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## DYNAMICS OF “INVISIBLE HAND” AND INFORMATION ECONOMICS

### ABSTRACT

*The purpose of this article is to explore the invisible hand in the modern economies. In other words this article is to test the applicability of Smith's famous metaphor and its relevance to the new area of information economics. In the first section the authors discuss the historical context, followed by a dynamic approach to invisible hand., i.e. its shaking, and conclude with the malfunctioning of the invisible hand in the information economics. Later they discuss information economics as a definite market failure, finding irrelevance of invisible hand in modern economies.*

**Key words:** *Invisible hand, failures, dynamics, externalities, information economics.*

### 1. Introduction

The history of invisible hand is considered to have started with the writings of Adam Smith, or at least in an economic context it was firstly explained by Adam Smith in the 18<sup>th</sup> century. In his book "An Inquiry into the Nature and Causes of the Wealth of Nations" Adam Smith set out the mechanism by which he felt economic society operated.

Smith uses the metaphor in the context of an argument against protectionism and government regulation of markets, but it is based on very broad principles developed by Mandeville, Butler, Shaftesbury, and Francis Hutcheson.

An essential part of Mandeville's view in his pamphlet *The Fable of the Bees*, important for the rise of invisible hand, is that a social order can emerge 'out of the spontaneous actions of purely egoistic impulses, requiring neither the regulation of government officials, on the one hand, nor altruistic individual behaviour, on the other.' (Eatwell, J & Milgate, M & Newman, P, 1989, 197).

Therefore, B. Mandeville, not Smith who saw it as morally neutral on the basis of natural law and natural liberty, firstly developed the original idea of invisible hand. The system in which the invisible hand is most often assumed to work is the free market. Adam Smith assumed that consumers choose for the lowest price, and that entrepreneurs choose for the highest rate of profit. He asserted that by thus making their excess or insufficient demand known through market prices, consumers "directed" entrepreneurs' investment money to the most profitable industry.

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The theory of the invisible hand is certainly persuasive, and its simplicity is also very attractive. But, even assuming all the correct conditions, does the invisible hand theory really lead to the maximisation of human economic wellbeing in the modern information economics? In other words is the invisible hand system applicable and can explain modern market behaviours and situations? In this article it will be attempted to answer this question and explain the so-called information economics where the invisible hand failure is inevitable.

## **2. Dynamic approach to invisible hand**

In his book Sterman (2000) noted that Smith was one of the first systems thinkers to show how the rational, self-interested individual people could, through the feedback processes created by their interactions, lead to unanticipated side effects for all. Smith himself, however, was careful to note the limits of the market feedbacks in equilibrating demand and supply at the natural price. “This at least would be the case where there was perfect liberty”—that is, under conditions of perfect competition. Where there are monopolies, trade secrets, government regulations, barriers to trade, restrictions on immigration and capital mobility, or other feedbacks outside the simple negative loops coupling supply and demand, Smith notes that prices and profits may rise above the natural level for many years, even decades.

Not all markets clear through price alone. Sterman (2000, 171) argued that few products are pure commodities for which price is the only consideration. Products and services are increasingly differentiated and companies compete to offer the best availability, delivery reliability, service, functionality, terms of payment, aftermarket support, and so on. In many markets prices do not change fast enough to equilibrate supply and demand and other competitive variables such as availability become important in clearing the market. Prices may be sluggish due to government regulation, the costs and administrative burden of frequent price changes, or considerations of fairness.

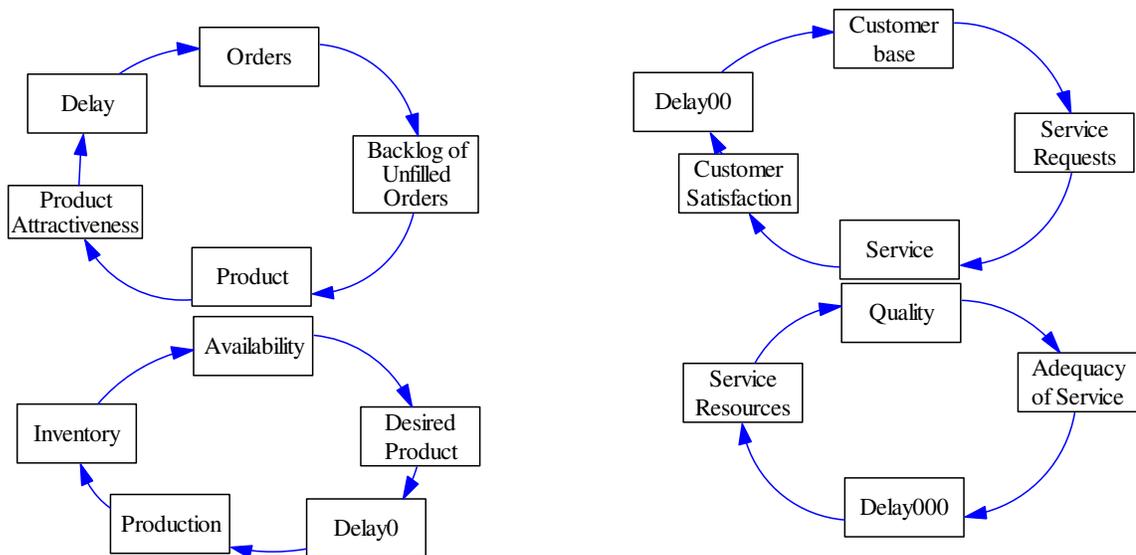
In addition, in many institutional settings price does not mediate markets at all. Most organizations, for example, have no price-mediated markets for offices, parking spaces, senior management attention, and many other scarce resources. In these cases, supply and demand are still coupled via negative feedbacks, but resources are allocated on the basis of availability, politics, perceived fairness, lottery, or other administrative procedures. Figure 1 shows examples of non-price mediated markets. In each case the feedback structure is a set of coupled negative loops which regulate the demand for and supply of a resource. As in the case of price-mediated markets, there may be substantial delays in the adjustments, leading to persistent disequilibria. (Sterman 2000, 171)

Figure 1.

### Feedback structures of non-price-mediated resource allocation systems

Left: Availability is an important competitive variable in many product markets, and firms regulate production in response to inventory adequacy and delivery delay.

Right: In service settings, higher service quality stimulates demand, but greater demand erodes service quality as waiting time increases, and accuracy, friendliness, and other experiential aspects of the service encounter deteriorate.



Adapted from Sterman 2000, p. 172.

Besides, political reasons can also lead to the disequilibrium. The non-pricing mediating function example is the oil crises of the 1970s when oil prices more than tripled in a matter of months as many Arab oil producers embargoed shipments to Western nations to retaliate for their support of Israel in the Yom Kippur war. Apart from these situations when invisible hand ‘shakes’ there conditions that completely abandon the invisible hand those are situations when instead of tangible we are dealing with intangible commodities as in the case of information economics.

### 3. Information Economics

Externalities are very important due to the fact they lead to (Pareto) inefficiency. Next to the positive and negative externalities, there are network externalities at the rapid and unprecedented growing information technology market. “*Network externalities occur when the value of a product or service to a buyer increases with the cumulative number of other buyers*” (Shapiro and Katz, 1992). One consequence of a network effect is that the purchase of a good by one individual indirectly benefits others who own the good - for example by purchasing a telephone a person makes other telephones more useful. This type of side-effect in a transaction is known as an externality in economics, and externalities arising from network effects are known as network externalities.

Many real world markets are imperfect due to limitations of information, costs of entry and exit, and inflexibility of resources. These imperfections create feedbacks at sometimes overwhelm the negative loops normally balancing supply and demand, leading to inefficiency or even the complete failure of the market. One well-known source of market failure is adverse selection which can arise when sellers and buyers in a market have different information (Akerlof, 1970). Akerlof’s result was a

breakthrough in economics. Not only did his model form the foundation for the important field of information economics, a field of immense importance in economics today, but he also demonstrated that the workings of free markets were not always benign, even without monopoly power or collusive agreements among producers. Akerlof showed that rational self-interest could lead individuals to promote though unintentionally, an end harmful to the society interest and themselves.

Akerlof's theory forms a basis for the rise of information economics. This new field of economics can be considered as a dynamic emerging model of market failure. Thus this section (which is heavily based on Skoko and Skoko, 2003) takes on the issue of how the technological paradigm has given a rise to the new (information) economics that is to explain this coupling that lead to the modern economies.

The first characteristic of the new paradigm is that information is its input or raw material; or as Castells (1996) put it: *these are technologies to act on information, not just information to act on technology* (as was the case in previous industrial revolution).

The second characteristic refers to the pervasiveness of effects: information is an integral part of all human activities; all processes of our individual and collective existence are directly shaped (although certainly not determined) by the new technological medium.

The third feature refers to the network logic of any system that is the network can now be materially implemented in all kinds of processes and organisations by newly available information technologies.

Fourthly, the information technology paradigm is based on flexibility. *Not only processes are reversible, but also organisations and institutions can be modified, altered by rearranging their components. In short they are turning the rules upside down without destroying the organization.*

The fifth characteristic of the technological revolution is the growing convergence of specific technologies into a highly integrated system. For example, microelectronics, telecommunications, optoelectronics, and computers are integrated into information systems.

For example, there is a growing interdependence between the biological and microelectronics systems – decisive advances in biological research (DNA etc.) that can only be processed because of massive computing power, etc. Furthermore, biological advances are increasingly introduced in electronic machines and computers (robots who are able to learn) using neural network theory (Skoko, and Skoko, 2003).

#### **4. Definitions of Information Economics**

The new economics is informational because productivity and competitiveness in this economy fundamentally depend on their capacity to generate, process, and efficiently apply knowledge-based information. The information economics is about structural transformation; about doing new things and doing old things very differently in very different organisational forms. The information economy is a new reality, because it is an economy with the capacity to work as a unit in REAL TIME on a planetary scale. Although there are replete of studies on different aspects of

information technology and economics and its influences in different areas, so far no comprehensive economics of information has been developed.

This is a very wide subject area, which overlaps with many other aspects of economics and business management. Consequently, there are several names for this ongoing shift in the economic landscape: 'post-industrial society', 'innovation economy', 'knowledge economy', 'network economy', 'new economy', an 'E-economy', 'digital economy', etc. However, we can use the 'information economics' name to define it.

Typical classical economists are concerned with what makes one country wealthier than another and how this is achieved through exchange. Applying the traditional definition it may be said that the economics of information is concerned with how data may be used to create, manage and exchange wealth.

In other words, by "economics of information" is meant a systematic series of concepts and theories which explain the role which information plays in assisting the firm in its conception, production and delivery of goods and services in order to create wealth in society (Remenyi, D. Money, A. and Twite, A. (1993).

Furthermore, an avenue to clarify this definition is to look at the difference between the new and old economics. That is, the difference between information (intangible) goods, which are treated by the information economics and other (tangible) goods subject to the traditional economics.

For centuries Smith's Invisible Hand of the market system for organisation and distribution has rested on the following posts: excludability, rivalry and transparency; while cost structure was basis for the price of goods. Modern technologies, ideas and information are beginning to undermine the features of the Invisible Hand forces as "an effective and efficient market system", simple by their characteristics. Ideas and "information goods" have particular characteristics that distinguish them from ordinary goods. These include:

- *non-rivalry* – if I have an apple you cannot have it; but if I know something, although you can learn it, I will still know it;
- *non-transparency* (in order to buy it, you should know what the information or idea is, once you know it, in many instances, there is no need for you to buy it);
- *non-excludability* – the owner of an information will no longer be able to easily and cheaply exclude others from using or enjoying the commodity (information), digital data is easy and cheap to copy. As pointed out by Skoko and Skoko (2004) "without excludability the relationship between producer and consumer is much more a gift-exchange than a purchase-and-sale relationship";
- *different cost structure* – marginal costs of reproducing and distribution that approach zero (e.g. cost-based pricing of a 10% mark up on unit cost makes no sense when unit cost is almost zero, therefore you have to price your information good according to consumer value, not according to your production costs);
- An information good is an *experienced good* every time it's consumed (in other words, you have to "value" it before you consume it); an ordinary good is an experienced good since consumer must experience it to value it (in short, you have to consume it to value it);

- *Customer-driven demand* for new services and technologies rather than price-driven demand for the ordinary good;
- *Unlimited resources*- Resources for creating information are technically unlimited while resources for producing an ordinary good can be limited or exhausted (it is not a problem of accessing or producing information, it's a problem of filtering, finding, communicating what's useful and what's not). As Dosi argued: .... *decreasing returns historically did not emerge even in those activities involving a given and "natural" factor such as agriculture or mining: Mechanisation, chemical fertilisers and pesticides, new breeds of plants and animals and improved techniques of mineral extraction and purification prevented "scarcity" from becoming the dominant functional feature of these activities* (Dosi 1988, 1129).

As to the analytical tools, the 'old' economics marginal analysis is still relevant for the new economy, but the power of economic analysis can be greatly increased by complementing traditional economics with the inframarginal analysis of the network of division of labour.

### **Conclusion**

In his theory of invisible hand, Adam Smith explained market mechanism, where individual actions on the market are guided by their self interests, and market is most efficiently allocating scarce resources.

There are many examples of goods where price is only one of many other factors like quality, delivery, image, and so on, which affect the demand for those products.

The crucial point in this article is that invisible hand is out of the equation in the case of intangible commodities. That is, invisible hand in information economics market does not work due to the new intangible good-information which replaced traditional, tangible products and services.

The invisible hand in today's market where innovations, technology and constant changes are main characteristics of business, shakes.

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## **DINAMIKA "NEVIDLJIVE RUKE" I INFORMACIJSKA EKONOMIJA**

### **SAŽETAK**

*Svrha ovog clanka je istraživanje koncepta Smithove nevidljive ruke i primjenu istog u informacijskoj ekonomiji. Autori su započeli ovaj članak povijesnim dijelom, nastavili sa dinamičnim pristupom nevidljivoj ruci, njezinom podrhtavanju te došli do nefunkcioniranja nevidljive ruke u informacijskoj ekonomiji. U djelu o informacijskoj ekonomiji koja se objašnjava kao tržišni neuspjeh, zaključuje se da nevidljiva ruka ne vrijedi za tu novu ekonomiju.*

**Ključne riječi:** *nevidljiva ruka, nedostaci, dinamički pristup, eksternalije, informacijska ekonomija*