovator firm is able to earn a super-normal rate of profit. Gradually there is diffusion of the new technology across the capitalist economy. When the new technique becomes widely used, it defines the new social condition of production and determines its value (which is now lower than before). Under certain conditions it is possible for the *average* rate of profit to be lower after the new technique is adopted by all capitalist firms than what prevailed before the adoption of the new technique. Considering the conditions under which this might happen takes us to the second problem in Okishio's (1961) argument.

Okishio (1961) makes an important assumption in his analysis: that the real wage rate remains unchanged. This is the key assumption that drives his result about the rise in the rate of profit, and it is easy to see why. Since the new technique of production reduces the overall cost of production, it implies a fall in the value of the commodity. Hence, a larger quantity of use values can be produced with the same amount of labor or the same amount of use values can be produced with the same amount of labor. If the real wage rate remains unchanged, the total increase in the productivity of labor is appropriated by capitalists, and the rate of profit would rise. But there is no reason why the real wage rate must remain constant. The real wage rate is the result of class struggle between capitalists and workers and there are no economic arguments that can rule out the possibility of its increase during the process of technical change. If conditions of class struggle result in an increase in the real wage rate, Okishio's (1961) result might no longer obtain.

We can put this discussion in more precise terms with the help of a simple one commodity model of the economy—like Ricardo's corn model or like models used in modern growth theory.

> *Proposition 2. Let β_1 and β_2 denote the rates of growth of labor productivity and capital productivity (the output-capital ratio), respectively, which is associated with a new technique of production; and let γ denote the organic composition of capital of the new technique of production evaluated at prices that prevailed prior to the economy-wide adoption of the new technique of production. In such a setting, we can define a Marx-Okishio threshold as follows: $\alpha^* = \beta_1 + \gamma\beta_2$. Using the threshold, we have:*
>
> > **1.** *Marx's Result: If the actual growth rate of the real wage rate is higher than α^*, then the average rate of profit falls after the adoption of the new technique of production;*

> **2.** *Okishio's Result: If the actual growth rate of the real wage rate is lower than α*, then the average rate of profit rises after the adoption of the new technique of production.*

What is the intuition? If the growth rate of the real wage is relatively high (i.e., above the threshold value identified in Proposition 2), then a large share of the fruits of productivity growth coming from technological change is captured by the working class. In such a scenario, the rate of profit falls, and we are in a world where Marx's claim holds true. On the other hand, if the growth rate of the real wage rate is low, then most of the benefits of productivity growth is captured by the capitalist class. This is manifested in the rise of the rate of profit, and we are in a world where Okishio's claim holds true.

3. Crisis of Excess Surplus Value

In a crisis of excess surplus, the rupture in the economy-wide circuit of capital is proximately caused by a fall in the rate of profit, which is, in turn, caused by an insufficiency of aggregate demand. There is a long tradition within Marxian political economy, which I will call the *underconsumptionist tradition*, which has kept the problems of aggregate demand at the center of analysis, and it is the primary purpose of this section to discuss the arguments in this tradition. While problems of aggregate demand become salient in discussions of crises of excess surplus value, there have also been some attempts to follow Marx's discussion on finance in Volume III of *Capital* in developing a parallel argument regarding a mechanism that becomes important in a crisis of excess surplus value: financial fragility (Crotty 1985; Duménil and Lévy 2013). The analysis of problems of financial fragility in capitalist economies from within a Marxian framework is in its infancy. Hence, while this article offers some brief remarks on the problems of financial fragility, its main comments on the crisis of excess surplus value will be reserved for a discussion of the tendency towards underconsumption.

3.1 Underconsumptionism

The key claim of the underconsumptionist strand of thinking, both within and outside Marxian political economy, is that, left to itself, the capitalist system is unable to generate enough aggregate demand to sustain a positive rate of growth. The underconsumptionist argument comes in two variants, with two versions of the first variant.

The first variant works with a two-department conception of the economy, with Department I producing means of production and Department II producing means of consumption. While we find a rather crude version of this first variant in the writings of early underconsumptionists such as Sismondi and Rodbertus, a more sophisticated version was developed in Sweezy (1942). However, both versions suffer from theoretical problems: the first version does not conceptualise the relationship between Department I and II properly; the second version does not have a proper theory of production. Since these problems of underconsumptionism have already been discussed extensively in the

literature, we will skip them in this chapter and instead point the reader to Shaikh (1978) and to Appendix B.

The second variant of underconsumptionist thinking moves away from the two-department conception of the economy and instead presents its argument within an aggregate, macroeconomic framework, more in line with the work of Keynes and Kalecki than the framework used by Marx. A well-developed version of this variant of the underconsumptionist argument is presented in Baran and Sweezy (1966). The key claim of their work is that monopoly capitalism is characterized by a strong tendency toward stagnation. What is the reason for this?

> [Monopoly capitalism] tends to generate ever more surplus, yet it fails to provide the consumption and investment outlets required for the absorption of the rising surplus and hence for the smooth working of the system. Since surplus which cannot be absorbed will not be produced, it follows that the *normal* state of the monopoly capitalist economy is stagnation.
>
> (Baran and Sweezy, 1966, pp. 108; emphasis in original).

The economic reasoning underlying Baran and Sweezy's (1966) claim can be understood with the help of a diagram that is adapted from their analysis and depicted in Figure 1. The horizontal axis in Figure 1 measures the economy's capacity utilization rate, which is defined as the ratio of actual output and capacity output. On the vertical axis of Figure 1, we measure two variables: the economic surplus and the total expenditure to absorb the surplus. The economic surplus is defined as the difference between total output and the necessary costs of producing that output. The total expenditure to absorb the surplus is defined as the level of expenditure in the economy that is over and above the expenditure out of wage income. Assuming, along classical political economy lines, that all wages are consumed, the expenditure out of wages is equal to the wage income. Thus, the expenditure to absorb the surplus is total expenditure *less* wages. This has, in turn, three components: (a) consumption expenditure of capitalists, (b) investment expenditure by capitalists, and (c) expenditure to support unproductive activities, where the latter refer to all activities that do not generate surplus value.

In Figure 1, economic surplus is represented by the upward sloping lines S_1, S_2 and S_3, which we call the surplus schedule (the subscript refers to time periods). At any point in time, for instance in period 1, the economy has a given productive capacity. For this given productive capacity, the economic surplus is an increasing function of the capacity utilization rate represented in Figure 1 by the upward sloping lines S_1. Economic surplus depends positively on the capacity utilization rate because of the presence of overhead costs—cost which do not vary with the level of output. Thus, when the level of output increases, the overhead cost per unit of output falls. If the variable cost remains more or less constant, then for any price level, the surplus increases with the level of output. For a given capacity base, the capacity utilization rate increases with the level of output, so that the economic surplus rises with the former. This is what imparts the upward slope to the line S_1. Over time, the surplus schedule shifts up, going from S_1 to S_2 to S_3, and so on,

and this long run movement is the key element of Baran and Sweezy's (1966) argument. But before we discuss the long run dynamics, let us look at the short run equilibrium.

At any point in time, the level of expenditure to absorb the surplus is also an increasing function of the capacity utilization rate and is represented in Figure 1 as the upward sloping expenditure schedule, E. One of the components of the expenditure stream that absorbs the surplus is investment expenditure by capitalist firms, and this is likely to be an increasing function of the capacity utilization rate. As capitalist firms operate with a higher proportion of their full capacity, they are going to be more likely to start planning for adding to that capacity and hence investing. Thus, even if the other two components of expenditure do not depend on the capacity utilization rate, the total expenditure to absorb the economic surplus would be an increasing function of the capacity utilization rate. This is what gives the upward sloping expenditure schedule E in Figure 1.

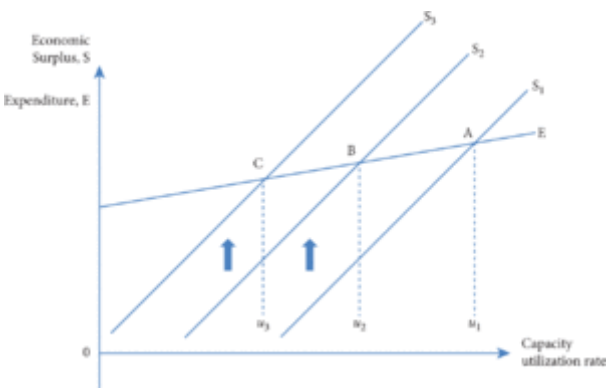

Figure 1: Short run and long run equilibrium in a monopoly capitalist economy. The upward sloping surplus curves, S_1, S_2, and S_3, represent the amount of economic surplus generated by the system as a function of the capacity utilization rate. The upward sloping expenditure curve E represents the level of expenditure that can absorb the economic surplus as a function of the capacity utilization rate. The intersection of the two curves gives the equilibrium rate of capacity utilization in the economy in the short run. Over time, the surplus curve shifts up. This leads to a downward drift of the equilibrium level of capacity utilization.

The short run equilibrium of the economy is given by the intersection of the surplus curve and the expenditure schedule. For instance, in period 1, the intersection is given by the point A, so that the equilibrium capacity utilization rate is represented by u_1. The meaning of the short run equilibrium, given by the capacity utilization rate u_1, is as follows: the structure of expenditures in the economy is such that it can only support a utilization rate of u_1 because only at this rate of capacity utilization does the economy generate enough expenditures to absorb all the economic surplus.

Turning to the long run, we see that the surplus curve shifts up over time. Hence, the equilibrium moves from A to B to C and so on. The corresponding level of the equilibrium capacity utilization rate falls from u_1 to u_2 to u_3 and a monopoly capitalist economy sinks "deeper and deeper into a bog of chronic depression" (Baran and Sweezy 1966:108).[8]

What is the reason for the upward shift of the surplus schedule? Monopoly capitalism is a system made up of giant corporations. In sharp contrast to firms in competitive capitalism, which were price takers, the giant corporations making up monopoly

capitalism are price makers (i.e., they "can and do choose what prices to charge for their products"). In a system composed of price takers, "Price competition is banned as a legitimate weapon of economic warfare." Prices of products are set so as to maximize the profits of the whole group of corporations producing that product or its close substitutes. While this can take various forms such as cartelization or price leadership, the important implication is that such price setting behavior imparts a pronounced upward bias "into the general price level in a monopoly capitalist economy." While price competition is banned, that does not mean the end of competition, because "it takes new forms and rages on with ever increasing intensity." The key impact of non-price competition is that it creates strong pressures on each giant corporation to reduce its costs of production. Thus, at the aggregate level, prices are downward sticky at the same time as costs of production fall. Therefore, the difference between the two, which is the economic surplus, tends to become larger over time. In Figure 1, this is represented as the upward movement of the surplus schedules over time.

There are three noteworthy points about the above argument: incompleteness, lack of attention to wage movements, and its focus on the supply side.

First, the evolution of the equilibrium capacity utilization rate depends on the movement of both the surplus schedule and the expenditure schedule. Even if the surplus schedule shifts up over time, the economy might still be able to sustain a high or rising rate of utilization of productive capacity if the expenditure schedule also shifts up. Hence, without a fully worked out theory of the evolution of the expenditure side of the economy, the overall argument is incomplete. While a large part of Baran and Sweezy (1966) is devoted to explaining why factors that could absorb the rising surplus is not strong under monopoly capitalism—see chapters 4 through 7 of the book—that part of the argument is not as tightly developed as the part that demonstrates the tendency for the surplus to rise. The arguments about the insufficiency of aggregate demand are developed only informally and the quantitative dimension remains underdeveloped. This is problematic because the key argument is a quantitative one: that expenditure to absorb the surplus (aggregate demand) rises *less* than the total amount of economic surplus.

Second, the argument about the tendency of the economic surplus to rise over time has an important lacuna. One of the key components of cost is the real wage rate, and it is not clear why the real wage rate will have a downward trend in a monopoly capitalist economy. If we visualize the real wage rate as being determined by class struggle, then many factors other than the nature of firms—competitive versus oligopolistic—would impact the outcome. The organization of workers in unions, legal provisions relating to hiring and firing of workers by firms, unemployment insurance and other social security benefits, and other such factors would impact the level of real wages. Hence, despite the existence of oligopolistic firms, the real wage rate might not fall over time. The fact that real wage rates in most advanced capitalist economies rose in a robust manner for close to two decades after World War II, but then stagnated for the next three decades,

suggests that there is no necessary link between monopoly capitalism and the evolution of the real wage rate.

A corollary of the first point is also worth highlighting. The key analytical content of Baran and Sweezy's (1966) argument is about the *supply side of the economy*. It relates to why the juxtaposition of oligopolistic pricing behavior and non-price competition between giant corporations leads to the generation of increasing amounts of surplus. Re-stated in the language of contemporary macroeconomics, the above argument claims that the aggregate supply curve shifts upward over time, and absent an equally large upward movement of the aggregate demand curve, the economy's equilibrium output falls over time. It is as if the monopoly capitalist economy is being hit by an unending stream of negative supply shocks—like the oil price rises of the 1970s or the 2000s—with stagnant aggregate demand. At best, that is a rather odd way to understand the evolution of a capitalist, competitive or monopolistic, macroeconomy.

3.2 Problems of Financial Fragility

In a situation of excess surplus value, the financial system comes under severe strain (Foley 2012). This is because the ability of the financial system to channelize surplus value into expenditure streams for the purchase of newly produced goods and services gets eroded. Why? In a situation of excess surplus value, the financial system is flush with funds, so that interest rates are low. This encourages speculative activity with *borrowed funds*, directed at purchasing key assets like land, or shares of stock, rather than produced goods and services.

For some time, which can even range over many years, the speculative activity becomes self-fulfilling. Economic agents use borrowed funds to purchase assets with the aim of making capital gains. If this activity is undertaken by a large fraction of the relevant set of economic agents, the demand for the asset rises and leads to a rise in its price. Thus, the initial expectations of the speculators are fulfilled, and it draws in more funds into the speculative activity. Thus, the speculative activity both feeds on and supports a bubble in the price of the relevant asset.

There are two effects of the speculation-driven asset price bubble. First, it leads to a "wealth effect" that boosts debt-financed expenditures. Since the price of the relevant asset increases rapidly, owners of that asset feel wealthy. Hence, they use that asset as collateral to borrow and spend. This boost to spending allows capitalist firms to sell commodities and make profits. In effect, the problem of aggregate demand that plagues a capitalist economy generating excess surplus value is solved temporarily. Second, it increases the financial fragility of the system because the share of debt-financed expenditures in the economy increases. Speculative activity that aims to make capital gains is largely financed with borrowed funds. Moreover, the debt-financed expenditures on commodities also, most obviously, rely on borrowed funds. Thus, the overall result is an increase in the share of debt-financed expenditures.

Asset price bubbles inevitably deflate, often triggered by some event in the larger economy. As expectations turn sour, speculators leave the asset in droves, driving down its price. This brings to the fore a long and complicated chain of payment commitments that cannot be met—because they were based on expectations of higher, or even increasing, price of the asset. Payment failures cascade through the system, roiling balance sheets and ushering in a full-blown financial crisis. The crisis in the financial system manifests itself in outright reduction of volumes of credit, increases in the cost of credit, deleveraging by economic agents to repair balance sheets, fire sale of assets, and other related phenomena. All these processes lead to drastic falls in expenditures, reductions in aggregate demand and could eventually push the economy toward an economic crisis.[9]

4. Conclusion

Together, the interlinked processes of generation and realization of surplus value provide the primary motive force for the dynamics of a capitalist economy. Smooth reproduction of the system requires that the unity of these two key processes be maintained. And to do so, the system needs to produce the “correct” amount of surplus value, neither too little nor too much. Since it is an unplanned and contradictory system, resting ultimately on the contradiction between use value and exchange value of the commodity form of production, a capitalist economy is neither able to know the “correct” amount of surplus value nor produce it any sustained manner. It is forever plagued by one or the other of two problems: production of too much surplus value or production of too little surplus value. Under the former scenario, the economy faces a crisis of excess surplus value, and in the latter case, a crisis of deficient surplus value.

Both types of crisis represent deep and prolonged interruptions of the economy-wide circuit of capital and manifest themselves as crises of overproduction. The proximate cause of both types of crisis is a fall in the rate of profit. In a crisis of excess surplus value, the fall in the rate of profit is caused by a lack of aggregate demand so that commodities cannot be sold at prices to realize the full value (and surplus value) of commodities. In a crisis of deficient surplus value, on the other hand, the rate of profit falls not because of insufficient aggregate demand but because of technological or social factors. Either the organic composition of capital rises or the rate of exploitation falls, leading, in either case, to a fall in the rate of profit even when commodities are sold at their full values (or prices of production).

The synthetic account of Marxist approaches to capitalist crises that has been presented in this chapter offers a fresh perspective on several important controversies that have marked this literature.

The controversy between proponents of the “falling rate of profit” crisis tendency and the “problems of demand” crisis tendency that has raged on for decades seem, from the perspective of the analysis of this chapter, rather unproductive and even unnecessary. Capitalist economies are prone to both types of crises: the first when the system

generates too little surplus value and the latter when it generates too much. There is no theoretical reason to believe that capitalist economies will be plagued by only one or only the other. Depending on the configuration of the capitalist economy, it can witness either type of crisis. The task of Marxist research is not to try to identify *the* crisis tendency that is valid for all situations, but rather to study particular configurations to see which crisis tendency seems more likely—a concrete analysis of a concrete situation.

A second, and related, controversy has focused on the role of aggregate demand in capitalist economies. The analysis of capitalist dynamics carried out with Marx's schemes of reproduction, both in cases of simple and expanded reproduction, demonstrate that capitalism can indeed generate adequate demand for the commodities produced (see Appendix B). Thus, simple-minded underconsumptionist arguments, like those presented by Rosa Luxemburg, are logically flawed. But while recognizing the logical problems of all variants of the underconsumptionist arguments, it is important to also stress the following point that Kalecki (1971) noted: the fact that capitalism *can* generate adequate aggregate demand does not mean that it always *will*. Capitalist reproduction rests on the unity of two separate phases, the generation of surplus value and the realization of surplus value. Since capitalism is not a planned system, there is no automatic mechanism to ensure that all the surplus value that is generated will also be realized. Hence, the problem of effective demand is very real in capitalism. But to locate the source of the problem, one needs to move beyond underconsumption theory, both from its simple and sophisticated versions, and develop a theoretically informed and empirically grounded theory of long-run capitalist investment.

Modern heterodox macroeconomics, working within a framework that comes out of the work of Keynes and Kalecki, has incorporated explicit investment functions into models of growth and distribution. The "investment function" is precisely an attempt to capture the determinants of capitalist expenditure on capital outlays, and thus fills the lacunae in Marxist underconsumptionist arguments. The general conclusion of this literature is that capitalist economies can be either "wage-led" or "profit-led"; economic theory cannot rule out one or the other. Moreover, when a capitalist economy is profit-led, a shift in income toward workers will *not* lead to an increase of the growth rate of the economy. Thus, the key intuition of underconsumptionist thinking—that a shift in income distribution in favor of workers—will ameliorate problems of aggregate demand and boost growth does not always hold even in models of growth that explicitly allow output to be demand-determined. In addition, a large body of empirical evidence seems to suggest that advanced capitalist economies, especially when international trade is taken into account, are profit-led (Barbosa-Filho and Taylor 2006; Kiefer and Rada 2015). Thus, a more nuanced view about the role and constraints of demand is needed than the one that comes out of the underconsumptionist tradition.

The third controversy relates to the so-called Okishio theorem, which has been interpreted as disproving Marx's claim that the average rate of profit has a tendency to fall in capitalist economies. Much of this controversy also seems (with the benefit of hindsight) needless. There are no theoretical grounds to claim that due to technological

change, the rate of profit will have a tendency to always fall (as Marx claimed) or that it will have a tendency to always rise (as Okishio claimed). A careful analysis shows that the impact of technological change on the rate of profit depends crucially on what happens in the labor market. If the real wage rate rises sharply during the period of technological change, then the rate of profit tends to fall; on the other hand, if the real wage rate does not rise fast enough, then the rate of profit might rise. The idea that there is no necessary contradiction between the claims advanced by Marx and Okishio, and that whether the rate of profit falls or rises after the adoption of a new technique of production ultimately depends of how the real wage rate behaves, is surprisingly present in the paper by Okishio (1961)—the origin of the whole controversy.[10] The same idea was highlighted by Foley (1986, chapter 8). But the subsequent literature, perhaps bent on polemics, has ignored this basic fact.

The study of crisis tendencies in capitalist economies is an extremely important and integral part of Marxist political economy. It separates Marxist approaches from both the neoclassical and Keynesian (or post-Keynesian) approaches to the study of capitalist dynamics and is rooted in the deep understanding of Marx about the historical limitedness of capitalism as a social form of production. While the Marxist tradition has certainly moved beyond its early twentieth-century fascination with implausible theories of capitalist breakdown, it should always keep the study of capitalist crises in the center of its theoretical enterprise. For it is mainly during periods of crisis, with the attendant suffering of the vast majority of the working people, that the contradictions of the system break to the surface and possibilities of its positive transcendence gain traction.

Acknowledgments

Thanks to Debarshi Das, Duncan Foley, and David Kotz for comments on an earlier version of this paper.

References

Baran, Paul A., and Paul M. Sweezy. 1966. *Monopoly Capital: An Essay on the American Economic and Social Order*. New York, NY: Monthly Review Press.

Barbosa-Filho, Nelson H., and Lance Taylor. 2006. “Distributive and Demand Cycles in the US Economy—A Structuralist Goodwin Model.” *Metroeconomica* 57(3):389–411.

Boddy, Raford, and James Crotty. 1975. “Class Conflict and Macro-Policy: The Political Business Cycle.” *Review of Radical Political Economics* 7(1):1–19.

Bowles, Samuel, David M. Gordon, and Thomas Weisskopf. 1983. *Beyond the Wasteland: A Democratic Alternative to Economic Decline.* New York: Doubleday.

Crotty, James. 1985. “The Centrality of Money, Credit and Intermediation in Marx’s Crisis Theory.” Pp. 45–82, in *Rethinking Marxism: Essays in Honor of Harry Magdoff and Paul Sweezy*, edited by Stephen Resnick and Richard Wolff. New York: Autonomedia.

Dobb, Maurice H. 1945. *Political Economy and Capitalism: Some Essays in Economic Tradition.* Westport, CT: Greenwood Press.

Duménil, Gerard, and Dominique Lévy 2013. *The Crisis of Neoliberalism*. Cambridge, MA: Harvard University Press.

Foley, Duncan K. 1986. *Understanding Capital: Marx's Economic Theory*. Cambridge, MA: Harvard University Press.

Foley, Duncan K. 2012. "The Political Economy of Postcrisis Global Capitalism." *South Atlantic Quarterly* 111(2): 251–263.

Glyn, Andrew, and Robert B. Sutcliffe. 1972. *Capitalism in Crisis.* New York: Pantheon Books.

Harris, Donald J. 1978. *Capital Accumulation and Income Distribution.* Stanford, CA: Stanford University Press.

Heinrich, Michael. 2012. *An Introduction to the Three Volumes of Karl Marx's Captial*. New York: Monthly Review Press.

Kalecki, M. 1971. "The Problem of Effective Demand in Tugan-Baranovski and Rosa Luxemburg." Pp. 146–155, in *Selected Essays on the Dynamics of the Capitalist Economy, 1933–1970*. Cambridge, UK: Cambridge University Press.

Kiefer, David, and Codrina Rada. 2015. "Profit Maximising Goes Global: The Race to the Bottom." *Cambridge Journal of Economics* 39(5):1333–1350.

Kotz, David M. 2015. *The Rise and Fall of Neoliberal Capitalism.* Cambridge, MA: Harvard University Press.

Kliman, Andrew. 2011. *The Failure of Capitalist Production: Underlying Causes of the Great Recession.* London, UK.: Pluto Press.

Marx, Karl. 2000. *Theories of Surplus Value. Books I, II and III.* Great Minds Series. Amherst, NY: Prometheus Books.

Marx, Karl. [1953] 1993. *Grundrisse: Foundations of the Critique of Political Economy (Rough Draft).* Translated with a foreword by Martin Nicolaus. London: Penguin Books.

Marx, Karl. [1885] 1992. *Capital: A Critique of Political Economy. Volume II*. Translated by David Fernbach. London: Penguin.

Marx, Karl. [1894] 1991. *Capital: A Critique of Political Economy. Volume III*. Translated by David Fernbach. London: Penguin.

Marx, Karl. [1867] 1990. *Capital: A Critique of Political Economy. Volume I*. Translated by Ben Fowkes. London: Penguin.

Mattick, Paul. 1981. *Economic Crisis and Crisis Theory.* London: Merlin Press.

Okishio, Nobuo. 1961. “Technical Changes and the Rate of Profit.” *Kobe University Economic Review* 7: 85–99.

Rotta, Tomas N. 2017. Effective Demand and Say’s Law in Marxist Theory: An Evolutionary Perspective. Working Paper 38. London: Greenwich Political Economy Research Center.

Shaikh, Anwar. 1978. “An Introduction to the History of Crisis Theories.” *Pp. 219–241 in US Capitalism in Crisis*, edited by B. Steinberg et al. New York: Union for Radical Political Economics.

Sweezy, Paul M. 1942. *The Theory of Capitalist Development: Principles of Marxian Political Economy.* New York: Monthly Review Press.

Sweezy, Paul M. 1981. *Four Lectures on Marxism.* New York: Monthly Review Press.

Wright, Erik Olin 1977. “Alternative Perspectives in Marxist Theory of Accumulation and Crisis.” *Critical Sociology* 25(2–3): 115–142.

Appendix A This Appendix contains mathematical proofs of Proposition 1 and 2 that were presented in the main text of the chapter.

A1. Elasticity of the Rate of Exploitation

Proposition 1: Let Q denote the organic composition of capital. If the elasticity of the rate of exploitation with respect to the organic composition of capital is less than Q/(1 + *Q*)*, then any increase in the organic composition will lead to a fall in the rate of profit.*

Proof. Let the elasticity of the rate of exploitation with respect to the organic composition of capital be denoted by ηQe so that

$$\eta Qe \equiv Q e d e d Q$$

Since the rate of profit is defined as

$$r = e 1 + Q$$

we see that the derivative of the rate of profit with respect to the organic composition of capital is given by

$$drdQ = 1(1+Q)2 \times \{dedQ(1+Q) - e\} = e(1+Q)2 \times \{\eta Qe(1+1Q) - 1\}$$

Since $e > 0$ (because capitalism requires positive surplus value), we can see the following result:

$$\mathrm{drd}Q<0$$

if and only if

$$\eta Qe<Q1+Q$$

which completes the proof.

A2. Marx-Okishio Threshold

Proposition 2. Let β_1 and β_2 denote the rates of growth of labor productivity and capital productivity (the output-capital ratio), respectively, which is associated with a new technique of production; and let γ denote the organic composition of capital of the new technique of production evaluated at prices that prevailed prior to the widespread adoption of the new technique of production. In such a setting, let us define the Marx-Okishio threshold as follows: $\alpha^*=\beta 1+\gamma\beta 2$. Then we have the following:

1. *Marx's Result: If the actual growth rate of the real wage rate is higher than α^*, then the average rate of profit falls after the adoption of the new technique of production;*
2. *Okishio's Result: If the actual growth rate of the real wage rate is lower than α^*, then the average rate of profit rises after the adoption of the new technique of production.*

Proof. We consider a one good (corn) economy. Since there is only one good, prices of commodities are proportional to their values (the sum of the direct and indirect labor time required for its production). Without loss of generality, we can assume that the value of money is 1 (i.e., every unit of money (say dollar) is equivalent to 1 hour of (socially necessary abstract) labor).

In this economy, production is carried out using corn (capital) and labor, and the output is also corn. A technique of production, in this setting, is a combination of the quantities of corn and labor needed to produce 1 unit of corn (i.e., the combination of capital and labor productivity).

A3. Initial Situation

Let the nominal wage rate be given by w, and let the technique of production be given by the combination (a, n), that is, a units of corn and n units of labor are needed to produce 1 unit of corn. Let the value (which is also equal to price) of a unit of corn be denoted by p. Then,

$$ap+n=p,$$

so that

$$p=n1−a.$$

If we denote the real wage rate by b and the rate of profit by r, then we have

$$b=wp=w(1−a)n$$

and

$$r=p−(nw+ap)nw+ap=1nb+a−1.$$

A4. Innovator Capitalist

Suppose an innovator capitalist finds a new technique of production, given by the combination (a', n'). Thus, if the new technique of production is used, then a' units of corn and n' units of labor will be needed to produce 1 unit of corn. For this new technique of production to increase the rate of profit of the innovator, it must be "viable," that is, it must reduce the cost of production at the prevailing prices, and it must be the case that wn+pa>wn'+pa', or equivalently that

$$bn'+a'<bn+a.$$

(A1)

Since we want to investigate conditions under which the new technique is adopted by the innovator capitalist, we will assume that (A1) holds. This will immediately imply that the rate of profit earned by the innovator capitalist with the new technique of production

$$r'=1n'b+a'−1$$

will be higher than what she earned using the old technique of production

$$r=1nb+a−1.$$

Since $r' > r$, there is an incentive for the innovator capitalist to search for an adopt the new technique of production.

A5. Marx-Okishio Threshold

When all capitalist firms adopt the new technique of production, the price (and value) of the commodity becomes

$$p'=n'1−a'.$$

Suppose the new real wage rate is given by δb, so that the growth rate of the real wage rate is given by (δ–1). In the new configuration of price and real wage rate, the rate of profit is given by

$$r''=1a'+\delta bn'-1.$$

Let δ^* denote the value of δ that ensures that the average rate of profit before the adoption of the new technique of production, r, is exactly equal to the average rate of profit after the adoption of the new technique of production by all capitalist firms, r''. Hence

$$1a'+\delta^*bn'-1=1a+bn-1,$$

so that

$$\delta^*=nn'+(aa'-1)pa'wn'.$$

The Marx-Okishio threshold, α^*, is the growth rate of real wage rate that ensures that ensures that the average rate of profit before the adoption of the new technique of production, r, is exactly equal to the average rate of profit after the adoption of the new technique of production by all capitalist firms, r''. Hence,

$$\alpha^*=\delta^*-1,$$

so that

$$\alpha^*=(nn'-1)+(aa'-1)pa'wn'.$$

Note that

$$(nn'-1)=(1n')-(1n)(1n)$$

is the growth rate of labor productivity, and

$$(aa'-1)=(1a')-(1a)(1a)$$

is the growth rate of capital productivity. Moreover, pa'wn' is the new organic composition of capital (ratio of constant capital and variable capital) evaluated at prices prevailing before the adoption of the new technique of production. If we denote the growth rate of labor productivity by β_1, the growth rate of capital productivity by β_2, and the organic composition of capital (evaluated at prices prevailing before technical change) as γ, then we have the Marx-Okishio threshold as

$$\alpha^*=\beta 1+\gamma\beta 2.$$

Now we are ready to prove the main results relating to the Marx-Okishio threshold.

A6. Marx’s Result

If the growth rate of the real wage rate is α, where $\alpha > \alpha^*$, then the average rate of profit will fall after the adoption of the new technique of production by all capitalists. To see this note that, since $\alpha > \alpha^*$, it is also true that

$$1+\alpha>1+\alpha^*=nn'+(aa'-1)pa'wn'=nn'+(aa'-1)a'bn'=bn+(a-a')bn'$$

which, on multiplying through by bn' gives the inequality

$$(1+\alpha)bn'+a'>bn+a.$$

(A2)
The average rate of profit before the adoption of the new technique of production is given by

$$r=1bn+a-1.$$

On the other hand, if the growth rate of the real wage rate is α, then the average rate of profit after the adoption of the new technique of production is given by

$$r\hat{}=1(1+\alpha)bn'+a'-1.$$

Using the inequality in (A2), we see that $r\hat{}<r$.

A7. Okishio’s Result

If the growth rate of the real wage rate is α, where $\alpha < \alpha^*$, then the average rate of profit will rise after the adoption of the new technique of production by all capitalists. The proof follows in exactly the same manner as the proof for Marx’s claim, with the sign of the key inequalities reversed.

Appendix B

In this Appendix, I present a critical overview of the first variant of the underconsumptionist argument about capitalist crisis. As I noted in the text of the main chapter, there are at least two versions of the first variant of the underconsumptionist argument, and in this Appendix I discuss both versions. In presenting this argument, I draw on Harris (1978), Shaikh (1978) and Foley (1986).

B1. First Version

The first version of the underconsumptionist argument about capitalist crisis, developed by early underconsumptionists, advances the claim that a typical capitalist economy is incapable of self-expansion on the basis of internally generated aggregate demand. There

are two key ingredients of this argument, the *demand gap* and *vertical integration*, and let us take these up in turn.

To understand the notion of "demand gap," let us note that, starting from the total (gross) output of commodities, if we remove the portion that is used up in the production process, we will get the net output. The net output corresponds, and is equal in value, to the total income earned by all agents involved in the production process. If, for simplicity, we assume that there are only two classes involved in production, capitalists and workers, then the sum of all profit income (surplus value) and all wage income (variable capital) is equal to the value of the net output.

To bring the focus on the problem of demand, let us ask the following question: who will purchase the net output? A portion of the net output will be purchased by workers—using their wage income. Even if workers spend all their income on consumption, they will not be able to purchase the total net output. This is because the value of net output is the sum of wages and profits, and since the latter is some positive quantity in capitalism, the value of net output is larger than the total wages. This leaves a "demand gap," that is, a portion of the net output that remains to be sold even after all wages have been spent.

To grasp the concept of vertical integration, let us divide total social production into two departments. The first department, called Department I, consists of capitalist firms that produce means of production, including machines, raw materials, fuel, etc. The second department, called Department II, produces means of consumption such as food, clothing, health care, entertainment, etc. Early underconsumptionist thinkers conceived of Department I as being completely subsumed under Department II. Thus, according to this line of thinking, the output of Department I is only used as "inputs" to the production process in Department II. An alternative way of stating this is to say that the economy is vertically integrated.

There is an important implication of this conception of a vertically integrated capitalist economy. Since the output of Department I functions only as inputs to the production process in Department II, this means that the net output is only composed of the output of Department II. Let us call the part of net output that remains after all the wage income has been spent as the "surplus product." Since the surplus product is a part of the net output, this also implies that the surplus product is composed only of the output of Department II.

We are now ready to lay out the basic argument of the first variant of underconsumptionism. Consider a capitalist economy with a zero demand gap. The fact that the demand gap is zero means that the total surplus value is used to purchase the surplus product—that is the only way that the demand gap can be closed. Since the surplus product is composed entirely of the output of Department II, it means that the whole surplus value has been spent on purchasing consumer goods. Hence, there is zero investment in this economy (i.e., none of the surplus value was used to purchased means of production and increase the scale of production). This means that the economy has no capital accumulation and, hence, can only have zero growth. A capitalist economy,

according to this early underconsumptionist vision, is not capable of sustaining positive rates of growth on the basis of internally generated aggregate demand.

We can arrive at the same conclusion by a slightly different route. Let us consider a capitalist economy with a zero demand gap. As we have noted above, this means that all the surplus value is used by capitalists to purchase consumer goods. What will happen if some capitalists save and invest part of the surplus value to increase the scale of production? If capitalists save a part of the surplus value and invest it (i.e., use a part of the surplus value to purchase means of production and labor power and increase the scale of production) this will have two effects. First, there will be a net decline in the demand for the output of Department II. Why? There will be a decrease in demand due to the saving out of surplus value; but there will be an increase in demand given by the part of this saving that is used to purchase labor power (which will be used by workers to purchase consumption goods). Since the former is larger than the latter (as long as some of the surplus value is used to purchase additional means of production), there will be a net decline in the demand for the output of Department II. The second effect of saving/investment of surplus value will be an increase in the output of Department II (unless all the additional investment goes toward the production of additional means of production, an unlikely scenario). Thus, the output of Department II increases exactly at the same time as demand declines, leading to a problem of realization. The overall result will be an increase in excess capacity in Department II, leading to a reduction in investment and growth. Thus, the impulse toward capital accumulation and growth, coming from saving and investment, is self-defeating. The natural state of a capitalist economy, the early underconsumptionists argued, is a state of stagnation.

A particularly interesting extension of this argument comes from considering the problem of growth of capitalist economies when there is an increase in income inequality. This could come about, for instance, due to stagnant real wages in the face of growing labor productivity. If labor productivity increases but real wages do not, that increases the share of surplus value in total value added. Since the value of surplus product is equal to the surplus value, a shift in the distribution of income away from wages will increase the surplus product. By the logic of the underconsumptionist argument, this would widen the demand gap and heighten the tendency toward stagnation in the capitalist economy.

How do we assess the strength of this version of the underconsumptionist argument? The basic problem in this variant of the underconsumptionist argument is the faulty conception of the surplus product—understood to be composed entirely of consumer goods—that comes from conceiving the economy as a vertically integrated production system. If the economy is conceived as a vertically integrated system, then the output of Department I (machines, for instance) can only be used as inputs into Department II. But this is not true. Machines can be used for producing machines, i.e. the output of Department I can be used as inputs into Department I itself. Thus, conceiving the economy as a vertically integrated production system is problematic.

A better way to conceptualize the relationship between Department I and II is to use the reproduction schemas that Marx developed in chapters 20 and 21 of Volume II of *Capital* (Marx, 1992). If we use Marx's reproduction schemas, we can demonstrate that a capitalist economy is able to generate, under certain conditions that relate to the *proportionality between the two departments*, adequate aggregate demand to purchase the total output of commodities. We can demonstrate this result not only for a capitalist economy undergoing simple reproduction (i.e. a zero-growth system) but also for a capitalist economy undergoing reproduction on an expanded scale (i.e., when it grows at some positive rate of growth). In fact, savings and investment out of surplus value, the main source of problem for the capitalist economy as depicted in the underconsumptionist argument, now becomes the driver of growth of the system. Not only is the system capable of generating self-sustaining positive rates of growth, if the ratio of the sizes of the two departments is "correct," then the system can smoothly reproduce over time (i.e., it would be plagued neither by problems of shortage nor of glut on its growth path).[11]

B2. Conditions for Expanded Reproduction

To study the conditions for expanded reproduction, we follow Marx (1992) is viewing the whole of social production as being organized within two departments. Department I produces means of production, and Department II produces means of consumption. The flow of time is broken into periods, with the following convention about activities: at the beginning of each period capital outlays are made; within the period production of commodities takes place; and at the end of the period the output is sold and the value (and surplus value) realized. Sale of the output comes from expenditures of capitalists and workers, the two classes in this economy.

The capitalist class makes two types of expenditures: (a) capital outlays to carry out production, which is the sum of constant capital (the amount of money used to purchase means of production) and variable capital (the amount of money used to purchase labor power); and (b) consumption expenditure. Variable capital, which is part of the capital outlays by capitalists, corresponds to the wage income of the working class, which is used for the consumption expenditure of workers. Hence, the total expenditure by the capitalist class is the primary source of all demand in the model of capitalist economies that we study here (the most important exclusions are the state and the rest of the world, which can be an additional sources of autonomous expenditure).

We can regroup the expenditures in the economy to arrive at the sources of demand for the output of the two departments. The demand for the output of Department I come from two types of expenditures: (a) replacement of used-up means of production in Department I and II, and (b) increments to the means of production in Department I and II. Note that both expenditures arise directly from the capital outlays in the two departments.

The demand for the output of Department II also comes from two types of expenditures: (a) consumption expenditure of workers in Department I and II; and (b) consumption expenditures of capitalists in Department I and II. Consumption expenditure of workers comes from wage income, which is the variable capital component of capital outlays by capitalists. Thus, consumption expenditure of workers comes indirectly from the capital outlays of capitalists. On the other hand, consumption expenditure of capitalists comes from the surplus value realized through sale of the output.

For a complete description of the model, we need to specify three parameters related, in turn, to the technology of production, the degree of exploitation of workers, and the investment propensity of capitalists. To do so, we will use subscripts I and II to identify the two departments. Let k_I and k_{II} denote the share of variable capital in total capital outlays in the two departments; these parameters characterize the technology of production used in the two departments, with a lower value of k denoting a more capital-intensive technology. Let e denote the rate of exploitation (ratio of surplus value and variable capital) that is common in both departments. Let p_I and p_{II} refer to the share of surplus value reinvested into production in the two departments; these characterize the investment behavior of capitalists in the two departments, with a higher value of p signifying a higher propensity to save and invest. Note that if pI=pII=0, then all the surplus value is consumed by capitalists and we get the special case of simple reproduction.

If this economy is to smoothly reproduce over time, it must be the case that there is neither excess demand nor excess supply in the market for the output of either department. Let us start by investigating the condition for equilibrium (i.e., when demand is exactly equal to supply) in the market for the output of Department I. Denoting constant capital by C, variable capital by V and surplus value by S, the total value of output in Department I is given by CI+VI+SI. In equilibrium, this has to be equal to the total demand for the output of Department I. But what is the total demand for the output of Department I, i.e. means of production?

In Department I, the demand for means of production comes from the need to replace the means of production that has been used up, C_I, and the need for incrementing the means of production, ΔC_I. The increment to the means of production in Department I arises from the reinvestment out of surplus value. In Department I, $p_I S_I$ is the amount of surplus value reinvested, of which the fraction (1-k_I) is used for purchasing means of production. Hence, the increment to the means of production in department is given by ΔCI=(1−kI)pISI. In a similar manner, the demand for means of production in Department II comes from replacement needs, C_{II}, and from the need to expand the means of production, ΔC_{II}, where the latter is given by the expression: ΔCII=(1−kII)pIISII. Hence the total demand for means of production is given by

$$CI+\Delta CI+CII+\Delta CII=CI+(1-kI)pISI+CII+(1-kII)pIISII.$$

There is equilibrium in the market for means of production when the total supply is equal to the total demand, that is:

$$CI+VI+SI=CI+(1-kI)pISI+CII+(1-kII)pIISII,$$

that simplifies to

$$VI+SI=(1-kI)pISI+CII+(1-kII)pIISII.$$

Since $CI=[(1-kI)/kI]VI$, $CII=[(1-kII)/kII]VII$, $SI=eVI$ and $SII=eVII$, we can plug these in the above equilibrium condition and algebraically manipulate it to get the following relation between the sizes of the two departments:

$$VIIVI=1+e-epI(1-kI)[1-kIIkII]+epII(1-kII).$$

(A3)

We can state the result of the foregoing analysis as

Proposition 3. Let V_I and V_{II} refer to the variable capital in departments I and II, respectively. If $kIIpII=kIpI=\eta$ and the ratio of the sizes of the two departments is given by

$$VIIVI=1+e-epI(1-kI)[1-kIIkII]+epII(1-kII)$$

(4)

then the capitalist economy can smoothly reproduce on an expanded scale at the rate of growth $g=\eta e$.

The condition derived in (A3) would also emerge if we investigated the condition for equilibrium in the market for the output of Department II.[12] This is not surprising. Since total social production is broken up into two departments, equilibrium in the market for the output of one department will automatically imply equilibrium in the market for the output of the other.

Note that the analysis presented so far has implicitly ruled out an interesting possibility: the movement of capital between the two departments. This could happen, for instance, if some of the surplus value generated in Department I were invested in Department II in the next period, or vice versa. We have ruled this out by assuming that the investment to increase the scale of production in each department comes from surplus value generated within that department. This implicit assumption simplifies the analysis and allows us to get the following simple condition for balanced growth:

$$kIpI=kIIpII.$$

(A4)

How do we get this condition given in (A4)? The intuition behind the condition is the following: if the two departments are to maintain the correct proportions over time

without any inter-departmental transfer of capital, they will have to grow at the same rate *on the basis of the surplus value generated within the department*.

If growth in Department I comes from reinvestment of surplus value generated within the department *only*, then the rate of growth of variable capital in Department I is given by

$$gI=\Delta VIVI=kIpISIVI=kIpIeVIVI=kIpIe.$$

Similarly, the rate of growth variable capital in Department II, on the basis of reinvestment of surplus value generated within the department only, is given by

$$gII=kIIpIIe.$$

Hence, if

$$kIpI=kIIpII,$$

then both departments grow at the same rate and the correct proportions are maintained over time, which is the condition in (A4).

Here, let us consider the underlying intuition. Given the parameters that capture technology, exploitation and investment behavior in the two departments, the right-hand side of the expression in (4) is some positive number.[13] Thus, proposition 3 shows that if the sizes of the variable capitals in the two departments maintain the proportion given by the right hand side of (A3), then the capitalist economy can ensure smooth reproduction on an expanded scale. How do we know this? The condition comes from an algebraic manipulation of the condition for equilibrium—equality between demand and supply—in the market for the output of Department I (for details see section A3 in the Appendix). Hence, if this condition is satisfied, it will imply that the total demand for means of production will be exactly equal to its total supply, both expressed in terms of value. Moreover, since total social production is broken up into two departments, equilibrium in the market for means of production (the output of Department I) will automatically imply equilibrium in the market for means of consumption (the output of Department II).[14] Thus, there will be neither excess demand nor excess supply in the market for means of production and in the market for means of consumption, which means that there will be smooth reproduction of the whole system of production.

The fact that the condition about the proportional sizes of the two departments given in (4) ensures smooth reproduction also highlights a possible mechanism for the emergence of crisis: disproportionality between the two branches of production. If the two branches are not of sizes that satisfy the condition given in Proposition 3, then smooth reproduction of the system will not be possible. Either there will be excess supply for means of production, coupled with excess demand for consumer goods, or the economy will face an excess demand of means of production as also an excess supply of consumer goods. In either case, there will be an overproduction of commodities, and the economy

will be plunged into a crisis—a crisis of disproportionality, as highlighted by Tugan-Baranowsky (see Sweezy, chapter X and XII).

B3. Second Version

The second, and more sophisticated, version of the first variant of the underconsumption argument is found in Sweezy (1942). The setting of his argument is the same as the one we have been using: a two-department capitalist economy undergoing expanded reproduction. Following classical economists, Sweezy (1942) assumes that all wages are consumed. On the other hand, surplus value is used for four purposes: a part is consumed to keep capitalist consumption at the same level as before, another part is used to increase capitalist consumption, a third part is used to augment constant capital and a fourth part to increase variable capital. While the sum of the last two is what we can call "accumulation" (or capital outlay), the third part is what economists now call investment. The main argument in Sweezy (1942) is developed in two steps.

The first step relates to the implications of capitalist relations of production on the growth of demand for consumption goods. It is undoubtedly true that capitalists want to increase profits to the maximum possible extent. This goal is usually achieved through two mechanisms: (a) through an increase in accumulation as a share of surplus value, and (b) by an increase in investment as a share of accumulation. The latter comes about as a direct result of the increasing mechanization of the production process, itself an outcome of the competitive struggle between capitalists.

Consumption demand comes from two sources, wages (all of which is consumed) and the share of surplus value that is not accumulated. As capitalism develops, the rate of surplus value rises, which implies that wages decline as a share of value added. On the other hand, the competitive pressure ensures that capitalists accumulate a larger share of surplus value. Hence, the share of surplus value that is not accumulated, and that is the source of capitalist consumption demand, declines over time. Thus, the ratio of the growth rate of consumption demand to the growth rate of the capital stock declines over time.[15]

The second step of the argument looks at the logic of production from a technological perspective. Sweezy (1942) believes that there is a constant and stable ratio between the capital stock and the potential output (or supply) of consumption goods. This is the key underlying assumption about technology and implies that the ratio of the growth rate of the supply of consumption goods to the growth rate of the capital stock is a constant. If we bring the results from the two steps together, we see the key point of the argument: the ratio of the growth rate of the demand for consumption goods to the growth rate of the supply of consumption goods falls over time. Hence, at some point, the supply of consumption goods overshoots demand, pushing the economy toward an acute realization problem.

How do we assess Sweezy's (1942) argument about the tendency toward underconsumption? There is a basic flaw in the above argument and relates to a faulty assumption about technology (Shaikh, 1978). There is no reason why the capital stock must maintain a constant and stable relationship to the potential supply of consumption goods. The stock of capital can be increased, with investment, to produce more means of production, in which case the potential supply of consumption goods would not change. In such a case, the ratio of the capital stock to the potential supply of consumption goods would fall, contradicting the second step of Sweezy's (1942). The upshot is that Sweezy's (1942) theory of underconsumption rests on a questionable theory of production and technology. Once that assumption is abandoned, the theory's main conclusion about the tendency toward stagnation in capitalist economies falls apart.

Notes:

([1]) "The attempts made from the orthodox economic viewpoint to deny that there is *general overproduction* at any given moment are indeed childish." (Marx, 2000: 411). For an interesting discussion of different interpretations of "Say's Law," see Rotta (2017).

([2]) This typology is used in Foley (2012). It is also implicit in Sweezy (1942, chapter 8) even though he uses a different terminology. What we have termed crises of deficient surplus value is referred to by Sweezy (1942) as "crises associated with the falling tendency of the rate of profit"; what we have called crises of excess surplus value is termed by Sweezy (1942) as "realization crises."

([3]) After explaining the operation of the law of the tendential fall in the rate of profit, Marx went on to outline many counteracting tendencies that might thwart the operation of the law so that we might not observe the rate of profit falling. The discussion here relates to the validity of the logic behind the law itself. Hence, the existence of counteracting tendencies is not relevant for the argument.

([4]) For examples of quotations, see Sweezy (1942:101–102).

([5]) A variant of this result was highlighted by Sweezy (1942) in the footnote on p. 102.

([6]) A strand in the literature has tried to bypass the problem captured by Proposition 1 with two strategies: (1) by using the ratio of constant capital to value added, C/(V+S), instead of the organic composition of capital, C/V (Wright, 1977); and (2) by using asymptotic arguments (Shaikh, 1978). None of these strategies offer valid responses to the problem, and the essential difficulty remains unaddressed. A better strategy is to acknowledge the problem and offer the weaker version of the claim of the law of the tendential fall in the rate of profit that is captured in Proposition 1.

([7]) The exact reference for Ladislaus von Bortkiewicz's work can be found in Sweezy (1942: 104), and the reference for Kei Shibata's work can be found in Okishio (1961:85).

([8]) In later work, Sweezy (1981) has called this argument a crisis of overaccumulation or a tendency for overaccumulation. The essence of the argument remains the same as found in Baran and Sweezy (1966).

([9]) For the importance of money and finance in Marx's theory of crisis see Crotty (1985), and for the role of the financial system in the 2008 crisis, see Dumenil and Levy (2011) and Kotz (2015).

([10]) "however large the organic composition of capital may become, the general rate of profit must increase without an exception, only if the newly introduced technique satisfies the cost criterion *and the rate of real wage remains constant*. And we can safely say that every production technique introduced by capitalists reduces the cost of production in terms of prevailing prices and wages. Therefore, we must accept the conclusion that every technical innovation adopted by capitalists in basic industries necessarily increase the general rate of profit *unless the rate of real wages rises sufficiently*." (Okishio, 1961: 92, emphasis added).

([11]) The formal analysis in this section draws on Harris (1977, chapter 10) and Foley (1986, chapter 5).

([12]) The total supply of the output of Department II is CII+VII+SII and the total demand for the output of Department II is VI+ΔVI+VII+ΔVII+(1−pI)SI+(1−pII)SII. Equating total supply with total demand, plugging in the correct expressions for the terms and manipulating them algebraically will give (A3).

([13]) Using the fact that k_I, k_{II}, p_I and p_{II} are fractions and lie between 0 and 1, it is easy to show that both the numerator and the denominator are positive.

([14]) In economics, this is known as Walras's Law.

([15]) Note that the growth rate of the capital stock is called investment.

Deepankar Basu

Deepankar Basu, University of Massachusetts Amherst