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## **Transaction costs, externalities and innovation**

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### **Abstract**

There is now considerable evidence on the value of using external resources to promote the development of innovative technologies. Furthermore, the ability to experience innovations in business by external links that may help to avoid risk, improve the quality of natural products, which means qualifying business activities and promote companies capable of rationalizing and projecting high yields. This paper provides an approach from the transaction cost theory of Ronald Coase, in particular, provides preconditions to estimate the specific market of biotechnology.

**Keywords:** Coase theorem, Transactions costs, Biotechnology, Ronald Coase, Innovation, Financial Markets

**JEL:** B2, B21, B41, D03, D43, D82, N56, O13

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## Transaction costs, externalities and innovation

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Two decades ago (1991), Ronald Coase received the Prize in Economic Sciences in Memory of Alfred Nobel in Stockholm, Sweden. Since then, their assumptions and their approaches have expanded considerably since market issues, business, organizations, stock exchanges and trading systems to the comparative economic history (Coase, 1995). Outside the laws of mechanics bodies found in the markets are too contingent to meet mechanical lawlike principles (Coase, 1998A). The world market is too malleable (Coase, 1937a, 1945, 1947a, 1960, 1961). The attribution of conventional interpretations of transaction costs is more ambiguous now than themselves known (Klaes, 2000). What are the implications of transaction costs? (Dixit, 1996) What are the implications of transaction costs out of the markets? (Groenewegen, 1995) What about transaction costs in volatile markets? These and other questions suggest a broader context of the work of Coase.

Remember that what interests the author is to develop an explanatory framework that helps us understand the difficulties of production in open markets (Coase, 1937b). I.e, to analyze how economic systems from what the author calls "the institutional structure of production" (Coase, 1991a). While some of the problems facing the economy is related to production, the focus is the mechanisms that create better or worse performance of the economy in societies with open markets (Coase, 1988D, 1990).

Coase proposed an explanatory model field located between type Pigou productive theories / Robbins, and the scope for cost problems specific exemplary cases (Coase, 1945, 1946b). Following the evolution of the concept of transaction costs may also be ways to explain why markets do not have a perfect performance (Coase, 1960). Moreover, the nature of transaction costs reflects a domain that is beyond the scope of the term originally used by the author. After its original development, the systematization of the ideas of Ronald Coase found in Oliver Williamson, Harold Demsetz and Steven Cheung, among others.

Beginning the decade of the fifties, the economy responds to problems of industrial organization and corporate matters. Coase exhibits his work in the broader context of economic history. The Wealth of Nations (1776) Adam Smith Coase serves to identify the subordinate role of central planning or government

regulations in the smooth functioning of the economic system (Coase, 1974a), in effect, the economy may be coordinated by a price system (invisible hand) and with beneficial results. It is with respect to the wealth of nations, similar to what Whitehead said about philosophy after Plato, according to Coase's economic theory after Adam Smith, only footnotes wide his great work. Although the factors given after the nineties with technology developments, theories of consumer and securities markets (among others) add new conditions and problems in the markets.

The hypothesis of economists after Adam Smith meets conditions to achieve results or, in another perspective, when the real world seems to have worked according to theory, so much the worse for the world (Coase, 1994). This is what seems to assume the historical reference that makes the reading of Ronald Coase on the economists of his time. So as with physics textbooks, the neoclassical version of the economy suggests that markets forcing changes leave the real world needs. The projection of the market in its most complete exposition resembles a system of extreme decentralization (Coase, 1988a). What does this mean? This is an image projected on the ability to self-sustaining markets and relatively unnecessary role of governments (Coase, 1988c).

Excessive concentration in the price system has been connected with the reductionism of the neoclassical approach to the nature of markets (Coase, 1945). In fact, the impression left by economists is that markets superstructure determines the types of behavior among agents. Above is the price system, below the world of people. That's a position that defends Lionel Robbins. In his Essay on the nature and significance of economic science, Robinson points out the obvious shortcomings of the old treatment of the theory of production with its approach to the property of the peasantry and industrial forms: "From the standpoint of the organization economist provision is a matter of industrial (or agricultural) if domestic international for a particular company, yes for "the" industry-... At the same time tends to leave the regulatory element completely out of the whole organization of production: the reciprocal relationship between prices and costs".

The idea was that the economist Robbins should not be interested in what happens to the domestic laws of the organizations, but only what happens in the market, buying inputs and selling goods produced by these factors (Coase, 1994 ). As Coase observed: "It totally ignores what happens between the factors of production and sale of such goods" (Coase 1960). To increase the flow of arguments in this direction neoclassical theory posits a micro that is largely a study of the pricing and production, "in fact, this part of the economy often is called theory of prices "(Coase, 1945).

With this review, Coase prepared his arguments on the theory of transaction costs (Coase, 1960). The neglect of other aspects of the system has been enhanced by another feature of neoclassical theory: the increasing abstraction of the analysis does not seem interested in the detailed knowledge of the

economic system in context. At least not for public policy issues or developments in technology or biotechnology appeal to you. After Coase others have corroborated some of the prejudices, Holmstrom and Tirole, for example, in "The Theory of the Firm" (Handbook of Industrial Organization) conclude that "the proportion between evidence and theory is now ... very low in this field." However, according to Coase, the authors still moves around within a theoretical level (Schmalensee, 1989).

The theoretical device with which neoclassical economics has played a similar role to the principle of inertia in classical mechanics of Newton particles contributes to expand the speculation about the behavior of "markets" in the void left on their own motion or rest. The bodies 'natural' markets transactions include, however, serious flaws on a surface enough information problem (Coase, 1960, 1990, 1991a, 1998a). Coase's expression to relate the work of neoclassical economists is "blackboard economics" (Coase, 1991a). After two decades of theoretical advances proposed by Ronald Coase, allow simulation developments in the economy that are amazing, however, remains a matter of principle applied force. We have come to the blackboard to digital media, but the models built are still limited (Dhalman, 1979).

In mainstream economic theory the market analogy recursive device relates as a "black box". One way surprising, according to Coase, because a majority of resources are used in modern economic systems are used within the company, and the decision of how to use these resources depends more on administrative decisions directly from the operation of the market (Coase, 1994). The resulting paradox is a dual purpose, according to Coase (1988a). The economic system depends largely on how these organizations bring their issues, specifically, the modern corporation (Coase, 1972). Moreover, it is surprising that the economists who show interest in the price system, manifest disregard for the context of markets. Specifically, for the institutional arrangements that determine relative exchange processes (Coase, 1991). The conventional theory then, in the opinion of Ronald Coase, is "a very incomplete theory" (1981a).

In *The Nature of Firm* (1937), Coase responds more directly to the errors of conventional wisdom. Remember that some standard wisdom quoted Arthur Salter expression: "The normal economic system works itself." Then explained that a competitive economic system coordinated by prices would lead to the production of goods and services valued by consumers. Approaches of this nature were intended to streamline the "invisible hand" of Adam Smith (Coase, 1977).

This early work of Coase is key to understanding the elegant insight of the theorem. The existence of transaction costs explains the nature of the company, although its scope is irrelevant for the rest of the economy (Coase, 1937a, 1945, 1960, 1965, 1972). The investments or risks of founding a company depends on transaction costs, so much information, the seriousness

of the contracts, compliance and prevailing legal order can also affect the goods and services produced (Coase, 1988a) . The chain of processes that generates a spontaneous market order depends on transaction costs. In other words, without the transaction costs would remain unexplained many important phenomena in the economy. Coase raises its argument to see that in essential terms of transaction costs can affirmatively act as barriers to monopoly and, negatively, to protect the interests of the market in cases where governments seek to impose unlimited. In summary, the strong assumption of the Coase theorem rests on the advantages for society to reduce transaction costs, while the other to impose barriers to prevent the violation of economic rights of the market (Coase, 1988B).

### **Market with (and without) transaction costs**

As shown, the Coase theorem is related to the analysis of transactions that operate under different circumstances and determined by the existence (or absence) of transaction costs. Some misinterpretations of his theorem describes "a world of zero" as the world Coaseano ... what can not be further from reality as this was the world that the author wanted to leave that economists "(Butler, 2003, p. 136), are derived from studies of the same, limited to a single level. The results of the analysis conducted Coase, in the case of the farmer and the farmer, leading to important implications. Coase concludes that in the absence of transaction costs, the parties are able to solve problems and find the production level that maximizes the social benefit for themselves (Coase, 1935, 1965, 1988a). This result can be used interchangeably with pre-allocation of property rights (Coase, 1994). This suggests then that the law and court decisions have no effect on the result (Coase, 1994). From that perspective, it follows at once that the correction of market inefficiencies is possible when there is effective coordination between market actors.

However, the fundamental assumption that this is possible is the absence of additional costs involved in carrying out the transaction. Further analysis of the case puts into consideration the costs of activities in reality and face: 1 - the search for an agent who wants to negotiate, 2 - the process of informing you want to negotiate with him, 3 - to determine and report the terms to be negotiated, 4 - to conduct the negotiation of such terms, 5 - to pursue the development of the contract containing these conditions, 6 - to carry out inspections to ensure compliance with commitments leads to a different outcome Coase . Coase determines that the value of the costs for such actions can be so high that it is feasible that prevents profitable transactions and therefore, are carried out (Coase, 1994, p.134). The transaction in this regard will be made only if the benefits outweigh the costs of achieving this (Coase, 1994, p.135).

In relation to costs incurred during the completion of a transaction, further developments carried out by Becker Williamson and transaction costs

associated with different aspects that contribute to the development of the theory (Williamson, Winter, 1991). This is linked with problems related to the internal organization of firms, the costs of collection, processing and communicating information, trade flows in decision-making, the goals and organizational behavior, the nature of relationships contract, the impact of information, opportunism, moral hazard and avoidance: the process of negotiation, bounded rationality, information asymmetries, uncertainty, adverse selection, costs of drafting, for payment enforceability contracts, sequential bargaining processes on the distribution of the benefits associated with fixed investment, and the internal structure of the organization, among others. In a specialized field such as biotechnology, this research explores the obstacles and limits to access information from quality imported equipment, contractual, legal system and administrative inefficiency in government agencies.

The above factors and Coase's analysis indicate the feasibility of individuals lack the ability to negotiate for transactions that maximize the social value of production. Similarly, it is known that the greater number of parties involved in the transaction, the lower the possibility of reaching a voluntary agreement (McEachern, 2000). Situations for which the government can play a role through legislation to reduce coordination costs, assign responsibilities, reduce uncertainty and transaction risk. In addition to systematizing the process that will streamline contractual arrangements with interests in investment companies and universities. Thus, the legal system becomes relevant to the scope of the optimal production level that maximizes social product with a higher level of efficiency (Coase, 1994), in order to avoid obstacles to transactions that lead to optimal results.

The effect generated by the law in this regard stems from its ability to affect private marginal costs (Betlan, 2003). He believes that "if trading is costly and imperfect information exists, then the rules help to reach the spot" (p.140). However, the benefit from the legal system must be considered within a framework of relativity in as "property rights may affect the economic efficiency for better or worse" (p.139). In that sense, "an incorrect allocation of property rights can lead to greater social marginal cost, and lower social solution" (p.140). Reason suggests caution in the implementation of measures arising from government action to correct market failures (Betlan, 2003, p.141). In this respect, Coase suggested not to make generalizations about the benevolence of government intervention and promotes a study of the peculiarities of each case to determine the mechanism of convenience in order to promote greater efficiency in the value of production (Coase, 1994).

### **Transaction costs, externalities and innovation**

There is now considerable evidence on the value of using external resources to promote the development of innovative technologies. Furthermore, the ability to experience innovations in business by external links that may help to avoid risk,

improve the quality of natural products, which means qualifying business activities (Powell, 1998), indeed, promote businesses with the ability to streamline and projecting high yields (Gemser and Wijnberg, 1995).

For the company, however, the potential for developing new products involves important strategic challenges. In many cases it requires developments in marketing, sales or production joint ventures (complementarity of competence, honesty, quality of the partners, etc.), yet the problems are more complex when it comes to developing new technology products, due to the uncertainty of the contracts, administrative procedures for imports, property rights and the fulfillment of the agreement between the parties. Some researchers maintain that openness to external resources, talent out of the same organization, innovation and sensitivity to external partners, contributes to significant savings in costs by offering new products. Also it can help minimize the risks (Quinn, 2000), Rubenstein, 1994). Others argue that the benefits from outsourcing generation technology products have been exaggerated also strategically can be a barrier to long term to run the talent and capabilities of the company (Chesbrough and Teece, 1996).

The relevance of this debate is that the projects to develop innovative products (biotech, for example), with transaction costs, in a broad sense, can mean significant ingredients of the total set of costs that may be companies or firms with results more predictable. Paradoxically, it is possible to estimate that transaction costs, at least in the perspective discovered by Coase and Williamson, significant fissures have yet to assess these issues in detail (Groenewegen, 1995). This is due to appear in the original formulation of the Coase theorem and further development of theory in Williamson (1991), there were a business model static type that does not reflect (actually) the dynamics of change, learning errors discovered by empirical experience.

This weakness, however, undermines the epistemological value that has the original theory on transaction costs. While new product development in biotechnology is dynamic and uncertain, it is also important to recognize that the process involves a lot of steps that are carried out separately, at least some processes can be considered as part of habits and daily trials. When the results are relatively safe is predictable transaction costs, i. e., the development of models, replicas of essays, and so on. This suggests that innovation see demand different processes, each one related to a particular aspect of technology, which has in many cases risks, rewards and balances when they are outsourced. In other words, the transaction costs are critical because the degree of outsourcing change depending on the evolution of the innovation process.



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