Philosophy Of Economics

Invisible Hands?

Smith's Metaphor Adam Smith described the market as if it were guided by an "invisible hand". Producers aim to maximize profits. Consumers aim to maximize utility. All have self-centred preferences. And yet, thanks to some sort of pre-established harmony, social welfare is the unintended consequence of these self-centred preferences. Everybody benefits from the market mechanism—not only the rich but also the poor. In particular, prices of goods (including labour) are fixed by the market mechanism in a way that is Pareto efficient, or optimal (no individual can be made better off without making some one else worse off).[1] An invisible hand is supposed to bridge individual wants and collective outcomes by—technically—solving a utility maximization problem, namely by finding an equilibrium state between supply and demand for all goods. Are markets really guided by an invisible hand, as many economists like to think?

No, answers Brigitte Falkenburg (2011). In particular, Falkenburg discusses the validity of Smith's metaphor in the light of the analogy between economic and physical systems, as endorsed by Smith, among others. Smith thought that the laws that govern the economic system are analogous to those that govern the system of celestial bodies:

> Like the single celestial bodies due to their masses form the overall system of gravitation, so the human needs fit in a system of economic action. Thereby the order of the planetary motions in the solar system equals a well-regulated socioeconomic system which develops in favour of the social welfare. In order to make this analogy plausible, Smith attributes men in his *Theory of Moral Sentiments* with a need for beauty, harmony and order. In contrast thereto the image of man in the neo-classical economics does no longer include any moral properties or principles. However, the conditions under which the analogy between physical and economic systems holds are neither made explicit in the work of Adam Smith nor in neo-classical economics. With them, the validity of the metaphor of an *invisible hand* which brings order into the system remains unquestioned. (212)

However, this is not the right analogy, for Falkenburg.

The Thermodynamic Analogue Falkenburg argues that the closest analogue to the economic system is a thermodynamic system, namely a system with many particles interacting with one another, and not a mechanical system of few (celestial) bodies. Ideally,

> [a] free market can be compared to a many-particle state, with unbound particles; or: to an *ideal gas* with *freely moving molecules*. The individual decisions of producers and consumer corresponds to the inertial motions of the molecules. (213)

Markets tend to a supply-demand equilibrium, with optimum utility for all participants, by means of laws analogous to those by which ideal gases tend to thermal equilibrium, corresponding to the state of maximum entropy.

So far, the analogy would seem to provide an argument for economic liberalism: "Compared to all economic systems, the untamed free-market economy works best. On the long run non-regulated markets enhance the welfare of all participants" (215). The analogy would appear to corroborate the liberal argument, which—for Rosenberg, at least—motivates general equilibrium theory (see Week 11).[2]

At the same time, Falkenburg points out that, already for Adam Smith, the market was not as-

[1] This is not to say that Pareto optimality coincides with equality, or justice, though (214; cf. Hausman 1992, §4.2).

[2] Still, the analogy comes with substantive assumptions, which prompt a revision of the neoclassical theory—e.g., of how production outputs and profit maximization are calculated (Richmond et al., 2013, 170, 204).

sumed to guarantee optimality without any constraint:

> [...] for Adam Smith public welfare also contains the legal order, which functions as a framework condition for the fulfilment of people's needs. Quite contrary to what is often purported, his metaphor of the invisible hand does not imply the development of totally deregulated markets towards an equilibrium but rather market development under legal conditions. (209)

More generally, the invisible hand hypothesis must be assessed relative to "the particular market conditions prevailing at [a given] moment" (216): To what extent are neoclassical assumptions justified in a given situation? Under which boundary (e.g., legal) conditions do supply and demand balance? What would happen in an absolutely deregulated market with uncontrolled growth?

To address these questions, Falkenburg discusses whether the neoclassical (false) microscopic assumptions about homo æconomicus are harmful or not, based on their macroscopic statistical consequences.

Neoclassical economics assumes that agents are rational and have no social bonds, whereas in fact their behaviour may be irrational or depend on moral principles and rules of conduct (see Week 3 to Week 7). The violations of these assumptions may result in microscopic deviations from maximizing behaviour, which wash out at the aggregate level, as it is commonly assumed. However, there are (at least) two cases where it is plausible to expect that microscopic deviations will be reflected at the aggregate level, namely trends (e.g., herding behaviour), which shift the equilibrium state, and "reflexive" expectations (e.g., self-fulfilling prophecies, where perceptions influence the market, which influences perceptions), which cause fluctuations (218). In such cases, it is impossible to predict whether the system will converge to a stable equilibrium, let alone whether the equilibrium is unique.

Analogously, if different markets with different socio-economic conditions are allowed to compete (or if there are productivity gains due to technological improvements), it is unclear whether the whole economy will converge to an equilibrium, and if so, whether social welfare will increase. This latter argument explicitly depends on how the thermodynamic analogy is understood by the econophysicist Jürgen Mimkes, whom Falkenburg cites approvingly. The idea is that the surplus, or profit, in an economic cycle may be calculated similarly to how the work of a Carnot machine is calculated in a Carnot cycle. In a Carnot cycle, the larger the temperature difference between two heat reservoirs, the more work the machine can do. In an economic cycle involving two markets with different standards of living (see Richmond et al., 2013, §18.1), the larger the difference between the standards of living, the larger the surplus in the overall system. More precisely, the economic analogue of the Carnot cycle consists of four steps, two at constant standard of living and varying "economic entropy", and two at constant economic entropy and varying standard of living. Here is a simple example of a production cycle (Richmond et al., 2013, 189):

$[1 \to 2]$ Apples are collected ($\Delta S_e < 0$) in a plantation at low wage level (λ_1);
$[2 \to 3]$ they are brought ($\Delta S_e = 0$) from the plantation (λ_1) to the market (λ_2);
$[3 \to 4]$ they are distributed ($\Delta S_e > 0$) to customers at high price level (λ_2);
$[4 \to 1]$ Fertilizers from waste are brought ($\Delta S_e = 0$) back to the fields ($\lambda_2 \to \lambda_1$).

At the same time, a monetary cycle obtains (in the opposite direction):

$[4 \to 3]$ Farmer collects ($\Delta S_e < 0$) money from customers at high price level (λ_2);
$[3 \to 2]$ money transfers ($\Delta S_e = 0$) from the market (λ_2) to the plantation (λ_1);
$[2 \to 1]$ farmer pays ($\Delta S_e > 0$) low wages to plantation workers (λ_1);
$[1 \to 4]$ workers transfer ($\Delta S_e = 0$) money to the market by shopping ($\lambda_1 \to \lambda_2$).

After each cycle, the larger the portion of the profit redistributed to the rich, the more the difference between the standards of living increases,

and thus the efficiency of the system. "This leads naturally to an ever increasing inequality instead of an oscillation around a socio-economic equilibrium" (219-20).[3] Falkenburg concludes:

> [...] A business cycle with a growing efficiency, thus gaining ever higher profits, always makes the poor even poorer and the rich even richer, exactly like the opponents of globalisation argue. Smith may have objected in favour of his metaphor that these conditions of globalisation depend on the lack of legal framework conditions. [...] But if the business cycle is regulated by political and legal constraints, its efficiency will be constrained as well; exactly like the advocates of an unrestricted market economy argue. Evidently, there is not much cause in the thermodynamic analogy to trust in the blessings of the market mechanisms. (220)

Although "[e]conomists dislike being confronted with such embarrassing truths", Falkenburg concludes, in the light of the right analogy between economics and physics the invisible hand hypothesis is unlikely to be true.

Discussion Falkenburg's argument stands or falls with the thermodynamic analogy. To what extent the analogy is illuminating is a matter of debate. I should only mention that the analogy is not strict.

The idea that entropy is key to economic processes was first introduced by Nicholas Georgescu-Roegen in the Seventies, with the understanding that the second law of thermodynamics (the entropy law) applies equally well to both energy resources and to material resources. However, it is false that material/economic resources are subject to degrading/dissipation in the same way energy is.

Arguably for this reason, Richmond et al. (2013, 166) introduce "economic entropy" as a dimensionless quantity—unlike the physical entropy, which has dimensions of joules per kelvin. It remains to be seen whether the economic analogues of the laws of thermodynamic are true, under some suitable interpretation. As Richmond et al. admit,

> [...] in the context of economics, we might imagine the physicist to be in the engine room helping drive a ship, whereas the economist is the captain on the bridge. (17)

In this light, it is an open question how the thermodynamic analogy may be used to cast doubt on an economic hypothesis, viz. the invisible hand hypothesis.

References

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[3] Notice that an exploitative system may create instability in the poorer market. Hence, maximal efficiency may not last forever (cf. 221). However, the interesting formal result is that inequality increases even when the utility of both parties increases exponentially, albeit at different speeds (Richmond et al., 2013, 192).