



Socialist alternatives to capitalism II: Vienna to Santa Fe

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Abstract

Optimal control theory and information technology provide tools with the capacity to implement top-down centralized allocation of resources in complex economies organized through a social division of labor. Twentieth century political and systems thinking, however, emphasize the virtues of bottom-up spontaneously organized systems. Workers' control can be analyzed as one variety of bottom-up spontaneous organization. Another is peer production, as in the case of open-source software. A model of peer production under the name Lifenet provides some insights into the advantages and limitations of this approach to socialism.

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1 Top-down

Barone and Pareto tackled the problem of socialist allocation using simple methods of the analysis of static economic equilibrium, centering on the idea that competition will force an equality between marginal cost and price. In the 1920s and 1930s, a group of mathematicians, statisticians, and economists, including notably Abraham Wald, John von Neumann, and Oskar Morgenstern, coalesced around Karl Menger's "Vienna Circle." Their discussions laid the groundwork for the mathematical approach to economics that dominated economic theory in the second half of the twentieth century. In particular, this work clarified the problem of how to keep

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prices from becoming negative through the application of “complementary slackness” conditions which allow for non-zero prices only when resources are fully utilized.

One result of this line of thinking was to situate the problem of economic allocation of resources in the broader context of optimal control theory. The mathematical theory of optimal control concerns the design of feedback mechanisms that can stabilize complex dynamical systems to achieve particular goals. A paradigmatic example is the problem of anti-aircraft gunnery, which became a key aspect of military combat in the Second World War. As Mirowski (2002) observes, the duel between the anti-aircraft gunner (who tries to aim at the point where he thinks the bomber will be when the shell reaches the aircraft’s altitude) and the bomber pilot (who tries to evade the shell through maneuvering the plane) inspired von Neumann and Morgenstern’s zero-sum game theory and the “cybernetics” of Norbert Wiener. (It is also the root of modern financial theory, where the problem appears as the task of predicting where asset prices will be when a trader’s transactions are actually consummated.)

One continuing tradition of thought takes the technocratic view that the task of socialism is to identify and implement a socially optimal allocation of resources and distribution of products. This is a “top-down” vision of socialism, in which the participants in the division of labor surrender their autonomy to a (presumably) benevolent centralized mechanism of social control. The development of sophisticated optimal control theory supports this top-down vision by revealing mathematically precise characterizations of the conditions for optimal allocation that are in principle generalizable to an arbitrary number of produced goods and capable in theory of dealing with problems of time and uncertainty. In this perspective, establishing socialism amounts to putting in place social institutions that can implement the solutions of optimal control problems. The power of these mathematical methods and the prestige of mathematics in the natural sciences disposed many sophisticated thinkers to accept the eventual triumph of optimal control methods as inescapable. Schumpeter (1942), for example, seems to have seen himself as fighting a doomed rear-guard action on behalf of an increasingly obsolescent capitalist entrepreneurial impulse in the face of an inevitably encroaching bureaucratic rationalization of social production.

The top-down optimal control program gained momentum from two other important developments of the 1930s that the Second World War greatly accelerated.

One was the input-output system of Leontief (1966), a compilation of data on inter-sectoral transactions at a previously inconceivable level of detail (on the order of dozens or even hundreds of economic sectors). To the technocratic socialist, it seemed only a short leap from Leontief’s tables to implementable plans of production and distribution. Indeed, during the Second World War, Leontief’s methods contributed significantly to resolving real-life bottlenecks created by planned armament production.

A second was the invention of the digital computer by Alan Turing, von Neumann, and others, a result of converging streams from the pure mathematics of proof theory, the combinatorics of code-breaking, devices for guiding artillery, anti-aircraft guns and aerial bombing, and rapid advances in electronics. Von Mises had felt confident in attacking the concept of central-planning socialism in the 1930s on the ground that it was humanly impossible to solve all the equations that characterize competitive

market equilibrium except through market interactions. But just a few years later, technocratic socialism had at its disposal a sophisticated mathematical representation of the allocation of social resources as an optimal control problem, a rapidly developing computing technology precisely adapted to solving such mathematical problems, and a rudimentary but generalizable input-output database on which to base calculations relevant to real-world allocation.

The constituency for developing this nascent technology of social planning extended far beyond head-in-the-clouds socialist idealists. Like nuclear bombs, these social engineering innovations had played a centrally effective role in organizing the successful war effort. (In fact, a good argument could be made that the cumulative impact of the social engineering and planning innovations on the actual prosecution of the war far exceeded the marginal importance of nuclear weapons.) In the paranoid mirror-world of the Cold War, the extension of rational planning institutions seemed to offer a critical edge in the long twilight struggle.

Perhaps it was an awareness of this threatening consensus that panicked Hayek into writing *The Road to Serfdom*, which conflates all varieties of collective social action into a monolithic “collectivism” threatening individual human liberty. In any case, it is not hard to see from a Marxist perspective that the program of technocratic centralized rational allocation would run into heavy weather with the capitalists themselves. The capitalist backlash left its mark on the economics profession, in the effective suppression of Lorie Tarshis’ Keynesian textbook and its replacement by Paul Samuelson’s carefully sanitized neoclassical synthesis, and in unremitting and ultimately successful pressure to marginalize and defund Leontief’s research program.

The top-down “hard” program of technocratic centralized rational allocation of resources guided by real data probably reached its high-water mark in the late 1940s, though it continues to exert a real influence on political economic thinking and policy discourse to the present day.

2 Bottom-up

There is a curiously close connection between the mathematics of optimal control theory and the mathematics of thermodynamics. Thermodynamics is the somewhat unlikely but hugely successful branch of physics that deals with systems that are too complex to be attacked directly by the methods of dynamics. A paradigmatic example is the behavior of molecules in diffuse gases such as the earth’s atmosphere: a relatively small volume of such a gas contains such an enormous number (on the order of 10^{23}) molecules that it would be beyond human capability to calculate their dynamics in detail (shades of von Mises’ critique of central-planning socialism). The ingenious application of statistical reasoning to this type of problem leads to very powerful and useful predictions about the macroscopic behavior of gases, regardless of the details of their molecular motions. Thermodynamic methods lead to deep insights into an enormous range of complex phenomena, though the results are generally not as simple as the behavior of diffuse gases.

When the interactions of the constituents of complex systems are more intricate than the collisions through which gas molecules exchange energy, such as commodity purchases and sales, the system can produce macroscopic emergent, adaptive behavior. Except in unusually tractable cases like diffuse gases, it is possible to study these emergent properties of complex systems only through simulation methods of limited precision. There is considerable reason to believe that the division of labor and the capitalist economy are best understood as complex systems (see Foley 2003; Albin 1998). In fact, as I have suggested, classical political economy can be understood as an attempt to reason through the implications regarding commodity production as such a complex system.

The last half of the twentieth century saw an upsurge in interest in bottom-up self-organized systems, such as anthills and bees' nests, bird flocks, computer networks, unsupervised learning algorithms such as neural nets, the capitalist economy, possibly the human brain, and a host of other similar examples. Several features of these bottom-up systems draw the attention of systems thinkers.¹

For one thing, compared to top-down optimal control systems, bottom-up self-organized systems tend to be more "resilient" or "robust". Self organized systems often (though not invariably) continue to function (possibly in a degraded mode) despite the disruption or even destruction of important subsystems, and in important cases can recover from such damage spontaneously. Top-down systems can be built with considerably "redundancy," but tend to be more vulnerable to disruption of key elements, particularly the feedbacks that implement their optimal control properties.

Another intriguing property of bottom-up self-organized systems is that although they are not designed to achieve optimal performance, they often do perform surprisingly well. Anthills, for example, are remarkably efficient in locating and exploiting food sources.

Bottom-up self-organized systems also exhibit a high degree of adaptability to new situations. Optimal control systems tend to be optimized for some particular context in which they are designed to operate. Self-organized systems can adapt to a wide range of environmental changes (though there are typically limits to the magnitude of shocks any such system can survive).

Capitalism itself is a good example of all these features of spontaneously organized bottom-up systems: historically, capitalist institutions tend to reproduce themselves even after the destruction wrought by wars, revolutions, and financial meltdowns; capitalist allocation of resources approximates efficiency to some degree; and capitalism has proven to be highly adaptable in the face of massive environmental changes (many of which, such as world population growth, climate change, and technical innovation, arise from the dynamics of capital accumulation itself).

The vision of the economy as a complex system gives rise to a "bottom-up" understanding of how commodity production is organized, a la Hayek. It also suggests

¹(Added 2020): The appearance of "Santa Fe" in the subtitle of this piece is a reference to the Santa Fe Institute as a central point of elaboration of the concept of complex self-organized systems, and a symbol of the ensuing intellectual program.

a parallel bottom-up vision of socialism as arising from the spontaneous organization of production through some framework of institutions different from private appropriation and exchange of products.

This bottom-up vision of social organization resonates with important political currents of the late twentieth century. The “New Left” movements of the 1960s rebelled against the centralizing and regimenting tendencies of “Old Left” socialism and communism by calling for decentralization, participation, and the political primacy of individual freedom and expression. The Left, such as it is in the contemporary world of globalized capitalism, is much more attracted to the vision of spontaneous political expression than to the unpleasant chore of organizing political and economic institutions.

This enthusiasm for spontaneity without central coordination or direction has attached different parts of the Left to various economic experiments, plans, philosophies, and models. Some of these, such as micro-credit institutions, amount to very minor modifications of the capitalist commodity system (or could indeed be regarded as systematic extensions of the logic of the commodity system).

One idea which flowers perennially on the Left as an alternative to capitalism is workers’ control. In its simplest form, this vision accepts the commodity-money framework of the organization of the division of labor, but proposes to replace capitalists as the organizers of production at the point of production by workers. Enterprises would be owned by collectives or cooperatives of workers, who rent or borrow capital and constitute what economists call the “residual claimants” of commodity production. Workers’ control has features of spontaneity, adaptability, and resiliency, partly as a result of inheriting them from capitalist-commodity production itself. Like capitalist firms, worker-controlled enterprises could form and dissolve in response to market signals to accomplish a decentralized reallocation of resources as society changes and evolves. It is possible to imagine capital-allocating institutions that would permit the free formation of new enterprises and hence a substantial degree of competition. Worker cooperatives, as producers of commodities, can co-exist with (and compete with) capitalist firms, so it is possible to imagine an evolutionary process of transformation of a capitalist economy into a socialist economy, if the content of socialism is workers’ control. The vision of workers’ control, by accepting the broad framework of commodity production and money, solves many of the puzzles that haunt more radical visions of socialism.

In fact, workers’ cooperatives do function as a subsidiary sector of most capitalist economies, and even have flourished in some circumstances. They have a long history in the Basque country of Spain, the American midwest, and Italy, among many other places. For some years, a major European economy, Yugoslavia, was committed to the workers’ control form of organization of social production, and its economy functioned largely on this basis, providing some invaluable historic experience to shed light on the actual workings of such a system. Economic theorists (for example Vanek 1970) have produced a rigorous analysis of the properties of worker-controlled enterprises and economies.

Some points stand out in surveying the history and experience of workers’ control. One is central to the economic analysis: the role of the actual workers in enterprises as residual claimants of enterprise income biases worker-controlled enterprises

against hiring because new workers dilute the claim of existing workers to the surplus revenues of the enterprise. This phenomenon in turn gives rise to pressures to differentiate claims to surplus revenues among different strata of workers. When worker-controlled enterprises become very successful, the resulting hierarchy of workers begins to resemble that of capitalist firms. When the contradictions between the juridical form of organization of the enterprise and the substantive claims of different strata of workers to the surplus revenues become acute, it is common for worker-controlled enterprises to privatize themselves spontaneously, converting into traditional capitalist firms. A second point is that despite the demonstrated capability of worker-controlled firms to compete successfully with capitalist firms under particular circumstances, there has been no tendency for worker-controlled enterprises to grow spontaneously to crowd out capitalist firms in any economy: workers' control remains a relatively small sector even in societies where tradition and practice favor this form of productive organization.

Another noteworthy bottom-up alternative model to capitalist firms as organizers of production is the "open source" or "peer production" movement that has been highly successful in developing computer software and generalized to some other similar fields such as pharmaceutical drug development and gene technology. Peer production is a decentralized, spontaneous form of organization of productive resources, through which a group of interested participants contribute time, energy, and capital to the production of socially useful products. TeX and LaTeX, typesetting programs widely used for scholarly and scientific writing, Apache Web servers, and the Linux operating system are products of peer production. The software created through peer production, aside from being "free," works enough better and more reliably than for-profit competing products to dominate important branches of computer technology. Peer production is a quite convincing demonstration of the feasibility (and even superiority) of organizing a technically sophisticated division of labor through spontaneous and primarily non-commodity/money-mediated social relations of production.

There are some major obstacles to peer production as a universal model of social production. The capital involved in software development is relatively small compared with human labor input. Much of the capital required to carry on software development, mainly computers and network connections, are cheap and already available to participants in open-source projects. (The network itself, the Internet, is provided socially through a complicated mixture of top-down and bottom-up institutions.) The participants in open-source projects typically have "day jobs" that provide them with incomes to pay the rent and keep food on the table through participating in the commodity-capitalist organized division of labor. Participants in peer production are motivated by their own needs and interests, like more humble hobbyists, as well as by powerful forces of social approbation and recognition for achievement. Many "volunteers" in peer production are actually participating at the instruction of their capitalist for-profit employers, who see commercial advantages in being involved in open-source program development. The products of many peer-production efforts are what economists call "non-rival" goods like programs or information for which the marginal cost of provision to an additional user is negligible compared with the fixed cost, for example, of program development. If we think about generalizing peer

production to sectors like food or textiles or construction, many contradictions are immediately apparent.

The explosive increase in computing power and the emergence of computer networks potentially solves problems for the bottom-up approach to socialism just as it does for the top-down approach. The central issue in organizing a complex social division of labor is, as Hayek pointed out, information. (That is not the only issue, of course, since incentives and coordination of effort at the point of production also pose important questions.) The capitalist-commodity system depends to a considerable degree on markets and the formation of market prices to generate and diffuse the information required for the organization of the division of labor. A socialist system that either de-emphasizes markets or dispenses with them altogether will have to depend on other sophisticated decentralized methods of processing and diffusing large quantities of information. The availability of powerful computers and networks at least holds out possibility of creating interactive systems that could function in place of markets in this respect.

The top-down vision of an optimally controlled society stemming from the Vienna Circle's mathematicians has morphed through thermodynamics into a Santa Fe Institute bottom-up vision of a self-organized, decentralized system of social dynamics.

3 What do we talk about when we talk about socialism?

Socialism is the dialectic negation of capitalist commodity production, and it is inevitable that the discussion of socialism is motivated by the desire to mitigate or eliminate features of capitalist commodity production that socialists dislike. Since there are many things about human social interaction to dislike, this discussion can become quite diffuse. (Can socialism eliminate war? racial and ethnic discrimination? gender oppression?) In order to focus our thinking, let me list three key aspects of capitalism that play a central role in socialist discussions of radical economic change: commodity production and inequality; private ownership of the means of production; and wage labor and exploitation.

3.1 Commodity production and inequality

In principle, as neoclassical general equilibrium theory asserts, we could imagine a commodity production system in which the distributions of wealth and income were highly egalitarian. In the traditional economic Walrasian model, for example, inequalities in the final allocation of produced goods and services arise only from inequalities in the ownership of productive resources, like labor, means of production, and land. One popular fantasy among egalitarian-minded economists and other social scientists is a society of decentralized commodity production with equally distributed ownership of productive resources, which would magically reconcile the goals of fairness, efficiency, and individual liberty.

The first point to make about this idea is that it is an historic empty box. One of the better-attested "regularities" of human social life is that commodity production

is associated with a highly unequal distribution of income and an even more unequal distribution of wealth. Typically, the top fifth of incomes and the top tenth of wealth amount to about one-half of the totals in commodity-producing societies.

There are several plausible explanations of just why this sharp degree of inequality, which is perhaps the most salient experiential feature of capitalist society, exists.

Human beings differ, for example, in their genetic endowments. Perhaps these enormous differences in economic outcomes reflect these differences. Some highly visible instances, such as the high incomes of sports stars, lend credence to this notion. It is interesting that the classical political economists tended to view inborn differences in human talent as negligible in their thinking about human society (and certainly neither Smith nor Ricardo was a radical critic of capitalist social relations). One reason to doubt this explanation of observed inequality is that independent non-economic measures of human capacities tend to show rather small, normally distributed differences among individuals. It is not easy to understand how the commodity production system could systematically amplify these differences and transform their statistical properties into the extremely skewed exponential and power-law distributions of income and wealth we observe.

The inheritance of wealth, either directly in the form of ownership of resources, or indirectly through inter-generational transfers in the form of education and other social advantages, is another popular explanation of the highly skewed distribution of income and wealth. But bourgeois revolutionary values are hostile to inherited privilege, and not very consistently supportive of concentration of wealth through inheritance. Large family estates are regularly dissipated through the multiplication of descendants, mismanagement, and extravagant consumption. It is not easy to produce models based only on inheritance that predict extreme concentrations of wealth and income.

Furthermore, some quasi-experiments dramatically call this hypothesis into question. In Eastern European countries in the 1990s, for example, privatization of very substantial state assets was sometimes based on distributing “vouchers” or shares on an egalitarian basis and allowing the recipients to sell their claims (or buy others’ claims) freely according to the rules of commodity exchange. Within a very short time, much shorter than the dynamics of inheritance would imply, the ownership of these claims became highly concentrated through speculation. Similar outcomes are common after land reforms and other redistributive measures. This suggests that even if it were possible hypothetically to equalize ownership of productive resources completely at one moment of time, there are powerful equilibrium tendencies of commodity exchange that would tend to reproduce a highly unequal distribution of income and wealth.

These equilibrium tendencies are, in fact, observed in thermodynamic systems with large numbers of degrees of freedom, which tend to reproduce exponential and power-law distributions. It seems likely that mass, decentralized social interactions, such as market exchange, share these powerful equilibrium tendencies. The Walrasian theorem that final allocations merely reflect the underlying distribution of ownership of productive resources depends crucially on the incorrect assumption that all market transaction take place at equilibrium prices. When we make the more realistic assumption that commodity owners very often exchange at disequilibrium

prices as they grope their way toward the determination of the equilibrium price, abstract models of commodity exchange imply skewed, highly unequal distributions of income and wealth (Foley 2010).

These considerations suggest that Marx was correct in arguing that the socialist reforms of the commodity system of exchange could not by themselves transform social relations. Similar conclusions flow from both the theoretical analysis of schemes like worker-controlled enterprises (which predict sharp inequalities) and even the historical experience of Yugoslav society, which experienced sharp increases in regional and class inequality during its experience with workers' control.

3.2 Private ownership of the means of production

Classical Marxist analysis tends to characterize capitalism in terms of the private ownership of the means of production. In Marx's theory of capitalism, the "monopoly" (in a class sense, not in the usual economic theory sense) control of means of production by a small capitalist class is a necessary condition for exploitation (though not a sufficient condition, since the availability of exploitable wage laborers is also essential).

Thus, classic socialism has centered its political energies on the "expropriation of the expropriators" through the elimination of private property in means of production.

The elimination of private property in the means of production has ramifications in various dimensions. One question is what happens to any incomes (profits) that accrue to owners of the means of production. Another question is how ongoing or new productive enterprises get access to means of production required to carry on production. A third, related, question is how scarce means of production are to be allocated among competing potential uses.

The experience of the Soviet experiment and various state socialist episodes make it clear that eliminating private ownership of the means of production in and of itself does not eliminate exploitation of the direct producers. In the Soviet case, there is strong evidence that a class division of society arose between members of the ruling elite who practically controlled the means of production on the one hand and direct producers on the other. A case can be made that the collapse of the Soviet system was the result of classic Marxist pressures to bring juridical relationships in line with substantive social relations of production by formalizing the "private" control over productive resources. (The historic transformation of major parts of the Soviet nomenklatura into the nascent capitalist class of post-Soviet society is possible confirmation of this view.) When western European nations flirted with state ownership of the means of production, the facilities nationalized were often in declining industries where the state enterprises could not make profits anyway. The motive of nationalization in these episodes was more often the preservation of jobs threatened by competition than redistribution of profits among social classes.

The relevance of private property in the means of production is closely related to the distributional questions just discussed. If the distributions of ownership of productive resources were equal, the system of private ownership of means of production in itself would not pose so many social drawbacks.

From the point of view of bottom-up, decentralized visions of socialism, private ownership, or at any rate some type of private control over means of production could be a means of relatively free access of new or ongoing productive enterprises to means of production. (The trick would be to prevent a market in means of production, or even some system of barter exchanges, from leading to concentrations of wealth. An appealing idea is to set things up so that productive enterprises could claim control only of means of production they actually used, but there might be incentives to evade such restrictions, which are difficult to enforce.)

3.3 Wage labor and exploitation

Marx's analysis of capitalist exploitation is based on his original and powerful analysis of the social relation of wage labor. Marx based this analysis on the distinction between "labor-power," the human capacity to perform useful labor, and hence add value to other inputs, and "labor," the actual expenditure of human capacities to achieve useful production. There are two fundamental aspects to this division.

On the one hand, the distinction between labor-power and labor illuminates the source of surplus value in the capitalist system. The value of labor-power, the labor-time equivalent of the wage paid, on average is smaller than the value labor creates. This difference is the source of surplus value (including profits, rents, interest, and the compensation of unproductive labor) for the system as a whole. From this point of view, it looks like a no-brainer for socialism to eliminate the wage labor form as a way of eliminating exploitation.

On the other hand, however, the distinction between labor-power and labor points to a critical issue in the organization of the division of labor. The capitalist has to pay for labor-power whether or not any useful productive labor turns out in the end to result. Thus, the capitalist faces the problem of extracting labor from labor power, which involves both motivating and controlling the behavior of the wage laborers. Historically, the wage-labor form appears to have been stunningly successful in these respects. Labor productivity, partly as the result of technical change, but also because of high levels of labor discipline, regularity, and skill acquisition, has increased enormously over the years of capitalist domination of social production. In many job contexts, the key element in the extraction of labor from labor-power has been the threat of firing. As we have come to understand through the economic analysis of principal-agent interactions (see, for example Bowles 2004), this mechanism works because capitalist employers offer a wage premium, or rent, to workers above their prospective incomes if they lose the job.

The problem for socialism is how to get rid of the exploitation inherent in the wage-labor form without also losing the enormous social advantages of labor discipline and motivation the wage-labor form carries with it. In the Soviet era, this dilemma was discussed under the rubric of "moral and material incentives."

It seems to me reasonable to imagine that a deep transformation of social relations of production would lead to parallel deep transformations in the behavior and feelings of human beings. For one thing, even where the dominance of capitalist institutions and bourgeois ideology is overwhelming, people themselves do not completely internalize the laws of commodity production: they worry about the environment, the

future of their and other people's children, and the welfare of other people. Capitalists themselves, of course, highly prize workers who internalize high standards of productivity and cooperation without the stick of threats of dismissal. (At least they like these characteristics in the workers they actually have hired, though they would probably prefer their competitors' workers to be responsive to purely material incentives.) It is a bit too easy, however, to wish away the principal-agent problem of bourgeois economics as irrelevant to a socialist society. The conflicts of interest, or moral hazards, a socialist organization of production would face might be very different from those of capitalist-commodity production, but they are unlikely to disappear altogether. Perhaps, as in peer production, socialist producers might be motivated more by the positive approbation and recognition of their colleagues than by fear of job loss, but socialists had better have some idea of how the social psychology of productive effort is going to work.

4 Fantastic conclusion

To bring this talk to an end, I will indulge in the luxury of fantasizing about some alternatives to capitalist-commodity production. There are some ground rules for this exercise.²

This is speculation about changing what Marx calls social relations of production. In thinking about alternatives in this (very broad) range of issues, I am not required to consider every social problem (foreign policy, religion, education, political institutions, mental illness, drug abuse, culture). In general, the basic supposition is that life goes on as usual. People get up, go to work or school, form families, reproduce, age, consume, and so forth. There are natural disasters and domestic and foreign conflicts, regional divisions, and the like. But it is not fair for me to wish away critical aspects of the problem of organizing a complex division of labor to sustain the type of technologically sophisticated society post-industrial capitalism has created, with relatively high levels of consumption and economic security. For example, it would not be very interesting for me to posit a system of universal abundance of use-values created by some imaginary robot work force, and then to spin a vision of the resulting glittering possibilities for human social life. It would also not be of much interest for me to ignore the problem of a "transition" by assuming a complete self-contained and self-reproducing alternative system. A socialist fantasy alternative has to include the notion of a "mixed" economy, in which commodity-capitalist social relations continue to prevail in some sectors, or regions. The socialist sector of the economy has to include methods for dealing with a capitalist-commodity other. Furthermore, I am most interested in ideas that would allow a socialist alternative to co-exist with (and in a larger sense compete with) capitalist-commodity social relations indefinitely. Thus, it is not fair for me to assume some "revolutionary" transformation of the whole society (even with the dystopian backdrop of a looming or ongoing ecological

²For a survey of other discussions in this vein, see Devine (2002), kindly brought to my attention by David Kotz, and Wright (2010).

crisis) to resolve basic problems of social relations. It is equally uninteresting for me, however, to ignore the deep hostility of bourgeois ideology to radical alternatives to capitalist-commodity production. I am interested primarily in how ordinary, regular suburban-urban people who by and large have jobs, incomes, and more or less stable lives through the capitalist-commodity system might transform their social relations of production.

It is not going to be hard to criticize the particular fantasy I put forward. The main function of such exercises is to induce dialectic thinking by making concrete assumptions that can be knocked down. On the other hand, it is not in the spirit of this kind of exercise to invoke “human nature” in one or another of its many incarnations as an objection; or to wish away through assertion the fact that capitalist-commodity production has many parallel unresolved contradictions. It is not reasonable to insist, for example, that opportunistic behavior would be any less mixed with social- and other-regarding behavior in a socialist fantasy than it is in capitalist-commodity reality. In fact, it seems reasonable to suppose that a change in social relations could re-balance human behavior toward others at least at the margin. It also seems reasonable to suppose that people are grown-up enough and aware enough of the facts of economic life to understand that at an aggregate level, consumption depends on production, and that they are willing to accept social responsibility to work productively as a condition of consuming.

4.1 Lifenet

So let us imagine an alternative set of social relations, which I will call “Lifenet” which can organize social production to meet at least some part of the spectrum of human needs outside capitalist-commodity institutions.

Lifenet production is organized through peer-production enterprises. People start or join existing peer-production initiatives without any direct material compensation. The output of these enterprises is made available freely to participants in the system through a Lifenet distribution system, just as open-source software is published freely through open-source licenses. One key point here is that users or consumers of Lifenet outputs agree not to re-sell them as commodities for money. The aim is to create an alternative system of production and distribution that can be effectively separated from capitalist-commodity production.

Participants in Lifenet enterprises have a Lifenet account maintained in a central Lifenet database. The Lifenet account records individual contributions to Lifenet enterprises, and also individual withdrawals of Lifenet products. Thus, an individual who participated in a food production enterprise would have that participation recorded in her Lifenet account; if she received food or clothing or software from Lifenet distribution centers (perhaps something like food coops or farmers’ markets today), these withdrawals would also be recorded in the Lifenet account. (One can imagine something like a credit card system to maintain these accounts automatically.) The purpose of the Lifenet account would not be to enforce an exact balance between individual contributions to the production system on the one hand and withdrawals through the distribution system on the other. It would, however, allow the system to monitor the balance of production and distribution as a whole, and to

identify and discourage or prevent possible abusive over-drawing on distribution. (If some level of the individual accounts were publicly accessible, peer pressure could play a major role in this respect.) The premise of the accounts is that Lifenet as a whole is solvent, and has products available for distribution.

A Lifenet system is going to work only if the individuals participating and the system itself develop an ethos of thrift, prudence, and waste-aversion. Lifenet must prudently keep large reserves of products to secure its ability to respond to contingencies (natural disasters, local breakdowns of the system) flexibly and reliably. The participants in the system must use its resources sparingly and thriftily, both as producers and consumers. The idea of “enough” has to pervade the system from top to bottom.

Now, as we have seen, the basic issue of a division of labor is what feedback mechanism can adjust shortages and surpluses of particular products. (People cannot live exclusively on high-performance open-source software if there is no food or drink in the distribution system.) In the capitalist-commodity system, the market provides this feedback (not perfectly as in the fantasies of attained neoclassical equilibrium theory, but at least well enough to keep complex societies going most of the time). One of the goals of the Lifenet system is to avoid the inevitable redistribution and concentration of money inherent in the Hayekian system that requires individuals to have a stake in market transactions to elicit their private information. Thus, it would not be acceptable (in this fantasy logic) to charge users prices for goods and services and credit enterprises with revenue for providing them. But here we are with the Lifenet food distribution coop in Berkeley short of wine, and the Baltimore shoe distribution outlet glutted with shoes (not to speak of the likely chronic oversupply of Lifenet software). Or, even more to the point, with a society-wide shortage of food and oversupply of clothing.

Addressing this problem requires a signal to producers to shift away from the over-produced outputs and toward the under-produced outputs. (The capitalist-commodity system signal is excess profits in the shortage sector and losses in the glutted sector.) These signals might be provided simply by producers monitoring the Lifenet accounts and noticing that the stocks of wine are running low, while the stocks of shoes are building up. Of course it is not very easy for shoe producers in Albany to shift to wine production. Furthermore, decentralized adjustment to observed shortages or over-stocking can easily lead to unstable responses.

One recourse for Lifenet might be to set up an interactive computer game with real-time inputs based on the Lifenet accounts where a kind of virtual market could provide price signals to producers and users. Simulation of this kind could help avoid instabilities in adjustment.

The most serious problem for Lifenet would be the reluctance (or inertia) of producers of products in chronic excess supply to make a major investment in new productive capacities, which might involve relocation and other social costs. This type of adjustment would test the motivation, imagination, and willingness to adapt of the Lifenet participants. Lifenet would have the advantage over capitalist-commodity production that it would not have to achieve the demanding marginal equalities implied by the equalization of the rate of profit as precisely as capitalist competition requires. The point of Lifenet would not be to optimize, but to satisfice, that is, to do

well enough to get along and let people devote more of their life energies to things they are interested in. If Lifenet could just manage to cope, it would succeed.

4.2 Lifenet boundaries

One idea of Lifenet or something like it is to create an alternative to capitalist-commodity social relations that could coexist and compete with capitalism.

The Lifenet could expand (or contract) in several dimensions in relation to a coexisting capitalist-commodity system.

At an individual level, Lifenet would not require an all-or-nothing commitment. A person could devote some or all of her energies to Lifenet for some or all of her life cycle, just as participants in peer production have “day jobs.” This implies that Lifenet participants would typically have not only Lifenet accounts, but also regular bank accounts, and would meet their consumption/reproduction requirements not just from Lifenet distribution centers, but also by spending money on commodities. This division would depend on individual choices, but of necessity would imply an aggregate division of social economy between Lifenet production and capitalist-commodity production. If Lifenet turned out to be extremely successful, it would starve capitalist-commodity production both by withdrawing productive labor and by meeting a larger proportion of human needs through the Lifenet distribution system.

There is inevitably another side to this dialectical coin, the “moral hazard” of individuals drawing much of their consumption from Lifenet without making a proportionate contribution to Lifenet production, in the short run subsidizing their private commodity expenditure, but also in the long run effectively subsidizing the capitalist-commodity system. (Marxist analysis would argue that in the long run the capitalist-commodity system would reduce wages for labor-power by just the excess of their subsistence wage workers would draw from the Lifenet.)

The coexistence of Lifenet with the capitalist-commodity system would provide an important safety valve both at the individual and social levels. If the Lifenet system experiences performance glitches (say, in the availability of goods and services in the distribution system), they can be smoothed at the individual level by shifting to the capitalist-commodity system. A smaller capitalist-commodity system as a result of effective competition from Lifenet would have less capacity to play this shock-absorber role. One way Lifenet distribution could adjust to shortages would be to supplement its own production with commodities purchased from the capitalist system. This would be self-defeating if it became a constantly reproduced pattern, but it could also be one of the informational signals to Lifenet to adjust its internal allocation of resources.

(A neoclassical economist might theorize that there is an “optimal” size for the Lifenet system at which its marginal benefits in terms of high production quality and higher quality of life decline to equal its marginal costs in terms of uncertainties of supply and inefficiencies of allocation. Along the same lines, Lifenet might be regarded as a separate economy that traded with the capitalist-commodity system.)

Another dimension in which Lifenet could expand or contract is the range of goods and services it provided. Something like Lifenet does coexist with capitalist-

commodity production in the form of religious institutions, peer production, hobby groups, and the like. Peer production has demonstrated its ability to compete effectively with capitalist-commodity production in producing software (partly because the commodity form creates incentives that interfere directly with critical aspects of software design and development). There is an open question as to whether it can be generalized to drug development, particularly for the treatment of rarer diseases that offer little profit incentive to capitalist pharmaceutical companies. How about local food production, child and senior care, therapy, clothing, textiles, heavy metals, transportation, and infrastructure? Each of these cases poses different obstacles to the success of the Lifenet model. (They also pose obstacles to the success of the capitalist-commodity model in many cases.)

This coexistence model implies the need for Lifenet enterprises to exchange with the capitalist-commodity system. Lifenet could not possibly supply all the input required for its own production, especially in its early stages of development. Thus, the Lifenet system will have to accumulate, manage, and spend money on capitalistically produced commodities. From the ideological point of view, this margin looks particularly sensitive, since it is where the pressures for Lifenet enterprises to shape themselves to the logic of the commodity system will be greatest. Financial assets of the Lifenet system would have to be managed as a kind of trust. If Lifenet could not accumulate enough monetary resources from transfers, it would have to export something of value to the capitalist-commodity system, an activity that also carries self-evident perils to the integrity of the Lifenet model.

4.3 Life cycle and economic security issues

From the individual point of view, Lifenet participation presents significant risks. Someone who devoted her whole productive energies to Lifenet might be content enough with Lifenet social relations and Lifenet-supplied goods and services, but what about risks of disability and retirement? Lifenet production will inevitably involve investment, which will divert productive resources from current consumption; what form would the corresponding saving take, and how could individuals in an investing cohort claim the returns from investment in the future? The Lifenet accounts provide a range of means of addressing these issues, at least in so far as they provided a credible record of generational contributions to and uses of production. Even in the realm of structured fantasy, it is clear that there is a risk of the Lifenet system degenerating into an alternative money-commodity accounting system in facing these issues. If Lifenet were to prove robustly resistant to the development of internal distributional inequality, perhaps it could tolerate some commodification around the edges without losing its essential character as an alternative to the capitalist-commodity system.

The model of Lifenet co-existing with and competing with capitalist-commodity production raises another level of risk, the risk that one or the other system might disappear entirely. Since both capitalist-commodity production and Lifenet production depend crucially on network economies to be viable, it is all too likely that they will develop instabilities as one or the other shrinks.

5 Questions by way of conclusion

Does the Lifenet fantasy actually have anything to teach us about the ideal of socialism?

Marx often reiterates the importance of separating the necessary metabolism of human reproduction, the expenditure of labor to create useful products, and the consumption of those products to support human social life, from the social relations through which reproduction takes place. This turns out to be very difficult in practice because we tend to perceive production and reproduction through the lens of the specific forms and social relations we actually experience. If Lifenet or any other version of socialism is viewed through the laws of the commodity, it will increasingly appear to be a distorted version of commodity production. This is a familiar effect of bourgeois ideology. On the one hand, bourgeois ideology would predict the rapid collapse of the Lifenet system (at least if it tried to cover the whole gamut of human needs for reproduction) in a chronic and universal shortage of use values. On the other hand, bourgeois ideology hints that any alternative system of social relations, to the degree that it is successful in fostering production and reproduction, would not be very different from the capitalist-commodity system. These boil down to different ways of asserting the identity of capitalist-commodity social relations with human social reproduction.

One advantage of the Lifenet fantasy is that it represents the transition to socialism as a cumulative process of day-to-day choice. In this way, it emphasizes what seems to me to be the central question posed by the ideal of socialism, the question of how we as human beings want to live our lives together.

References

- Albin PS (1998) *Barriers and bounds to rationality: essays on economic complexity and dynamics in interactive systems*. Princeton University Press, Princeton
- Bowles S (2004) *Microeconomics: behavior, institutions, and evolution*. Princeton University Press, Princeton
- Devine P. (2002) Science and society special issue: building socialism theoretically: alternatives to capitalism and the invisible hand, vol 66
- Foley DK (2003) *Unholy trinity: labor, capital and land in the new economy*. Routledge, London
- Foley DK (2010) What's wrong with the fundamental existence and welfare theorems? *J Econ Behav Organ* 75:115–131
- Leontief W (1966) *Input-output economics*. Oxford University Press, New York
- Mirowski P (2002) *Machine dreams: economics becomes a cyborg science*. Cambridge, Cambridge University Press
- Schumpeter JA (1942) *Capitalism, socialism and democracy*. Harper and Brothers, New York
- Vanek J (1970) *The general theory of labour-managed market economies*. Cornell University Press, Ithaca
- Wright EO (2010) *Envisioning real Utopias*. Verso