Is a capitalist steady-state economy possible? Is it better in socialism?

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Abstract
This paper examines the question of compatibility of a steady-state economy as defined by Herman Daly with the capitalism system of social organization and also with the socialist economy models described by ecosocialists and by Oskar Lange. It concludes that the steady-state economy is compatible with both systems. It also concludes that, under certain conditions, the realization of a steady-state economy would be easier and preferable in a socialist system rather than in capitalism.

Keywords: steady-state economy; degrowth; capitalism; socialism; sustainability; population; alternative economies; economic organization; green growth; a-growth

Abbreviations: SSE = steady-state economy

1. Introduction

The increasing intensity of the environmental problems that we face as a global community for the last fifty years has led to the development of several important ideas and proposals regarding the systemic changes that may be introduced in order to reverse the existing tendencies. Most prominent among them are the Steady-State Economy (Daly, 1972), the Green Growth Economy or Green Economy (OECD, 2015, 2011; UN, 2012), the ideas of Degrowth (Hickel and Kallis, 2020; Kallis, 2011; Kallis et al., 2012), of Ecosocialism (Kovel and Löwy, 1991; Löwy, 2018) and of Ecomodernism (Asafu-Adjaye et al., 2015). These ideas and proposals are sometimes referred to as theories. Strictly speaking, a theory is a statement that can be tested, and in that sense these ideas are not theories. However, we can continue to call them theories as long as we understand that in essence they are simply ideas.

The Green Growth Economy and Ecomodernism offer ideas and proposals which, independently of their effectiveness, can be applied in the presently existing socio-economic system in most countries, i.e. within the institutions of capitalism. For the ideas of degrowth and ecosocialism to be applied it would require important institutional changes, more so in the case of ecosocialism. For ecosocialists the prosperity of human society and the health of the environment will coincide with the socialist transformation of society. For degrowth the required changes are not clearly delineated although the advocates of degrowth speak of non-violent and democratic transition beyond capitalism.

The case of the steady-state economy is debatable. Can a steady-state economy be capitalist or does it imply major institutional changes? This question was discussed ten years ago and when Herman Daly, the best known advocate of the steady-state economy, was challenged by Richard Smith, replied “I have never used that term, always speaking of steady-state economy, which in my view is something different from capitalism and socialism” (Daly, 2010). Apparently, Daly believes that the imposition of constraints he introduces on population size, on the throughput of resources, and on income inequality is sufficient to

change the nature of capitalism, even though he keeps the market mechanism for allocative purposes.

Critics of the steady-state idea (Smith, 2010; Trainer, 2016) argue that steady-state and capitalism are not compatible. If an economy is steady-state it cannot be capitalist and vice versa. This is a result of the "growth imperative" which is built on the foundations of capitalism. Lawn (2011), on the other hand, argues that capitalism can exist in a variety of forms and the steady-state economy introduces institutions that can make steady-state capitalism "workable and capable of releasing humanity from consumerism and its current growth addiction" (p. 24).

In this paper we intend to discuss this question further and to show not only that a steady-state economy, with the constraints imposed by Daly, can be capitalist, but also that a steady-state economy is possible, and under certain conditions, preferable in socialism.

2. The steady-state economy is an old idea

The steady-state economy is not a new idea. It was developed by classical economists under different circumstances and it was called a stationary state (Mill, 1885). In this model the size of population depends on the difference between the natural price of labor (minimum of subsistence) and the market price of labor. If the market price exceeds the natural price population will increase, and if the opposite occurs population will decline. In the long run, population will stabilize at its maximum when market and natural prices are equal (Ricardo, 1971). That requirement is the same as Daly's constant population. The need for a constant flow of throughput was not necessary as there was no concern about ecological problems. With constant population and constant technology, in the long-run this model leads to zero profits, and constant stock of capital. William Baumol (1951) calls this model the "magnificent dynamics" of the early classical school. Therefore, capitalism can exist and operate with zero profits and consequently without capital accumulation.

3. The modern definition of steady-state economy

Daly defines the steady-state economy:

> "as an economy with constant population and constant stock of capital, maintained by a low rate of throughput that is within the regenerative and assimilative capacities of the ecosystem… Alternatively, and more operationally, we might define the SSE in terms of a constant flow of throughput at a sustainable (low) level, with population and capital stock free to adjust to whatever size can be maintained by the constant throughput that begins with depletion of low-entropy resources and ends with pollution by high-entropy wastes" (Daly, 2008, p. 4).

The above definitions are not without problems. How is the low rate of throughput to be determined in a market economy? And if that can be determined, what are the right values of population size and stock of capital, particularly if these two values are not related by a constant proportion? Even if we assume that the stock of capital is determined on the basis of technological factors, how is the size of population to be determined? The size of population

is determined by factors that are not directly related to the stock of capital or the size of throughput. For the definition of steady-state economy that is capitalist, the determination of population and throughput is sufficient. The stock of capital will be determined by the technology that relates labor and capital with product.

For the purpose of examining whether a capitalist economy can be a steady-state economy we will first place only one limitation, namely that population needs to be constant at whatever size. Then the additional limitation of a constant throughput will be introduced. But let us first examine the arguments on the basis of which some authors have come to the conclusion that a steady-state economy cannot be capitalist.

4. The growth imperative or "grow or die"

The question regarding the compatibility of a steady-state economy and capitalism has been asked in the recent past by Smith (2010) in a critique of Daly's version of steady-state economy and his answer is in the negative. His answer is based on a brief analysis of three characteristics of capitalism, i.e. that producers are dependent on the market, that competition is the engine of economic development and that the law of survival in the marketplace is "grow or die". In short, the growth imperative is a law of nature in capitalism.

The same conclusion has been reached by Binswanger (2009) who shows that capitalist economies need to grow because otherwise firms will not be able to realize profits. According to him the simulation results of his model illustrate the growth imperative of capitalism. Similarly, according to Gordon and Rosenthal (2003) growth in capitalism is not just desirable, it is necessary for the future survival for each individual capitalist firm and for the system as a whole. Also, Li (2007) concludes that an a non-growing economy implies that the rate of profit will fall to zero, and therefore a steady-state economy, i.e. a zero growth economy, is not compatible with capitalism, i.e. a system based on the pursuit of profit.[1]

Finally, Blauwhof (2012) using Marxian terminology and an expanded reproduction scheme explains that if the economy cannot grow the surplus cannot be invested and can only be consumed or wasted. He adds that capitalists may have ways to raise the profit rate, such as those we see in the real world (wage cuts, avoidance of taxes, state subsidies) but there are limits to these and therefore it is unavoidable that the rate of profit will fall and approximate zero. The conclusion is that a steady-state economy cannot be capitalist.

From the point of view of the history of economic thought it is interesting to note that the Marxian expanded reproduction scheme has found its modern expression within Keynesian economics in Domar's growth model. It has been shown (Lianos, 1979) that aside from terminological differences Marx's expanded reproduction scheme and Domar's growth model are conceptually and mathematically the same. The conclusion derived from Domar's model is that a capitalist economy cannot stand still. If it does not grow it must decline.

[1] Li makes the assumption that in the long run the output-capital ratio is equal to the marginal output-capital ratio. This is always true in a linear production function, but if it is of the commonly used type (i.e. of the Cobb-Douglas type) it will never be true and if it is a third degree equation it will be true only at one point.

5. An arithmetical example

It is useful at this point to consider an arithmetical example that would make clear the above claims and show clearly the effect of restriction that a steady-state economy would impose. Consider the following production function

$Y= A K^{1/3} L^{2/3}$

where Y=product, K=capital, L=labor and A is the technology factor.

It is clear that if K and L both increase Y will also increase. Now let A=10, K=16 and L=144 and also assume that labor is constant at that level. Workers consume (Cw) all their income (W=wL) and capitalists consume (Cc) half of their profits (Pr) and invest (I) the other half. For simplicity, capital does not depreciate. Based on these hypothetical data, Table 1 provides the corresponding estimates for the three first periods.

Table 1. Calculation of profit rate for three periods under the assumption of stable population

Period	K	Y	Cw	w	Profit	Cc	I	R=Pr/K
1	16	692	460.8	3.2	231.2	115.6	115.6	1445%
2	131.6	1398	932	6.47	466	233	233	353%
3	364.6	1964	1309	9.1	655	327.5	327.5	179%

In this example, wages and profits will increase from period to period but the profit rate falls. From 1,445% in the first period it falls to 353% in the second and to 179% in the third. As capital increases the profit rate will be approaching zero. For K = 875,680 the profit rate falls to 1% and for K = 64,000,000 it falls to 0,05%. Clearly, in a steady-state economy where population is kept constant capital accumulation will bring profit rate down to zero. Therefore, the question of the ability of a steady-state economy to survive in capitalism is legitimate and important.

6. Can a steady-state economy survive in capitalism?

In a pure capitalist economy where the government does not have an economic role and its only function is to protect private property (Nozick, 1974) the survival or the collapse of a steady-state economy will depend on the behavior of entrepreneurs and consumers. Also, in a pure capitalist economy prices are assumed to be perfectly flexible.

Consumers change their tastes constantly either because they have an inherent tendency for change or because of advertising or because new products appear in the market. Given that total wages (the wage share) will be constant when the steady-state has reached the equilibrium position, the changes in consumer tastes and in demand will bring profits in some sectors and losses in others. Thus, zero profits in general does not mean that all firms will have zero profits. As long as there is change in consumer tastes there will be economic activity to exploit the opportunities and make profits. The tendency for shifting demand between sectors of consumer products may be strengthened by the production of better

quality goods[2] (Lawn, 2011, p. 10). Of course, this may be also true for capital goods. Lawn (2011) suggests that entrepreneurs, in addition to improving the quality of products, can attempt to improve the production techniques and make them more efficient, that is to increase the value of coefficient A in the production function. Technological improvements, embodied and disembodied, may change the mix of employment among sectors, and involve costs for research and also for educating the labor force but the gains in efficiency would recover the costs.

Let us now make the heroic assumption that all firms have reached the point where the profit of each one of them is zero. Now Li's question (2007, p. 29) comes to mind: "But if the profit rate does fall to zero, then what is the point of being a capitalist?" In modern microeconomic theory, the long-run cost curve of a firm and therefore its supply curve includes a normal profit which is a payment to the entrepreneur sufficient to remain in business. It is not a surplus, but a payment for his services as coordinator and organizer and for bearing the risks associated with running a business.[3] There are millions of entrepreneurs today in the real business world that receive just their normal profit.

We may conclude that a SSE with constant population can be capitalist. The picture changes drastically if an additional restriction is introduced for a constant throughput, i.e. for ecological equilibrium.

7. One more arithmetical example

It may be remarked that the arithmetical example we used in a previous section misses the whole point of the idea of the SSE because it ignores the limits to growth. So let us now introduce the additional restriction of ecological equilibrium in the form of equality of ecological footprint with bio-capacity (EF=BC). Let also EF = 0.3Y and BC=2,471. Now ecological equilibrium requires that total product must be equal to, or less than 8,238. If Y = 8,238 and L = 144 the required capital is K = 27,000. Then, in this case wages will be W = 5,494, profits will be Pr = 2,746 and the rate of profit 10%. In a pure capitalist economy because of the growth imperative (or the tendency to maximize profits) capital will grow and, therefore, the ecological equilibrium cannot be sustained.

If ecological equilibrium is to be sustained, restrictions must be introduced in the use of resources and this necessitates the introduction of institutions such as those that Daly has proposed (e.g. cap auction trade system, nationalizing money but not banks, taxes on profit, expansion of the public sector etc.). However, an economy with such restrictions is not a pure capitalist economy although the market mechanism is allowed to work. We may assume that this is the reason that Daly always refers to a steady-state economy and not to a steady-state capitalist economy.

[2] Lawn mentions these factors but he adds that costs remain unchanged. This is hard to accept because quality improvement usually requires research, marketing, etc.
[3] It is interesting that Marx (1971, ch. 23) introduced the idea of the *functioning capitalist* who is receiving wages for the labor of supervision and management and "for skilled labor whenever the business is operated on a sufficiently large scale to warrant paying for such a manager…" (p. 386).

8. Can a steady-state economy be capitalist?

Semantics is important but in this case it is also important to make clear classifications in order to avoid unnecessary confusion. I believe that an economy which allows private property of the means of production and the decisions about production and consumption are freely taken by individuals in the context of freely operating markets can be characterized as a capitalist economy, even if the government participates in the economic processes and imposes restrictions that society deems necessary for the protection on the environment or for other purposes. Of course, the extent of the government's involvement is important but at the present time it is limited to narrow limits in most countries.

Given this definition of a capitalist economy and the above discussion, I believe it is correct to conclude that a steady-state economy can be capitalist or, better, that a capitalist economy can became a steady-state economy.

9. Is a socialist steady-state economy better?

The conclusion that capitalism can become a steady-state economy does not imply that there is no other way of dealing with the environmental problems of our time. In the introductory section we mentioned another four ideas that could be considered, and other such as, for example, Trainer's (2016) "the simpler way" may be considered. In a *grosso modo* comparison of the steady-state economy with the other ideas, it is my view that the SSE is superior in three counts. First, it includes constant population as a condition for sustainability, given that its present size is bigger than the size that the planet can support. Second, it clearly recognizes that the available resources are limited and consequently there are limits to growth. Third, it has a well-articulated economic theory to support its claims. The other ideas I have mentioned miss some or all of these characteristics.

Degrowth supporters recognize that resources are limited but evade the issue of population and have not presented a well-defined and well-constructed theory on which their model is based. Degrowth at its present formulation is more a political movement than a clearly articulated economic model. Supporters of green growth and ecomodernists seem to believe that the only problem of the planet is the quantity and the source of energy we use. Thus, green growth advocates suggest methods of increasing the efficiency of energy use while ecomodernists suggest total dependence on nuclear energy. Both groups ignore other resource limits and also the problem of overpopulation. Ecosocialists and Marxists in general suffer from an anti-malthusian syndrome that originates from Marx's deep antipathy for Malthus[4], and the problem of overpopulation is no part of their program. On the issue of growth versus degrowth, ecosocialists take a third position and speak about a qualitative transformation of development. With regard to the structure and functioning of the economy

[4] Marx had much stronger negative feelings for Malthus than just antipathy. He had no hesitation to call him a plagiarist, a shameless sycophant, a sin against science, and a libel on the human race (Petersen, 1988, p. 80). I may risk suggesting that Marx, in using irony and derision when he was referring to other writers, was imitating the ancient philosopher Epicurus on whose philosophy of nature he had written his doctoral dissertation. According to Diogenes Laertius (1969, p. 211), Epicurus was calling Plato's Academy "the toadies of Dionysius", Protagoras "a village schoolmaster", Democritus "Derocritus" (the idle-gossip), the Cynic philosophers "foes of Greece", and even Aristotle "a profligate who became a soldier and a drug-peddler after dissipating his inheritance".

ecosocialists suggest a system of democratic ecological planning where the population will make the main decisions. Major decisions will be taken by direct popular vote, less important decisions by elected bodies on a national, regional or local scale depending on the issue under consideration. Also they give emphasis on "full employment with equal conditions of work and wages". According to the Belem Declaration (Angus et al., 2009), ecosocialism involves a revolutionary social transformation which includes democratic decision making in the economic sphere and collectivization of the means of production.

Although these comparisons may be useful, they do not really form a basis on which a choice can be made. There are many reasons for the difficulty of choosing among them. First, they are all hypothetical and their significance for the good of the planet and human society cannot be evaluated in advance. Second, it is difficult to foresee the economic and other costs of following each of these proposals. Third, for whose benefit is the choice to be made, for the present generation, for our grandchildren or for the people who will live on the earth after two hundred years? Finally, one should compare and evaluate the possible or the expected disadvantages of each of these proposals.

However, choices must be made in advance, and the only decisive criterion from the point of view of ecological balance seems to be how a proposal (or a theory) deals with the population size. The explosion of population size threatens any social system with catastrophe. Capitalism as a system has no mechanism to control the size of population, but capitalism in the steady-state economy version is defined by restrictions one of which is constant population. In this respect the steady-state economy model even within the framework of capitalism is superior. But even in steady-state the problems of capitalism will remain, income inequality being the most serious. It fact, the empirical evidence shows that modern capitalism allows extreme wealth and income inequalities, and this creates in the mind of the objective observer the suspicion that something is rotten in the kingdom of capitalism. In the steady-state economy the distribution of incomes will improve because the constancy of population will create a tendency for higher wages, but it is unknown how much of inequality will remain.
Socialism in all versions is a system which promises economic equality based on complete or extended public control of the means of production. Can a steady-state economy be socialist? The answer depends on the decision making process that the socialist state will adopt. If important decisions are taken by popular vote, as in the version of ecosocialists mentioned above, there is no guarantee that population can be kept constant or be reduced. In a socialist state of the type described by Oskar Lange, where production is under the control of the state but the choices of consumption goods and of professions is left to the individuals, the constancy of population would depend on the willingness of the state authority to enforce the necessary measures. In general, there seems to be no theoretical or practical contradiction in having a steady-state economy in a socialist system.

In all versions of capitalism and socialism, persuasion and education as well as monetary and other motives may convince the general population to reduce the number of children in the family. This is more likely to take place in a socialist system because the size of the market does not depend on the size of population and there would be less opposition to population reduction by organized economic or political groups.

With respect to the requirement of a constant throughput it is clear that it can be easily satisfied in a socialist economy of the Oskar Lange type since the state possesses the means of production and therefore controls the quantity of total product. In the ecosocialist type where democratic ecological planning will be decided by popular vote there is no guaranty what the decision of millions of people with different levels of knowledge and preferences will be.

10. Conclusion

In this short paper we have argued that the model of the steady-state economy as described by Herman Daly can save the planet or at least reduce the environmental problems to manageable proportions if proper restrictions are imposed on population size and on the quantity of total output (or of throughput, in Daly's terminology). We have attempted to show that, contrary to Richard Smith's and Ted Trainer's claim, the model of steady-state economy is compatible with capitalism and also that, contrary to the claim of Philip Lawn, the steady-state economy under socialism is preferable under certain conditions. These conditions have to do with the political freedoms in the Oskar Lange socialism, and the uncertainty and inefficiency of the decision making process in the case of ecosocialists.

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