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## CONSTANT CAPITAL AND THE CRISIS IN CONTEMPORARY CAPITALISM: ECHOES FROM THE LATE NINETEENTH CENTURY

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**ABSTRACT:** Because constant capital involves irreversible decisions, understanding this subject is essential for coming to grips with the complexity of the economy, especially crisis theory. This paper attempts to show how both Marx and late 19th century neoclassical economists in the United States realized that the relative growth of constant capital made competitive economies unsustainable.

### I. INTRODUCTION: CONSTANT CAPITAL AND CRISES

An understanding of constant capital is an overlooked, but necessary component of crisis theory. This paper uses the experience of the 19th century U.S. economy to illustrate the relationship between constant capital and economic crises. The rapid technological advances of the time led to a lethal combination for capital. Investment in constant capital suffered rapid devalorization, while growing productivity saturated markets, creating what was then known as *The Great Depression*.

### II. CONSTANT CAPITAL AND LABOR, LIVING AND DEAD

Constant capital is anything but constant. Constant capital is constant only in the sense that it is incapable of producing surplus value. The reason for this constancy is that the living labor that once created constant capital produced surplus value has already been expended. Now that the living labor has become congealed in a material form, it now only exists as dead labor.

This sequence of dead and living labor is important to keep in mind. The dead labor of constant capital is used in the extraction of surplus value from new living labor. Some of that living labor will produce more constant capital to extract another round of surplus value. Hence, Marx's classic vampire metaphor of dead labor devouring living labor. Like everything else in Marx's vision of capitalism, constant capital still represents a

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fluid set of social relations. From this perspective, the relevant social relations are the various relationships of the owners of constant capital. Understanding these relationships throws important light on the vampire-like nature of constant capital and its role in crisis theory.

This analysis of constant capital does not sit very well with the common algebraic descriptions of Marx's theory, which tend to be static. In fact, the dynamic nature of constant capital becomes obvious from the two forms in which constant capital appears in such equations. Firstly, we see the  $C$ , the stock of the remaining accumulation of dead labor, as part of the denominator of the organic composition of capital. Then we see a different  $c$  -- a flow -- as one of the constituents of value, which, along with variable capital and surplus value, make up the value of a commodity. We can understand these two  $C$ 's by proposing that the second  $c$  represents something like depreciation of the other  $C$ .

Algebraic value theory presents this  $c$  as something like a steady peeling off of the value of the aggregate  $C$ , almost like a meal intended to be partially eaten, with the remainder served as leftovers over the course of the next few days.

Of course, this peeling is relevant only to fixed capital, which lasts more than one production period. Marx, however, understood how similar difficulties could even arise with capital goods, which were totally consumed during a single production period. In fact, he often used cotton as an example of irregularities in the organic composition of capital (see Perelman 1987).

Marx addressed the idea of a regular peeling in the eighth chapter of first volume of *Capital*, by proposing that experience would teach capitalists about the probable lifetimes of their constant capital. Just as a life insurance company can feel comfortable about committing to make payments without knowledge of the lifetime of any particular policyholder, the capitalist can feel relatively confident about how much value constant capital gives up during any period of production (Marx 1977, p. 311).

For example, many big operations have comparable knowledge about the lifetimes of light bulbs. Based on this information, they save money by scheduling periodic replacements of all light bulbs rather incurring the expense of arranging to send a person to replace each individual bulb as it burns out.

In general, however, this image of a regular disaccumulation of capital by "peeling" creates a serious challenge. Capitalists typically lack information comparable to the life insurance companies.

Marx clearly understood that nobody can know in advance how this peeling will proceed in the future, but he waited until later in the book to introduce that level of complexity. He did so in a dramatic fashion, by turning to the observations of Charles Babbage, who, like Isaac Newton, was a Lucasian professor of mathematics at Cambridge. Babbage attempted to construct the first computer in the early nineteenth century, more than a century before the first working computer appeared. Babbage never lived to complete this project, but recently two models were constructed upon his design.

Of course, this computer was based on mechanical power rather than electronics, but it still required parts with very precise specifications. In carrying out his project, Babbage had to work with many workshops. This experience taught him a great deal about modern manufacturing.

Based on this experience, Babbage published an extraordinary book, *The Economy of Machinery and Manufactures*, which went well beyond any contemporary work of political economy in creating a realistic analysis of modern production. The significance of rapid technical change struck Babbage (1835, p. 286) who claimed: "improvements succeeded each other so rapidly that machines which had never been

finished were abandoned in the hands of their makers, because new improvements had superseded their utility”.

Babbage's rule of thumb was that the cost of an original machine was roughly five times the cost of a duplicate (Babbage 1835, p. 266). Babbage used the example of frames for making patent net that initially sold for twelve hundred pounds. A few years later, they cost only sixty pounds (Marx 1977, p. 528; Babbage 1835, pp. 286, 214). According to Babbage's estimates, in terms of value theory, one hour of labor embodied in patent nets that were only a few years old would be equivalent to three minutes of direct labor embodied in a new machine.

Such declines in reproduction costs are common during periods of rapid technological change. This phenomenon was abundantly clear during the early decades of the personal computer, when each new generation of computers would start out with a price something like \$10,000, then decline relatively rapidly until it approached \$1,000, at which time a new generation would appear. While the price declines were relatively predictable, the timing was not.

Babbage's observations remind us that this "peeling" is not just a matter of predictable wear and tear. Shifts in demand, as well as changing technology, can affect this moral depreciation.

Without foreknowledge of the future, moral depreciation defies measurement. For example, new uses for capital, which is already fully depreciated, might emerge. Alternatively, new conditions might make brand new capital worthless, even before it has been turned on.

Once we recognize that moral depreciation involves complex sets of social relations, any adequate value theory involves much more than an employer squeezing surplus value out of living labor at the workplace. In effect, both value theory and crisis theory require a "macroeconomic" vision in addition to the standard "microeconomic" of the direct creation of value in the workplace.

From this macroeconomic perspective, what Marx called the social division of labor, the process of production extends over time and space, because workers scattered throughout the economy have, both directly and indirectly, produced the capital goods and materials, with which the workers in the workplace are using. Volume 2 of *Capital* shows how difficult this coordination is, even when the economy is aggregated into one producing consumer goods sector and another producing capital goods.

Of course, the analysis of constant capital requires something far more complex than the simple two-sector economy of Volume 2. The capacity to create value, as well as the general process of capital accumulation, depends upon the specific material characteristics of capital -- its use values, which, in turn, depend upon social relations. Take a moment to consider the rich mix of social relations of constant capital.

### III. THE FOUR SOCIAL RELATIONS OF CAPITAL

Capitalism involves much more than abstract capitalists accumulating abstract constant capital. Consider how the social relations of capital extend in four different directions. The social relations with labor are primary. In this respect, the owners of capital must efficiently direct the labor in their employ in order to extract as much surplus value as possible -- the microeconomic dimension.

In addition, the social relations of capital include its connections with its potential customers. Capital must make also sure that it chooses to produce commodities that the market will valorize. Here, capital has a relationship similar to the one described in mainstream economics: the need to produce goods that find a market,

whether among final consumers or other producers. Again, as Volume 2 of Capital indicated, capitalists have no firm information about the market that they will face.

Thirdly, within the social division of labor, owners of capital have a complex, vertical network of relationships with other capitalists, including suppliers, and distributors. Finally, capitalists have an equally complex, horizontal relationship with competing capitalists.

Each of these relationships involves a contradictory mix of cooperation and conflict. For example, workers typically must ostensibly comply with the demands of employers in order to earn their wages at the same time as they might take measures to protect their own interests as best they can. As marketers of commodities, capitalists attempt to appear to serve the needs of their customers, but, at the same time, they will attempt to increase profits whenever possible by scrimping on quality or resorting to deception, perhaps, at the same time, taking into consideration how such measures might harm their future prospects. Similarly, alert customers may shift to other suppliers in order to get the best deal possible.

With sufficient market power, suppliers or distributors, such as Wal-Mart, will squeeze and even destroy producers that are insufficiently compliant with their demands. Finally, competing capitalists jockey for position, attempting to win away customers or conspiring with suppliers or distributors to undermine their competitors. None of this will be unfamiliar to people who study modern business practices. At the same time, however, competing capitalists will act in unison to further their class interests.

Of course, competitors may also attempt to win market share by investing in superior methods of production. This technological competition plays a key role in promoting economic progress, at the same time as unsettling economic relationships, even to the point of triggering crises. Here we advance into new territory, which highlights Marx's superiority to conventional economics.

First, from an obvious micro perspective, investment in superior technology offers an opportunity to steal a step on the competition. In addition, such investment generally also involves economies of scale. As soon as one capitalist invests in one of these scale-increasing new technologies, others are left with the choice of adopting a new technology or exiting the industry. When too many producers attempt to meet the competition by making comparable investments, over-accumulation results.

In effect, then, competition creates a technological imperative, which floods. This phenomenon conflicts with the need to produce according to consumers' "needs," in the sense that excessive capacity builds up in particular industries. When such imbalances become more common, crises occur. I will return to that process later.

#### **IV. THE CONTEXT OF TECHNOLOGY IN *DAS KAPITAL***

Marx was writing his mature works at critical technological juncture, when industry was first learning to efficiently harness fossil fuels -- a period that has been called the Second Industrial Revolution, but in many ways should more properly be called the first Industrial Revolution.

As Marx noted, during the so-called first Industrial Revolution handicraft workers were still producing capital goods. Because of the primitive methods for producing constant capital, the potential for rapid over-accumulation was limited, a limitation that was demolished during the second half of the 19th century. At this stage, rapid technological improvements in the capital goods meant that over-accumulation became hardwired into the capitalist system.

Under this new technological regime, the value of the constant capital was under continual threat. Echoing Babbage's example of patent nets, Andrew Carnegie once

leveled a brand-new factory as soon as he heard of a better production technique (see Perelman 2006, p. 115).

One important characteristic of this new technology was a tendency to use capital to replace labor. As a result, the organic composition of capital should be increasing; however, without knowledge of  $c$ , measurement of  $C$  becomes impossible.

Nonetheless, we can get a handle on this process using the superficial perspective of neoclassical economics. Under this new regime, fixed costs continued to grow relative to marginal costs. To the extent that prices gravitate toward marginal costs, most firms will be unable to meet their fixed costs. As Marx noted in his unpublished notebooks, "It is therefore clear that in competition, once the monopoly in the new invention has come to an end, the price of the product is reduced to its production costs" (Marx 1991, p. 143).

The tendency toward increasing returns to scale intensified the difficulty of survival. The only logical market-based outcome with continually increasing economies of scale would be the destruction of all competitors, except one, leaving a monopoly.

In the last decade of his life, Marx could see this phenomenon beginning to play out in global economy. I know of nobody else who anticipated the consequences, although Babbage was well on his way, noting, "It may thus happen that the instrument or tool actually producing the work, shall cost five or even ten thousand times the price of each individual specimen of its power" (Babbage 1835, p. 69).

Especially in the United States, increasing returns to scale quickly saturated markets. The pressure to replace rapidly devalORIZED constant capital created waves of bankruptcies. As might be expected, industry reacted by squeezing labor as much as humanly possible in order to protect its diminishing profits. The intensification of labor was not enough. Capital needed some method of limiting competition to prevent it from extinguishing itself.

## V. ECONOMICS TO THE RESCUE?

In late 19th century, the best students from the United States went to study in Germany. The economists who returned became the leading economic theorists. Although they were largely conservative, they brought back a healthy respect for the work of Karl Marx. In fact, a good deal of their work would be familiar to anyone with a knowledge of Marx's analysis. They even created the American Economic Association as a vehicle to respond to the prevailing free market policies of the conventional, American-trained economists.

Consider the case of the very conservative Arthur Twining Hadley, an early president of the American Economic Association and longtime president of Yale University. In 1879, he wrote to a friend that was interested in Marx, but "while far from agreeing with him," he accepted that his work had a "higher scientific aim than almost any work on political economy in the last half century" (Hadley 1948, p. 32). Almost twenty years later in *Economics: An Account of the Relations Between Private Property and Public Welfare*, Hadley recognized, "the size units of capital is so large that free competition often becomes an impossibility, and theories of economics which are based upon the existence of such competition prove blind guides in dealing with modern price movements" (Hadley 1879, p. iii).

Hadley was typical of these German-trained economists in taking this position. At the same time, these same economists perfected the neoclassical analysis, which purported to prove that the system was just. Its high point was John Bates Clark's idea that exploitation is impossible in a market economy because everybody receives compensation equal to their marginal product.

The Marx-like writings of these economists were intended to shape policy, while their marginalist theories were created as ideological defense from workers and farmers

who were challenging the *status quo*. In fact, both theories eventually won out on their intended terrain. Neoclassical apologetics for capitalism eventually dominated academic economics.

In terms of policy, however, by the late 19th century, consolidations, often led by J.P. Morgan, managed to stifle competition, allowing the rate of profit to recover. German-trained American economists embraced this outcome, taking the position that consolidation would eliminate wasteful duplication (see Perelman 2006). Similarly, the period marked the first time that the United States began to use intellectual property as a macroeconomic technique for gaining an edge over other nations.

Unfortunately, the promised efficiencies of the Morganized trusts, cartels, and monopolies of the late nineteenth and early twentieth never appeared. That outcome should have been predictable. After all, monopoly eliminates the incentives that are supposed to make capitalism efficient. Under this new regime of limited competition with lagging technological change, the distribution of income became highly skewed. The result was that industries began to resemble financial institutions rather than centers of production -- a process that accelerated in recent decades.

A modest burst of productivity occurred in the early 1920s, when industry made the next step in learning to harness the potential of fossil fuel. Previously, the factories were built around the power of the steam engine, distributed throughout the plant by belts and pulleys. By the 1920s, business finally learned how to distribute power more efficiently by way of electricity.

This new technology was an exception to the rule, in the sense that it generally did not involve an increased economy of scale; instead, it was capital saving. Even so, extreme financialization was already underway. Combined with the growing inequality, the stage was set for the Great Depression.

Mainstream economics could never comprehend the connection between constant capital and financialization because it exclusively pays attention to transactions, completely ignoring social relationships, including relationships of production.

## VI. MARX AND NEOCLASSICAL ECONOMICS

What follows is not intended as THE crisis theory, but only what I consider to be a necessary part of crisis theory. After all, a crisis is the result of a complex network of dysfunctional social relations. The social relations of constant capital are an important part of this conjunction, but, of course, only part.

Indeed, the logic of capital accumulation is so obvious that both Marx and neoclassical economics (read properly) reached the same conclusion. Marx framed his argument in terms of the increasing organic composition of capital; neoclassical economics in terms of increasing fixed capital with prices determined by marginal costs.

As noted earlier, the data required for measuring the organic composition of capital do not exist. Part of the problem is that any measurement of the organic composition requires knowledge of the depreciation pattern of the existing capital stock, including moral depreciation.

In contrast, the language of conventional economics is convenient, especially because it supports Marx's contention about the inherent tendency to crisis, without addressing the challenge of measuring the organic composition of capital. In effect, neoclassical economics discredits itself while confirming Marx's analysis.

Consider the lesson from neoclassical economics in a competitive environment of rapid labor-saving technical change. Competing capitalists face the necessity of investing in new technology or eventually exiting the business. A firm may profit in the short run by adopting the new technology; however, any temporary advantage an individual firm may gain may disappear in short order and turn into a curse for the entire industry.

Each wave of new technology tends to replace labor with fixed capital, pushing marginal costs toward insignificance. In addition, once this new technology becomes commonplace, economies of scale saturate the market, making matters worse.

In any case, the general tendency of marginal costs to fall relative to fixed costs is indicative of a rising organic composition of capital, with many of the consequences suggested by Marx. In a competitive market, this combination of saturation and falling marginal costs tends to cause rapidly falling prices. This deflationary tendency means that debt will become increasingly difficult to service, as was the case in the late nineteenth century. In short, without protection from the forces of competition, mass production becomes overproduction. This was the lesson that the German-trained economists got from Marx.

Something even more threatening to capital will occur if technology is developing too rapidly: capitalists will have to scrap their increasingly complex capital stock long before they have time to recover the cost of purchase. Babbage witnessed this process with the machine for making patent nets. This rapid devalorization of capital can possibly eat up profits even quicker than falling prices. In short, capital, left to itself, exists in a Hobbesian world, in which the economic life of capital values may be nasty, brutish, and short.

## VII. A BRIEF THEORETICAL NOTE: CONSTANT CAPITAL AND CRISES

Marx noted that capital "encounters barriers in its own nature" (Marx 1974, p. 410). Understanding the social relationships of constant capital makes Marx's words clearer. In the process, crisis theory becomes richer.

Because marginal costs of services may be relatively high, many old-line manufacturing businesses have moved into services, more often than not, finance. Finance, however, lives off the surplus value extract from the productive sectors. Bubbles give the temporary illusion of success, but profit ultimately depends upon the surplus -- a fact that the recent crisis makes clear.

Once financial capital becomes freed from its moorings in the productive system, it loses much of its connection with the underlying value system. In the process, values become infused with fictitious values. As a result, the capitalist system becomes increasingly incoherent.

This incoherence can permit finance to capture an otherwise incomprehensible share of the fruits of the economy; however, lacking the kind of feedback that the value system of a more traditional economy provides, financialized capitalism is far more vulnerable to crises, which then liquidate much of the accumulation of fictitious values.

Whether overproduction, underconsumption, or disproportionality triggers such crises is another question. Certainly, the excessive reach of financial capital makes underconsumption more likely. The increasing lumpiness of the capital bases of much modern technology increases the chance of a disproportionality crisis. Finally, the relationship between overproduction and the competitive pressure to adopt new technologies with an increasing scale of production is obvious. The complications created by the growing importance of finance cause the system to amplify the consequences of each of these potential triggers.

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