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The Economics of “Autophagy”:  
Implications of the Economy as “Machine”

Abstract

The description of “the economy” as a machine has both descriptive and performative dimensions. That is, the machine is an accurate description of the mechanization of production processes with the onset of the industrial revolution, to improve productivity and efficiency. The focus on efficiency is ubiquitous in economics, from Adam Smith’s division of labor, to the “production possibilities frontier” of modern economic pedagogy. This description is also normative, since operation at the frontier of efficiency is the goal of increasing the “wealth of nations.”

This paper will explore the methods by which this metaphor of economy as a “machine” operates to achieve such reification of a human institution. One important institution is language, where a specific term can refer to an “object” which is also a human institution (Searle 2010). This term referring to an institutional “object,” like money or property, can help to naturalize the institution and increase its conformity, reliability, and confidence. That is, such dehumanization would be condemned if recognized, while the operation of certain conventional language systems remains unexamined. At the same time, the presumably mechanical operation of the economy actually draws “life” from humans and the ecology, without the full awareness of its participants, like a form of “autophagy.” Such an examination can open possibilities for institutional change.

## The Economics of “Autophagy”: Implications of the Economy as “Machine”

### I. Introduction

In the transition from feudalism to capitalism, and the shift from hereditary monarchy to the liberal state, there was a great opening of debate regarding the proper sources of authority. Systematic attention was paid to natural science, from gentlemen tinkers to the state supported Royal Society, and to “reason of state,” which later became political economy. The Enlightenment is a term generally used to refer to these massive innovations in the nature of legitimate authority. The sources of wealth were shifting, from trade to production, and there were explicit new designs for systems of employment, aside from traditional forms like guilds and household production. The moral dimensions of new practices such as “usury” and “slavery” were debated, along with emerging forms such as indentured servants and wage laborers. Extending an appeal to religion, and building on the new status of natural science, the natural law “origin stories” of the pre-political individual forming a “social contract” still pervade our political and economic theory, with the associated commercial overtones about the inherent nature of society. The goal of political economy has become and remains the “wealth of nations.”

The separation of certain spheres from others, such as the public/private divide, and the reification of production using humans as instruments, was one type of accommodation to these moral issues. The abstract notion of “the economy” is then driven by different principles, such as efficiency, regardless of the impact on those whose working lives are structured by this imperative (Davis 2015b). The effort is justified by the claim that “more is better,” and humans as consumers are happier as a result of these efforts to maximize production, given resource and income constraints.

The paper will proceed by reviewing the methods of organization of modern state and industrial production, and the ways in which they were rationalized. We will analyze the ways in which this organization can be characterized as “autophagy,” or feeding on itself, along with the moral, social, and political implications.

### II. The Modern Liberal State

In the shift from hereditary monarchy to liberal state, certain functions were internalized, such as finance, military, and welfare (Davis 2015a). From tax farms to tax bureaucracies, finance became more reliable and predictable, allowing for the establishment of public credit. Mercenaries paid with bullion were replaced by standing armies. Instead of nobles obliged to serve their lord, or instead of citizen militias, citizens became taxpayers to support the professional military. Instead of parish poor laws, there were national programs to support deserving veterans, disabled workers, and widows with children. This professionalization of the state resulted in bureaucratization, and impersonal relations among citizens, instead of direct relations among neighbors (Calhoun 2007, 70-72). The associated formalization of rules had the potential of becoming an “iron cage” (Weber 1930), or the “road to

serfdom” (Hayek 1945). Affective relations were confined to the family, relatively invisible in the context of the pursuit of the “wealth of nations” (Davis 2017a).

As states became more complex, there was a formalization of rules and the rule of law, in order to establish and maintain regular procedures, such as taxation and the administration of justice. Rationalized legal and administrative expertise became more important, to replace manorial courts and arbitrary royal decree. With economic modernization, the definition of property was subject to flux, from land and livestock to financial assets and information like patents (Davis 2015a). Yet the term, “property” could have the same connotation with the associated material foundation, because of the extension of meaning of the same term. In this way, social institutions, like finance and patents, which are entirely human creations, can appear to have the same solidity as land, a form of reification. These institutions become “social facts” (Searle 2010), and have the same apparent immutability to the individual. Reification can be functional, appearing to be beyond the influence of the individual, while actually relying on the compliance of all individuals. In this way, “the economy,” which is a hybrid of human and material elements (Latour 1993), can appear to be an object, like a machine.

### III. Production with Human Instruments

Adam Smith’s famous text begins with the division of labor, as a technique for increasing productivity. This pursuit of increasing output per unit of time has led to a “treadmill,” by which companies competed to reduce the working time necessary per unit of commodity production (Postone 1996). Commentators from Karl Marx (1967), the revolutionary thinker, to Alfred Chandler (1977), the prominent business historian, then examined the techniques for increasing productivity. Mechanization, automation, the application of science, and the professionalization of management were all techniques employed in this drive for productivity improvements. From the use of codes to program textile machines, by Babbage, to modern computers and software, there was an attempt to extract knowledge from the skilled worker into management and into the machine itself. Perfection of production techniques led to the discipline of scientific management in the nineteenth century and cybernetics in the twentieth. From merely reducing labor time to eliminating the worker altogether, the human increasingly became an appendage to the machine. Information systems increasingly integrate global production and distribution processes, centralizing management functions in ever more sophisticated software like enterprise resource planning (ERP) (Haigh 2001). Big Data is the new thing in management, and the cloud computer providers are already a tight oligopoly (Amazon, Google, IBM, Microsoft). Artificial intelligence (AI) in current stages of development promises to integrate machine systems over the internet in global production and supply chains (Davis 2018a), to replace the driver in the family sedan, as well as the consumer’s own intelligence in the home with automated voices impersonating a friendly assistant.

### IV. Mind/Body Split

Western values have consistently ranked mental activity over manual, and creative over necessary labor (Nelson 1996). Ancient Greek philosophers decried the realm of necessity in the *oikos*, inhabited by women, slaves, and children, and preferred the realm of freedom in the polis. Modern neuroscience has

identified the mind/body split between higher cognition in the neocortex from instinctual or autonomic responses in the amygdala, a contrast between “thinking fast and slow” (Kahneman 2011).

The separation of mental and manual labor, and relative valuation of mental over manual, was characteristic of workplace organization. What is widely known as “Fordism” is the use of the assembly line, and standardized work protocols, to reduce the skill levels of the workers, and to make them more interchangeable, easier to replace, with lower wages. Famously, Fred Taylor, the developer of “scientific management,” used the stop-watch and close observation to find the “one best way” for a given task to be performed. Fine divisions of labor encouraged workers to aspire to the next level in the hierarchy, instead of to form solidarity among peers (Gordon, Edwards, Reich 1982).

As production systems developed, standardized metrics and protocols were necessary to have systems of interchangeable parts (Noble 1977). As management observed and extracted knowledge from the skilled workers, the managers themselves became more professionalized (Chandler 1977). Some of the most notable experiments in regimentation of production were for the military, such as the Harpers Ferry Armory (Smith 1977), and computers in the modern era (Edwards 1996).

#### V. Abstraction

The organization of commodity production, based on the metric of productivity, led to the development of categories relevant to increasing output per unit of standard time. Productivity itself, still a ubiquitous indicator, generalizes all output,  $Q$ , relative to labor inputs,  $L$ , with labor considered as a “homogeneous” factor of production, used by economists as diverse as Marx and Keynes. Further, the production of surplus, savings, or profit, depends on reducing the time necessary for the production of wage goods, relative to total production time (Davis 2017c). Whether the metric is Marx’s relative surplus value, or mainstream economics notion of shutdown point (based on maximum average labor productivity, or minimum average variable cost), the goal is to increase production beyond consumption, to allow for “savings” and investment.

Once increasing productivity can be generated, based on mechanization, automation, improvement of management, or globalization, the increased rate of return can be measured as a return on investment.

#### VI. Finance and Automatic Rate of Return

Money became reified as a symbol representing the worker, the debtor, and the tax payer, all important roles in modern economies. The use of money advanced to purchase materials and labor, to organize production, and to collect revenue from the sale of the product can be conceptualized as a financial circuit. From Aristotle and Marx, the circuit,  $M - C - M'$ , represented the possibility of making more money,  $M'$ , from borrowed money,  $M$ , directed towards trade and production of the commodity,  $C$ . Money lending then became profitable, and a separate financial sector became differentiated from production. Given the time-based system, there was an imperative to make ever greater financial return from any given project per unit of time, resulting in competition among the lenders and borrowers, extending credit, and an increasing rate of financial turnover. The expansion of finance has resulted in a global system, integrating producers, consumers, and nation states. Lenders require a given rate of return from borrowers, and in this way money seems to expand by itself automatically. These financial relationships, based on human producers and consumers, appear automatic (Davis 2017d).

Because the financial circuit can provide necessities and luxuries, and appears to grow by itself, it seems to be a self-contained alternate reality. What we know as the circular flow economy is essentially exchange between the household and the firm, after splitting production from consumption, the worker from her product. This exchange is based on legally defined individual private property (Davis 2015a), defined in terms of parcelization of the earth, excluding the so-called externalities of human and ecological reproduction. Within its own terms, nonetheless, it is vulnerable to over extension of credit and self-fulfilling bubbles. Further, economic financial models assume infinite time, and the models of calculating present discounted value tend to over-value the present and to “discount” the future. The circular financial flow of the economy abstracts from material and life-generating processes, which are presumably embedded in the abstract equations that connote absolute precision. Economic models are linear instead of truly “circular” including waste (McDonough and Braungart 2013), with no account of the costs of disposal. Yet these self-referential global financial models would presume to encompass the earth. Ultimately the financial system based merely on quantitative expansion of  $M - M'$  is relatively meaningless, and the concentration of finance leads to excessive political power (Lessig 2018).

The operational requirement of the automatic expansion of money has led to financialization (Davis 2017d) in place of real investment. With increasing concentration of markets and income, there is an increasing ossification of the economy, with less resilience and more governmental support of “too big to fail” companies and banks. The financial system is focused on the production of “safe assets” instead of distributing the risk of innovation, much like a *rentier* economy (Davis 2018b). One outcome is the increasing number and size of financial crises.

#### VII. Mass Consumption and Identity Politics

Faced with impersonal bureaucracies of the state and the corporation, there is an effort to differentiate oneself in personal consumption, the presumed private sphere. With a cornucopia of consumer choices available, individuals tend to choose consumer styles to identify with some preferred group or image (Davis 2011), while the number of potential personae tends to multiply. Measures of health and well-being are diminishing in the US, nonetheless, with a culture of instant gratification, hedonism, and addiction. Rather than see a conflict between “recognition” and “redistribution” (Fraser 2013, 175-186), it is possible that neither work nor consumption offers meaningful rewards, while incomes stagnate for the middle and lower classes.

#### VIII. Reversal of Life and Death

There is a value system inherent in capitalism, identified in Smith as well as Marx, which values death over life. This leads to a relatively low valuation and investment in human reproduction, and a tendency to deplete the human and ecological resources on which the system depends, or “autophagy.”

##### a. Smith’s “Invisible Hand”

With the goal of productivity among firms and the formalization of the state, many institutional settings in modern industrial economies are characterized by bureaucracy. As individuals are inducted to specific institutional roles, they are prescribed to perform certain actions, like the precision of double-entry bookkeeping (Poovey 1998, 33-65). The system as a whole enforces certain outcomes, beyond the individual’s control (Searle 2010). Sometimes celebrated as “market forces,” the “invisible hand” can

also be likened to a shroud (Rothschild 2001; Baucom 2005; Vogl 2015; Wennerlind 2011; perhaps “value” is Marx’s version of the ghostly “invisible hand,” capable of autonomous movement).

The economy can be imagined as a “machine” (Nelson 2006; Wilson 1998, 42) because individuals have relinquished their agency to become “objects for sale.” Money enables the individual to express the most refined and distinctive preferences as a consumer, while objectifying others into prescribed roles as producers; and then empowering each individual to reverse these roles. The worker is paid a money wage instead of control over his product, with which he can purchase any other commodities, but in limited quantity. The mortal individual can “spend” her life working and saving, with the promise of “perpetual” assets produced by the financial system and the state.

#### b. Marx

Marx makes much of the reversal of living and dead, in *Capital*. Value is produced only by living labor, and machines only transmit value, when used in production (like depreciation). This value is only realized when sold to (living) consumers.

But there is a reversal with commodity fetishism (Davis 2017d). Workers believe that the commodities are valuable in themselves, not due to their own involvement in the production process. The population considers money as valuable in itself, and able to grow automatically over time.

Machines certainly contribute to enhanced productivity, as noted by both Smith and Marx. But as mechanization develops, the worker is more like an appendage to the machine. The machine keeps the pace of the production process, as with the assembly line. In the factory, the machine is the most obvious presence, filling the entire space, increasingly as production is automated. Knowledge of the production process is no longer on the shop floor, with skilled workers, but embedded in the software of the machine. Ultimately machines can be produced by machines, in the capital goods sector, manifesting the peripheral role of living labor. Increasingly even intelligence can be automated, with the development of “artificial intelligence” or AI.

The living worker is dominated by “dead” labor, embedded in the machine and the knowledge extracted from the production process, or separately organized research and development by the corporation. The most highly remunerated occupational categories are management, engineering, and finance, rather than human reproduction or agricultural production or conservation. There is a clear color-coded hierarchy of pay, with white collars receiving more than blue or pink. The household does not produce value at all, according to both mainstream and heterodox accounting systems (Davis 2017a).

The so-called “monopoly” of the ownership of the means of production is the institutional leverage over the labor force by employers, who can treat the employment of workers as contingent on profitability, an abstract category with no apparent connection to their own contribution to the production process.

The workers are treated as objects, and the commodities and money are treated as valuable, manifesting a complete reversal of the human, with the priority of the “dead” over the “living.” At the end of the long chapter on machinery in Volume One of *Capital*, Marx notes that mechanization can increase the production of relative surplus value, but the ultimate source of wealth is humans and the soil.

Capitalist production, therefore, develops technology, and the combining together of various processes into a social whole, only by sapping the original sources of all wealth – the soil and the labourer.

(Marx, *Capital*. 1967, Volume I. Ch. 15 “Machinery and Modern Industry,” Section 10, p. 507)

That is, the system which appears automatic, to grow by itself, actually depletes its true sources of wealth, the population and nature (Moore 2015). This can be called a form of “autophagy,” or feeding on itself.

### c. Fossil Fuels

A notable example of the replacement of living labor (animal and human) with preserved energy is the extensive use of fossil fuels in industrialization, first coal and then petroleum. These fuels enabled the continuous flow of production, with liquid chemical processes and then with flows of electrons, or electricity; that is, the material characteristics of some substances actually improved on the smooth flow of labor time. These innovations made production more susceptible to control. For example, striking coal miners were replaced with automated oil pipelines, and the governance of entire countries was affected to maintain stable oil supply. Flows of global credit were assured by collateral based on oil production and reserves, supported by arms sales to stabilize allied governments (Mitchell 2009). When evidence mounted regarding the impact of CO<sub>2</sub> emissions on global warming, these scientific results were denied (Oreskes and Conway 2010, 295-307) and the fossil fuel industry initiated a concerted campaign to alter the operation of US democratic processes (Mayer 2016). The improved technology of renewable energy, especially solar, threatens the leverage of the oligopolistic energy corporations and states, as these resources are in fact already widely distributed globally, as the sun rises and sets.

## IX. Recovery of Agency with the Public/Private Divide

Citizenship represents the individual in the state, who may otherwise relinquish agency as a worker.

To allow for agency, there is a separation of state from market, a public/private divide, and presumed system of checks and balances. An expanded view of the “social contract” of market economies is to submit to market discipline in return for the availability of cheaper commodities and quest for upward mobility. While the individual is subsumed in performing according to market requirements, each citizen is presumably represented in the state apparatus, where agency is recovered. But separation of powers in the structure of the state reduces the direct impact of the voter (Polanyi 1944, 225-226), even without voter suppression and electoral fraud.

## X. The Post Human Future

In popular science fiction, as well as academic analysis, it is increasingly possible to imagine a production process entirely without humans. That future process could be performed by a combined integration of computer and person (Brynjolfsson and McAfee 2014) or a new form of machine/person like “cyborgs” (Haraway 1991). Because of the capitalist economic imperative for productivity improvements, in the workplace and in the military, there is a long term bias towards labor saving technological change; that is, towards increasing automation. As a result, there is a direction to invention that may not benefit

human kind more generally, but instead focus on productivity and profitability. Such objectives as public health and education, and assurance of minimal standards of nutrition, are feasible (Jananoff 2016), but have a low priority.

Nietzsche's notion of the "last man" was based on presumed mediocrity (Fukuyama 1992), but the relative disappearance of humans from production persists in a culture that claims individual freedom. In contrast to this inexorable replacement of the human in the operation and conception of the economy, alternatively there could be a shift in economics, philosophy, and social science, away from the productivity imperative and the purported anthropocentric goals of material wealth and consumer satisfaction. The natural law origin stories assumed that the earth was created for human use, and for human preservation, rather than respect for its life processes. Rather than the objectifying stance of modern science and social science (Nelson 1996), we could develop a common perspective of life on earth, such as shared metabolic processes across species, which are remarkably sensitive to temperature (West 2017, 174-177, 236-245). Rather than forms of "consumption" which actually degrade life on earth, there could be an appreciation of the true sources of wealth (Schor 2010), with new forms of community and sustainability (Davis 2017b).

## XI. Conclusion

The value system inherent in capitalism, to prioritize "dead" capital over living labor, is ultimately self-defeating. The term "autophagy," or self-consumption, could be used to describe this phenomenon. Capitalism consumes its workers, in the process of production, but does not adequately provide for or reward the re-production of the labor force or sustainable investments in ecology. Rather, the need for labor discipline requires the impoverishment of humans, in terms of health and education and other improvements in human capabilities, a neglect which can contribute to political instability. Ironically, climate change, from the replacement of living labor with fossil fuels, threatens the stability and permanence of "property" itself. Such a system is only sustainable with globalization in a labor surplus economy, always seeking new frontiers, leaving behind despoiled wastelands in its wake.

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