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Pareto Efficiency, the Coase Theorem, and Externalities: A Critical View

Andrea Ventura, Carlo Cafiero, and Marcello Montibeller

Abstract: We offer a critical review of the Paretian definition of efficiency by noting its correspondence with the description of the logic underpinning market relationships. With reference to Ludwig Wittgenstein's analysis of the value content of tautologies, we discuss the tautological nature of the propositions regarding the efficiency of exchange and market equilibria when there are externalities. We critically review the debate on the Coase theorem, its treatment of externalities, and the contrast with the Pigouvian approach, taking into account the distinction between propositions that are true based on their formal logical structure and propositions that are true with respect to their correspondence to actual states of affairs. We also reveal and discuss the logical inconsistencies — in particular, the one between the Coase theorem and perfect competition — and the practical consequences of the application of Pareto efficiency to the analysis of externalities.

Keywords: Coase theorem, economic methodology, efficiency equity, market failures, social values

JEL Classification Codes: A13, B41, D61, D62, D63

Within neoclassical economics, the problem of externalities has been traditionally tackled from two different perspectives. According to the first perspective, which originates with Arthur C. Pigou ([1924] 1932), external effects that are not accounted for in production costs or in the individual utility functions — and, therefore, that are not reflected in the prices — will cause even perfectly competitive markets to produce a Pareto inefficient allocation of resources. In the conventional parlance of contemporary economics, there would be a market *failure* in achieving efficiency. A second perspective was later proposed where the explanation for the inefficiencies, determined by the presence of externalities, is sought for in the incomplete or absent definition of property rights that, if present, would allow a market to develop. Thus,

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especially after Ronald H. Coase (1960), the Pigouvian tradition has been challenged: Externalities do not cause a market failure. Rather, identified inefficiencies would be due to *missing* markets.[1]

Originally very sharp, the differences between the two views seem to have been blurred over time, and the theoretical debate within neoclassical economics[2] — rather than highlighting the differences — has espoused positions that give emphasis to one or the other view, depending on the particular case. The neoclassical debate over externalities, therefore, characterized by the coexistence of two different conceptions of the role of markets, has obscured the significance of the initial difference. What is even more problematic is that, despite numerous critiques, the "Coasian" view seems to have been fundamentally accepted, at least in principle, up to the point that some have suggested abandoning the term "externality" and discussing the issue of externalities only in terms of "property rights" and "transaction costs."[3]

Our objective is to reconsider some of the key issues of the debate, showing that the two approaches embed two different views of the relation between markets and the state, between the private and public spheres of the economy. In other words, we will show that behind the two approaches, there are two different ideas of markets and social relations.[4] To this end, we start with reexamining the Paretian definition of efficiency. We show that what is known as the "Pareto criterion" is not simply a logical criterion aimed at separating what is in the realm of positive science from what is not (as maintained, for example, by Robbins 1935). It can also be interpreted as a criterion that divides those uses of resources that are consistent with the logic of free exchange from those that are not.

Such a shift in view enables us to challenge propositions regarding the efficiency of competitive markets on grounds of their scientific validity. We demonstrate that such propositions are not based on the comparison between an objective metric of efficiency and the actual functioning of market economies. Rather, they evaluate the performance of ideal "markets" through the lenses of a criterion that is coincidental with the modes of operation of the same idealized market.

Starting from this consideration, we follow a methodological distinction between propositions that are valid on grounds of their intrinsic coherence and

[1] The essential elements of the Pigouvian position is defined in Arthur C. Pigou ([1924] 1932), Howard S. Ellis and William Fellner (1943), James E. Meade (1952), Tibor Scitovsky (1954), and Erza J. Mishan (1969, 1971). For the alternative view, see Arrow ([1969] 1983), James M. Buchanan and W. Craig Stubblebine (1962), Coase (1960), Harold Demsetz (1967), Knight (1924), George J. Stigler (1966), and Ralph Turvey (1963).

[2] Worthy of note is Walter P. Heller and David A. Starret's (1976) attempt at a systematization of the issue within the neoclassical economics mainstream. Their work could be deemed the final point of the debate that took place in the 1970s, although the difficulties in achieving a consensus are evident in the authors' own conclusions: "It seems to us that the intuitive concept of externality must remain somewhat imprecise" (Heller and Starret 1976, 20).

[3] Terry L. Anderson (2004).

[4] In the same line of inquiry is Tihomir Ancev and Michael Harris's (2006) work, in which the difference between the Coasian and Pigouvian approach is identified in the relationship the two approaches maintain with social norms (see also Dragun and O'Connor 1993).

propositions whose validity depends on their correspondence with real phenomena. After discussing a number of epistemological problems raised by such a distinction, we show that the Coase theorem — which Paul Samuelson (1995) and others[5] recognize as either "tautological" or "false" — is really one or the other. Being one or the other depends on whether one focuses on the internal logical consistency of the theorem's statement or on the correspondence between the statement and the practical possibility that any type of externality might be internalized by bargaining among the interested parties.

In the last part of the article, we reexamine the question of whether the solution of the externality problem, along the lines advanced by Coase and his followers, is defensible at all on the logical ground. We also highlight the fundamental difficulties that one faces when trying to apply the Pareto criterion to environmental, institutional, or legal problems, as it is customarily done within the Coasian tradition.

Pareto Criterion and Market Efficiency

Starting with Lionel Robbins (1935),[6] the utilitarian view, according to which redistributive policies in favor of the poorer strata of the population were welfare improving, has been criticized at its foundation. Robbins, in fact, defined the "economic problem" as the problem of the individual choice of how to allocate scarce resources among competing uses. He accepted the definition of efficiency suggested by Vilfredo Pareto, according to which a given allocation is efficient if, and only if, it is not possible to change it without causing a loss to somebody. Therefore, in reallocating resources, only those changes that could improve the welfare of somebody without losses for anybody else could be considered welfare improving. Changes that would create benefit to some and losses to others cannot be assessed on scientific grounds, given that their evaluation would necessarily require an interpersonal comparison of utility, considered inadmissible if one wanted to lay claims in positive science.

To the proponent of such a view, by separating economic efficiency from equity and other considerations related to the distribution of endowments, economic theory had achieved the status of a scientific discipline which — in the spirit of Pareto's own scientific program and in analogy to what happened within natural sciences — clearly distinguishes facts from opinions. One corollary of all this is that any proposition derived from the theory could be validated through empirical tests.[7]

However, we believe that a change of perspective on the content and meaning of such a methodological choice is necessary. We note, in fact, that the *definition* of efficiency, according to Pareto, corresponds to the *description* of an exchange

[5] Paul Samuelson (1995). Among those who stress the tautological character of the Coase theorem, are Robert D. Cooter (1987), Joseph Farrel (1987), and Dan Usher (1998).

[6] Lionel Robbins (1935).

[7] On the link between Pareto and the sciences of nature, see for example Roberto Marchionatti and Enrico Gambino (1997).

equilibrium, and that the set of inefficient positions, in a Paretian sense, coincides with those positions that would be modified by free, voluntary exchanges among subjects interested in their own individual utility maximization, where utility is linked to the consumption of the objects obtained through the exchanges. In other words, exchanges among self-interested individuals in ideal conditions (that is, with no transaction costs and perfect information) would continue only up to the point that potential mutual gains are exhausted — that is, up to a Pareto optimal position. Beyond that, where any one of the individuals involved would suffer a loss, no fully voluntary exchange would occur. Therefore, such an equilibrium can be *described* as a Pareto optimum: One individual's utility could only increase at the expenses of someone else's.

It must be noted that, at this point, we do not refer to *actual*, but to *ideal* market exchanges. This point is well illustrated by Knuth Wicksell:

> [Pareto] defines this maximum as the point or position, from which it is impossible to move while ensuring a gain in utility or *ophélimité* for *all* participators in the market. With such a definition, it is almost self-evident that this so-called maximum obtains under free competition, because *if*, after an exchange is effected, it were possible by means of a further series of direct or indirect exchanges to produce an additional satisfaction of needs for the participators, then to that extent such a continued exchange would doubtless take place, and the original position could not be one of final equilibrium. (Wicksell 1934, 82-83)

Thus, in essence, the logic that defines Pareto efficiency and the logic that motivates market exchanges among self-interested parties are one and the same thing. We return to this issue later, but here we only want to suggest that the one associated with Pareto is not a neutral, objective criterion to be invoked to assess the quality of an economic outcome. Rather, it is the description of the *logical form of a specific social relation*: the one that forms between two self-interested individuals who meet in a "market" exchange.

Several results follow from this remark. First, we suggest that, by failing to recognize such correspondence, neoclassical economics ended up giving the badge of a criterion (to distinguish claims founded in positive science from claims that are not scientific) to just one of the many possible forms of social relationships — namely, that of market exchange.

Second, let us consider how we can reexamine the proposition according to which any competitive equilibrium is efficient, as stated by the first fundamental theorem of welfare economics. The proposition is problematic, even apart from the considerations that we are presenting, given that it depends on maintaining a series of hypotheses on the nature of technology, preferences, and information, excluding a whole set of phenomena that determine the functioning of any real market. To reestablish the validity of the result, economic theorists have created theoretical constructs whereby the abstract nature of the maintained hypotheses is so clear that

anybody would agree that those models are purely artificial devices. In Kenneth J. Arrow's own words, "[a] complete general equilibrium system ... requires markets for all contingencies in all future periods. Such a system could not exist" (Arrow 1986, 393).[8]

Apart from the considerations on the usefulness of general equilibrium models, what we want to stress here is that discussing the efficiency properties of the equilibria achieved in competitive markets, as proposed by neoclassical economics, does not amount to evaluating the actual functioning of real-world markets with an objective criterion. Rather, it amounts to conducting a logical comparison between a particular definition of efficiency (that, as we noted, coincides with the natural end point of market exchanges between self-interested parties) and ideal markets in which — through completely *ad hoc* hypotheses — all conditions required to ensure that individuals could participate in a market exchange, fully informed about all kinds of goods, are assumed to hold. Those are markets that, almost by definition, do not exist. Thus, it should be evident that a proposition, such as "ideal competitive markets are Pareto-efficient," is a tautology.

To better clarify the content of the last statement, let us decompose the logical chain of propositions affirming the efficiency of competitive equilibria. We will have:

- *Proposition 1a*: Pareto efficiency is *defined* as the condition where it is not possible to increase anybody's welfare without reducing somebody else's.
- *Proposition 1b*: A competitive market is *defined* through a series of assumptions, such that the equilibrium it achieves can be described as a situation where it is no longer possible to move away as a consequence of mutually advantageous free exchanges.
- *Proposition 1c*: Equilibria on "competitive markets" are Pareto efficient.

[8] A statement that led Hodgson (1992, 756) to note: "The general equilibrium project lies in ruins. It does not 'deal with' economic subsystems in any adequate or meaningful sense. It can represent neither true markets, nor money, nor key types of knowledge and uncertainty, nor real time" (see also Blaug's [2003] assessment of these models). Mark Blaug (2003, 154) assesses these models, concluding: "The best way not to learn how market function and how a competitive economy actually works is to study general equilibrium theory." The point is that, to general equilibrium theorists, neoclassical economics has lost any link with an empirical starting point. The theory is defined as a "consistent set of definitions, hypotheses, theorems that can be used, when needed, to formally represent various concepts and problems of economic theory" (Ingrao and Israel [1987] 1990, 207). The bases for such axiomatization of general equilibrium have been set by Kenneth J. Arrow and Gerard Debreu (1954) and Gerard Debreu (1959). As noted by Joseph Stiglitz (1994, 29), the major achievement of Arrow and Debreu is that they revealed how exceptional are the conditions required to obtain the correspondence between efficiency and equilibrium — that is, the fact that such conditions are impossible to be realized in actual markets. The truth is that neoclassical economics has utilized these models not to reject the Walrasian theory of equilibrium, but rather to be able to use it. On one hand, the economic system has been described as a simple mathematical structure, "with a radical and uncompromised emptying of the theory from any empirical reference" (Ingrao and Israel [1987] 2006, 270). On the other hand, formal analyses of abstract models have been used as if they could provide indications on how to build an economy that might get close to those ideal conditions. The fallacy of this methodological approach is what we want to expose, with specific reference to the problem of externality.

Proposition 1a gives a definition of economic efficiency that corresponds to the logical form of market-based social relations. *Proposition 1b* defines the competitive equilibrium in such a way that bargaining and trade end when all mutually advantageous free exchanges are exhausted.

As for the line of reasoning that leads to *Proposition 1c*, we have two possibilities that are important to keep distinct, depending on the content given to the expression "competitive market." If reference is made to *actual* markets, the efficiency property is limited to situations where perfect competition — that is, the presence of a large enough number of agents — would exhaust any possible gain from trade, with no dissipation through rent-seeking and where a series of precise conditions on technology, preferences, absence of public goods and of external effects are met. As pointed by Arrow (1986) and literature on "market failure," given that such conditions cannot hold in any real "competitive market," *Proposition 1c* is false.

However, if reference is made to *ideal* markets, in which the conditions needed to achieve efficiency are *assumed* to hold as *ad hoc* hypotheses and — as too often done within the debate on social cost — any other kind of inefficiency is reduced to transaction costs and asymmetric information, then *Proposition 1c* is a tautology, given that it would be equivalent to:

- *Proposition 1d*: Without inefficiencies (that is, with no transaction costs and with perfect information), the market is efficient.

As it should be evident, *Proposition 1d* is built by combining a definition of efficiency, coinciding with the logic of market relations, with a definition of a "competitive market" in which anything that would hinder the full expression of such relations has been eliminated through *ad hoc* hypotheses and by the instrumental use of an identity between the term "inefficiency" and the set of transaction costs and informational problems.[9] Therefore, it does not concern any real status quo.

The limited cognitive value of such reasoning can be better appreciated by noting that, when using the same structure of the argument, but a different definition of efficiency, we could reach a rather different result. To illustrate that let us refer to Karl Polanyi (1977). Criticizing Robbins's methodological turn, Polanyi proposed that economics in its "formal" sense — that is, relative to choices regarding the allocation of scarce means to competing ends — cannot substitute for a "substantive" conception of economics, based on the requirement that fundamental human needs be fulfilled.[10] Rather than circumscribing the domain of economics to the analysis of the logic of

[9] Arrow ([1969] 1983, 60) proposed a definition of transaction costs (later used also by Williamson 1985, 18), according to which "transaction costs are the costs of running the economic system." It is thus clear that to assume absence of transaction costs means to neglect the presence of any cost associated with the functioning of actual markets — that is, of all potential sources of inefficiencies. It follows from this a definition that "market failure is the particular case where transaction costs are so high that the existence of the market is no longer worthwhile" (Arrow [1969] 1983, 68).

[10] Karl Polanyi (1977, ch. 2).

individual choices, we might consider that any choice is truly free only if the choosing individual has achieved such a minimum level of comfort which enables him/her to act freely in pursuing his/her own happiness, (without constraints induced by lack of fundamental needs such as, for example, those listed in the Universal Declaration of Human Rights).[11] Therefore, we could *define* economic efficiency as the condition that corresponds to the reaching of a minimum standard of material welfare by all citizens. We would thus have:

- *Proposition 2a:* Economic efficiency is *defined* with reference to a minimum standard of material welfare for the entire population.
- *Proposition 2b:* Social policies are *defined* as those policies which guarantee a minimum standard of material welfare for the entire population, where material welfare refers to the fulfillment of a specific set of fundamental needs.
- *Proposition 2c:* Social policies are economically efficient.

Proposition 2a provides a definition of efficiency that is derived from a "substantive" idea of the economy à la Polanyi, while *Proposition 2b* gives an acceptable description of social policy that is intuitively appealing, consistent with the Universal Declaration of Human Rights, and in line with some of those invoked in many democratic countries. Once one accepts *Propositions 2a* and *2b*, then *Proposition 2c* logically follows. Obviously, social policies are not always capable of assuring a minimum level of material welfare to everybody, and sometimes such policies create distortions in terms of that specific objective or of other objectives of economic policy. Yet, one could "explain" social policy failure as being due to the presence of imperfect information and the cost of making the required transfers to the needy. Then, one could "prove" that the efficiency of social policies may be reestablished by assuming perfect information and the absence of transfer costs.

The discussion so far underlines a serious conceptual problem that one should keep in mind to fully understand the arguments we advance here. To prove the efficiency of both competitive markets and social policies, we have presented arguments that — apart from the obvious differences in the content of the propositions — possess the same logical structure: They are tautological. As a consequence, it is clear that each argumentation, on the whole, is formally consistent. Nevertheless, this says nothing regarding the truthfulness of the argument's assumptions or of its conclusion, as it says nothing about any real property of markets or social policies. To explore the latter issue, we need to establish whether the hypotheses, around which the deductive chain is built, describe existing or possible conditions. In other words, we believe that the problem of the formal consistency of the proposed "proof" of the efficiency of competitive markets is of a completely

[11] In the Universal Declaration of Human Rights, art. 25, para. (1), we read: "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control."

different nature than the problem of whether or not the underlying model of the market corresponds to reality. The two questions needs to be kept neatly separated. To confound the question regarding the functioning of real markets with that concerning the analytic coherence of the formal system, used to represent them, is a dangerous misunderstanding. As we shall see, this actually takes the discussion away from scientific grounds.

A Digression on Method

Our reasoning so far raises serious epistemological problems that can be tackled from various angles and with reference to various schools of thought. The literature of relevance is vast. We explore some of it here from the perspective offered by Ludwig Wittgenstein ([1921] 1981), The reason for our choice is that Wittgenstein had conducted an analysis which became a fundamental pillar for later developments in the philosophy of science. As we shall see, Wittgenstein's *Tractatus* discusses the cognitive value of tautologies that allows us to make the distinction between propositions that are true because of their logical coherence and propositions that are true because they relate to actual facts — a distinction we find useful in discussing key arguments presented here. A reference to Wittgenstein, coupled with the our Pareto criterion discussion, will help us critically examine the epistemological value of the Coase theorem and the legitimacy of the norms derived from it.[12]

In the *Tractatus Logico-Philosophicus* ([1921] 1981), Wittgenstein divided propositions in three classes: *meaningful*, *meaningless* (*sinnlos*), and *nonsensical* (*unnsinnig*). The first group includes propositions that describe possible states of affairs (*Sachverhalten*). Such propositions could be true or false. They are true if they describe states of affairs that exist — that is, "facts" (*Tatsachen*). They are false if they describe states of affairs that do not exist in reality.[13] According to Wittgenstein, only these propositions, characterized by their assertive nature, have cognitive value. They are the propositions on which natural science is based. It is important to keep in mind that the analysis of the meaningfulness of propositions conducted by Wittgenstein in the *Tractatus* is based on the possibility of reducing elementary components of propositions to elementary objects — that is, on the logical atomism. It is precisely because of that possibility that meaningful propositions are the propositions of the natural sciences and not those of social or historical sciences.[14] In fact, these latter propositions do not properly concern, *stricto sensu*, elementary objects.

[12] A discussion point that, in many ways, parallels the one we make here has been presented by Andrew Halpin (2011). Halpin rejects the idea that the Coasian model sheds light on the world as it is, thus overcoming blackboard economics, and criticizes the legitimacy of its normative consequences.

[13] According to Ludwig Wittgenstein ([1921] 1981, Prop. 4.1), "[a] proposition presents the existence and non-existence of atomic facts."

[14] Although Wittgenstein did not directly state this, and although it might be possible to argue in favor of some propositions of the social and historical sciences (to the extent that they describe facts), we believe that Wittgenstein's position in *Tractatus* is basically what we have described.

Meaningless (*sinnlos*) propositions, on the other hand, are those that, due to their logical structure, are either always true (tautologies) or always false (contradictions), independently from the truthfulness of their elementary components. These propositions, according to Wittgenstein, have no cognitive value, being limiting cases of a certain range of meaning.[15]

To the last group — that of *nonsensical* (*unsinnig*) propositions — belong the pseudo-assertive propositions of ethics and aesthetic. These are the propositions comprising the comprehension of the human world, which do not have cognitive value, yet *show* their content through artistic representation and mysticism.

According to Wittgenstein's theses, the proof of the efficiency of competitive markets is thus not a scientific proposition due to its tautological character, and can only be deemed as a method to verify the formal consistency of propositions that need to be validated by empirical tests. For this reason, two propositions that are antithetic — efficiency of the market and efficiency of social policies — can both be considered true if they are constructed in a tautological form. However, precisely for that reason, neither of them provides any knowledge of the real world.

By referring to Wittgenstein's distinction between meaningful and meaningless propositions, we can now reexamine the argument of the efficiency of markets by distinguishing two cases: (i) a case where the correspondence between markets and efficiency becomes a defining concept on purely logical grounds (i.e., if efficiency is defined in terms of the Pareto criterion, then free exchange is efficient) and (ii) a case where the interest is in comparing a criterion of efficiency with a complex state of the matter, as it is the reality of a market economy.

In the first case, as suggested by Wicksell above, the argumentation is immediately recognizable as a tautology. The Pareto criterion sums up to the laws of free voluntary exchange, therefore, once the opportunities for mutually advantageous exchanges are exhausted, Pareto efficiency is achieved.

In the second case, a tautological core can be revealed through a more complex sequence of passages. These can be summarized in what we labeled as *Proposition* 1*d*, according to which, "[w]ithout inefficiencies, that is with perfect information and with no transaction cost, a competitive market is efficient, considered that the definition of efficiency coincides with the definition of the logic of market exchanges." In this case, given that the proposition on the efficiency of markets cannot be empirically validated (because real markets present several phenomena that hinder the possibility of full expression of the logic of free voluntary exchange), *ad hoc* hypotheses are added to salvage its empirical validity — that is, to "save the phenomena." However, inclusion of such *ad hoc* hypotheses makes the proposition

[15] It is important to keep in mind that, according to Wittgenstein, in order for a proposition to have a cognitive value, it must describe a possible state of the world. Formal disciplines, in this sense, are conceived as rules for the creation of propositions, and not as sets of sensible propositions themselves, given that they cannot indicate facts. Therefore, formalizing a discipline does not exempt it from the need to compare the propositions with the existing facts in order to assess their truthfulness.

empirically empty, given that now it would always be true, irrespective of which real set of facts it is compared with.

In other words, with reference to the link between exchange and Pareto efficiency, the analysis is limited to the definition of exchange as efficient. If a wider scope is given to the link between market and efficiency, so that an attempt is made to refer to the conditions existing in actual market economies in their actual functioning, the argumentation on the efficiency of the market outcome turns tautological — be it immediately or by means of the inclusion of *ad hoc* hypotheses. Once it is recognized that it always ends up being a tautology, the proposition about the Pareto efficiency of the equilibria in free markets ought to be deemed as meaningless, and thus should not belong to the realm of positive science.

Our reasoning leads us to analyze the role that Wittgenstein's *Tractactus* ([1921] 1981) played in the development of the neo-positivist tradition which has accompanied and promoted the creation and evolution of economics as a scientific discipline. The Vienna Circle's philosophy — an essential component of this tradition — can be linked directly to the methodological settings proposed in the *Tractatus*, precisely because it would allow a critique to the "metaphysics" embedded in propositions, seemingly coherent, but deprived (according to this conception) of any cognitive value.[16] The *Tractatus*, in fact, points to the exclusion from science of all traditional philosophical problems that — under the light of this conception — are revealed as meaningless as they cannot be referred to elementary facts.

To be sure, Wittgenstein was aware of the existence of a deep gap between the human language and the theses on language formulated in the *Tractatus* ([1921] 1981).[17] Thus, while neo-positivists made his theses one pillar of their methodology, he abandoned logical atomism and introduced language games theory, thus reviving the possibility of an understanding of human language and practices. Indeed, already at the time of the *Philosophical Remarks* ([1930] 1975), Wittgenstein elaborated a radically different conception of language[18] that would ripen in the *Philosophical Investigations* ([1945–1949] 2009). In this later work, Wittgenstein recognized the multiplicity of language games and advanced the thesis that not just language, but the

[16] Cf. in particular, Wittgenstein ([1921] 1981, Prop. 4.003 and 4.11). Among the many commentaries on the relationship between Wittgenstein and the Vienna Circle, see Friedrich Waismann (1968) and Rudolf Carnap ([1928] 2003, x).

[17] "We feel that, even if all the *possible* scientific questions are answered, our vital problems have not even been touched" (Wittgenstein [1921] 1981, Prop 6.52, emphasis original).

[18] "Die Phänomenologische Sprache oder 'primäre Sprache' wie ich sie nannte schwebt mir jetzt nicht als Ziel vor; ich halte sie jetzt nicht für möglich. Alles was möglich und nötig ist, ist das Wesentliche unserer Sprache von ihrem Unwesentlichen zu sondern." ("I no longer have the Phenomenological or 'primary language,' as I once used to call it, in mind as my goal. I no longer hold it to be necessary. All that is possible and necessary is to separate what is essential from what is inessential in our language.") (Wittgenstein 2000, 2, 118). We must clarify that the expression "phenomenological or 'primary language'" must be intended here as an equivalent to the ideal language of *Tractatus*.

description of facts and things itself is an interpretation, thereby paying a tribute to the prevailing cognitive, linguistic, and cultural structures.[19]

Concerning the philosophy of science and the relationship between the methods of natural and social sciences, it is precisely the later works of Wittgenstein that fed innumerable studies and lines of research which transcended the limits imposed by the positivist method on social sciences and economic research. In general, the need to overcome those limits is clearly evident in the mere observation that, even though economics aims at analyzing regularities and relationships among variables that are not given in nature, contrary to what happens within natural sciences, it contributes to promote a vision of the world subsequently adopted by economic actors to find their way and act within the same reality. In economics, prescriptions are continuously derived concerning questions of law, politics, environmental regulation, etc. Contrary to natural sciences, economics is also constitutional of the reality it aims to analyze.

Despite the fact that, during the twentieth century, reflections on the subjective nature as well as the sociological and cultural conditioning of knowledge have often been presented within language sciences, philosophy of science, sociology, and anthropology, the theoretical foundations of mainstream economics have remained unaffected.[20] This gap originates from the fact that neoclassical economics, by referring to the Pareto criterion and Walrasian equilibrium, has attempted to achieve the status of a scientific discipline by adopting the positivistic model of science before the so-called "second scientific revolution." This foundational paradigm, which has become a *constitutional part* of the discipline, presents a difficulty for mainstream economics to effectively reconcile its technical-scientific basis with the unavoidable references to politics, society, and history.

From here on, we proceed in two directions. First, we tackle the question of whether, within the economics' debate on externalities, analytical rigor has been respected. In particular, we look into whether the attempt to reconcile externalities and the competitive market model has been successful. We also analyze how the Pareto criterion, when used outside the limited sphere of the idealized competitive

[19] Between 1929 and 1946, Wittgenstein continued his conversations with Piero Sraffa. As Wittgenstein ([1945–1949] 2009) himself recognized in the *Philosophical Investigations*, his relationship with Sraffa was decisive in Wittgenstein's decision to abandon the conceptions on language from *Tractatus*. The theme of the relation between Sraffa and Wittgenstein, and the reasons for Sraffa's interest on Wittgenstein's theses on language — although somehow related to the issues we discuss here — would require an in-depth analysis that is beyond the scope of this article.

[20] By reviewing this debate, Fabrizio Fornari (2002, 120, authors' translation) shows how lines of thought, very different from each other, such as those of Edmund Husserl, Hans-Georg Gadamer, Émile Durkheim, or Karl Mannheim, "highlight, first of all, that any form of knowledge, be it commonsensical or scientific, is intimately connected to the socio-cultural context within which it develops, and then that the cognitive and interpretative activities performed by social actors are constitutional elements of society itself." Our claim that there are valuations hidden behind the Pareto efficiency, and that the latter implies a specific form of social relationships, can be one example of such connections, mostly overlooked by the neoclassical economic literature. The wider implications for economics of these themes are explored by Wade D. Hands (2001).

market (as it is done, for example, by the Coase theorem) takes on a totally different significance. We examine, in particular, how the application of the Pareto efficiency criterion in the presence of externalities contrasts sharply with the claim that its use would allow scientists to analyze individual choices without the need to engage in subjective value judgments — a claim that has been invoked to legitimize the Pareto efficiency criterion politically.

Pareto Efficiency, the Coase Theorem, and Externalities

As already noted, the Pigouvian analysis of externalities focuses on the discrepancies between private and social costs. Pigou's suggested that a solution was to set up a system of taxes and subsidies in order to reestablish the equality between private and social costs, so that the "right" incentives would prevail and guide private action.

Frank H. Knight (1924) developed an alternative approach that later found an essential foundation in the so-called "Coase theorem." Coase (1960) described the problem of the social cost, which was due to the presence of an externality, as if the external damage could be quantified as a reduction of the level of production of a tradable commodity. By referring to the example of a herd that enters a farmer's field and damages the crop, Coase shows that, when both the benefits to the breeder and the damages to the farmer depend on the herd size, the "socially optimal" size of the herd could be found at the point where the additional returns on the livestock activity obtained by further increasing the herd size equals the corresponding additional damage suffered by the farmer. According to Coase, such an optimal result could be achieved by letting the involved parties freely bargain — that is, by a market mechanism. What is more, the result would not depend on the legal status of the parties' property rights, meaning whether the breeder is liable for the damage caused to the farmer, or if his herd is entitled to enter the farmer's field and damage the crop. In the first case, the breeder would be willing to pay something to the farmer in order to buy the right to enter the farm. In the second case, the farmer would be willing to pay to avoid it. Coase showed that, if the parties could bargain with no additional cost, it would be in their mutual interest to reach an agreement that maximizes the joint value of the two activities, and that the outcome in terms of herd size would be the same.

According to Coase, therefore, externalities are a problem only to the extent that there are constraints to the free bargaining among the involved parties, first of which being the lack of proper definition of property rights. It is not a question of whether or not a market mechanism is capable of achieving an acceptable resource allocation. Rather, it is a problem of "missing" markets.

What came to be known as the Coase theorem[21] includes two statements: First, when a complete definition of property rights allows the parties involved to trade at no costs to them, the market would achieve the optimal solution — namely, one that

[21] As Steven G. Medema (2011) recalls, Stigler (1966) is the first one to present Coase's (1960) set of propositions as a theorem.

involve an "efficient" amount of externality and economic production, and one that maximize total wealth. Second, such a quantity is uniquely determined, meaning that it is independent from the assignment of property rights. The relevant literature terms these two statements the "efficiency proposition" and the "invariance proposition," respectively.

We must immediately note that, as Ray E. Canterbery and A. Marvasti (1994, 220) note, "Coase appears to want a social valuation based upon market prices. But since prices reflect private not social cost, the evaluation of social costs with private cost data is contradictory for Coase and Pigou alike." In other words, the Pigouvian analysis starts from the consideration that the prevailing prices, as formed on private markets, are not efficient. That is, they fail to signal the proper incentives because they do not reflect all private and social benefits and costs. In the Coasian analysis, on the other hand, both the prices of commodities and the value of external costs are taken as given. According to Coase, the fundamental problem raised by Pigou is *a priori* solved by the market, or, rather, it is completely neglected.

In addition, it is obvious that, as initially recognized by Coase himself, once the influence of the legal structure on production costs and commodity prices is recognized, the proposition on the invariance of the efficient outcome falls apart:

> Of course, if cattle-raising commonly involved the destruction of crops, the coming into existence of a cattle-raising industry might raise the price of the crops involved and farmers would then extend their planting. But I wish to confine my attention to the individual farmer. (Coase 1960, 4)[22]

Unfortunately, by defending the dominance of market logic over the law, such a dependence of an efficient outcome on the initial assignment of property rights is neglected in most of the literature that supports the validity of the "Coase theorem."[23]

In reality, the relationship between markets and the law is much more complex. Efficiency and equity consideration cannot be decoupled. The legal assignment of property rights always has consequences on equilibrium prices, when income effects, tastes, and initial wealth levels are taken into consideration.[24] To recognize the interconnection between legal assignment of rights and the way in which active

[22] Although he initially limited his analysis to the case of a single actor, thus to a partial equilibrium analysis, Coase later accepted the more extensive interpretations of the theorem as proposed, among others, by Stigler (1966), Warren G. Nutter (1968), Harold Demsetz (1972), and Robert Feldman (1974).

[23] On this, see Medema (2011, footnote 29) who states that "[t]he invariance proposition does not hold" and "this is seemingly the only aspect of the Coase theorem milieu that, to this point, had not been subject to any serious debate." The truth is not that a serious debate has not been attempted, but that those who defend the Coase theorem seem to be diminishing it (see, for example, Medema [1994] in reply to Canterbery and Marvasti [1992]).

[24] The invariance proposition has been criticized since the beginning by several authors, including Stanislaw Wellisz (1964), Guido Calabresi (1965), and Erza J. Mishan (1967). Medema (1995, xviii) summarizes the debate on this issue: "The outcomes are not likely to be the same (in the sense of an identical allocation of resources) under different initial rights assignments, owing to effects on income, wealth and tastes."

markets develop and prices form — more specifically, the link between equity and efficiency — leads to rejecting one of the fundamental rules of law and economics — namely, the normative proposition that rights should always be assigned to a "best user" in a way that reproduces the outcome of a potentially costless market transaction. In other words, the law ought to "mimic the market." Put differently, the failure is in not recognizing that who the "best user" is might depend on the distribution of wealth and relative prices and, therefore, on the initial allocation of rights that legitimated the production.

In substance, by treating it as a two-party bargaining problem, the question of a social cost is deprived of its very nature because, in the conditions described by the Coase theorem, no "social" issue would truly be at stake. Coase did nothing, but restate the correspondence between Pareto optimality and exchange equilibrium whose tautological character we already demonstrated in the first part of this essay. The similarity between the "efficiency proposition" of the theorem and the exhaustion of the incentives to exchange ordinary commodities is indeed recognized by Coase himself. Without that recognition, in Francis Y. Edgeworth's (1881) original bargaining model, the efficient solution *depends* on the initial allocation, and thus the "invariance proposition" does not hold:

> Edgeworth implicitly assumed that there was costless "contracting" and "recontracting"; and I have often thought that a subconscious memory of the argument in *Mathematical Psychics*, which I studied more than fifty years ago, may have played a part in leading me to formulate the proposition which has come to be termed the "Coase Theorem." (Coase 1988, 160)

Coase (1960) developed his argument by maintaining the same hypotheses (i.e., absence of transaction costs and given prices and external costs) for cases where the external effects involve many parties, thus suggesting a similarity with the case of bilateral bargaining.[25] Such a correspondence between a single exchange and a market can be justified by the presumed perfect symmetry among the participating parties typical of cases in which trading involves an undifferentiated commodity. When

[25] We must note here that bilateral contracting is very different from a market process. Contrary to what happens in perfectly competitive markets, in a bilateral bargaining the possibility remains that gains from trade would be dissipated by the strategic behavior of the involved parties. Cento Veljanovski (1982, 60) draws attention to this issue and, in a lucid discussion on the theorem and on the definition of transaction cost, concludes: "[T]he assumption of zero transaction costs is not sufficient to ensure that the parties settle at the gain maximizing outcome unless it is explicitly assumed that bargaining is cooperative, and this, I suggest, is to assume rather than establish the validity of the Coase theorem. ... Indeed if there is any theorem in such a world it is the exact opposite of the Coase theorem. The appropriate theorem in bargaining context is what I shall term the Johansen theorem [Johansen 1979]: Direct bargaining has an inherent tendency to dissipate the gains-from-trade through strategic behavior." Similarly, Robin Hahnel and Kristeen A. Sheeran (2009) underline the difference between game theorists' "complete information," and the traditional assumption of "perfect information," concluding that the latter is insufficient to avoid. Also, in a bilateral bargaining, the incentive to hide one's own preferences would destroy the possibility of reaching an efficient outcome.

applying it to the analysis of external effects, Coase offered a critique to the unilateral Pigouvian tax.[26] This critique was rejected by Wallace E. Baumol (1972) and by Wallace E. Baumol and William J. Oates (1975). The issue is relevant because it conceals a more fundamental problem related to the impossibility — when externalities are involved — to extend the results that hold for an individual exchange to the conditions of a competitive market.

Following Baumol and Oates (1975, 19-24), we can distinguish between *depletable* and *undepletable* externalities. For the former, the external effect is such that the impact on any individual is mitigated when the number of those, who suffer from it, increases. If it were technically feasible, the assignment of property rights in such a case would allow the exchange of an externality as if it were any other commodity, and so the efficiency property of the market would be restored. The latter are the most common type of externalities that produce damages to individuals and their effect is not lessened by the number of individuals involved. To restore efficiency in this case would require a rule similar to the one that regulates production of public goods: That is, the imposition of a tax equal to the sum of net marginal costs, with no tax or compensation for the damages caused:

> [R]ather than saying that there is no price that yields an optimal quantity of a public good (externality), it may be more illuminating to say that a double price is required: a nonzero price (tax) to the supplier of the good, and a zero price to the consumer. Of course, no ordinary price can do this job, but a Pigouvian tax, without compensation to those affected by an externality, can indeed do the trick. (Baumol 1972, 312)

Returning on the issue sixteen years later, Coase (1988, 182) at last agreed with Baumol: "[T]aken on its own grounds, the conclusions of the Pigouvian tradition are, in fact, impeccable" (Baumol 1972, 307; Coase 1988, 185). He then proceeded to reformulate his critique of the Pigouvian scheme by noting that it would require too much information to be feasibly implemented: "My point was simply that such tax proposals are the stuff that dreams are made of" (Coase 1988, 185).[27] With this argument, however, Coase moved the debate away from its logical consistency and to an empirical feasibility, thereby missing the crux of the issue.

If — as Baumol 1972 clarified — a set of different prices is required to restore Pareto optimality, the explanation of inefficiencies in terms of incomplete definition of property rights, and thus of absence of markets, must be wrong and the proposition, according to which efficiency might be restored simply by redefining the property right, must be rejected.

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[26] According to Coase (1960, 41), if a polluter is forced to pay a Pigouvian tax equal to the damage caused, the symmetry between those who produce damages and those who suffer from them requires that a "polluted tax" should also be imposed to any additional cost of pollution-reducing measures taken by those who create the externality.

[27] It may be worth noting that such "social omniscience" hidden in the "[l]ack of precision regarding 'transaction costs'" (Hahnel and Sheeran 2009, 234), necessary for the Coase theorem, could also be used to defend the Pigouvian scheme.

The question of whether externalities can be dealt with via a market mechanism can also be tackled from another perspective by noting the irreconcilability of the Coase theorem with perfect competition. The issue can be elucidated by following the treatment in Arrow ([1969] 1983), where the problem of the "exclusion principle" and the link between externalities and public goods is explicitly taken into consideration.

Arrow followed in the logical path opened by Coase, according to which, if externalities were typical commodities, the same conditions that ensure the efficiency of competitive markets could be invoked to obtain an efficient allocation. To illustrate the point, Arrow defines x_{ik} as the amount of the k-th commodity consumed by the i-th individual, an amount that, when externalities are present, is included as an argument of the utility function of many individuals (Arrow [1969] 1983, 145). Then, by defining the externality as a set of fictitious commodities x_{jik} — that is, one for each of the individuals who suffers from it — Arrow claimed that the independence among the utility functions would be reestablished:

> The point of this exercise is to show that by suitable and indeed not unnatural reinterpretation of the commodity space, externalities can be regarded as ordinary commodities, and all the formal theory of competitive equilibrium is valid, including its optimality. (Arrow [1969] 1983, 146)

Such a fictitious multiplication of commodities, however, would introduce a fundamental contradiction in the whole reasoning, given that there should be a large number of buyers and sellers for each commodity in order to invoke the "competitive" character of the market. Arrow himself admitted that "[e]ach commodity (j,i,k) has precisely one buyer and one seller. Even if a competitive equilibrium could be defined, there would be no force driving the system to it; we are in the realm of imperfectly competitive equilibrium (Arrow [1969] 1983, 146).

In what appears as a true paradox, from Arrow's own words emerges that a "competitive equilibrium" with externalities is not an equilibrium, and it has nothing to do with perfect competition. The efficiency properties that could be associated with it are summed up by the statement that "we are in the realm of imperfectly competitive equilibrium."[28] In other words, it is false to assume that a competitive

[28] It is worth recalling that to overcome the logical impossibility of reconciling perfect competition — which implies perfectly elastic demand functions for individual firms — with positions that are off equilibrium (where, given a discrepancy between the amount supplied and the amount demanded, some of the agents would be "rationed," i.e., either consumers would not be able to acquire, or producers would not be allowed to sell all the goods they want at the equilibrium price), Arrow (1959) stated that any departure from the equilibrium would mean an exit from perfectly competitive conditions. Thus, already in 1959, Arrow associated perfect competition exclusively with equilibrium positions, while, in 1969, he claimed that a situation where there is no tendency toward equilibrium could be defined as a "competitive equilibrium." A critique similar to ours has been proposed by Joseph Stiglitz (1994, 34), where he notes that Arrow and Debreu's idea of treating commodities at different times and in different states of nature as different commodities is at odds with the fact that there could never be competitive markets for them.

equilibrium can be defined in the presence of externalities, when it involves — by definition — just one buyer and one seller.

Arrow's analysis leads us to reject the conclusion that the source of inefficiencies that are due to externalities can be identified with the absence of a market because of prohibitive transaction costs. Our rejection is motivated both by the correspondence between theory and facts and for analytic reasons. In facts, it is difficult to conceive the *real* possibility of bargaining for each external effect, especially when the externality is undepletable. It is also very problematic (to say the least) to extend the concept of transaction costs to include the cost needed to increase the number of agents who trade a given externality in order to ensure competitive conditions. Even if we accept this, such an instrumental use of the concept of transaction cost would be in contradiction with the externality-commodity division that Arrow proposed. No matter how creatively one interprets transaction costs, nobody can violate reason to the point of cloning the same commodity in a way that each individual would identify his/her own one, and of claiming that, for each of these commodities, there would be enough buyers and sellers to ensure competitive conditions.

To summarize, the "invariance proposition" of the Coase theorem does not hold, owing to the fact that different rights assignments — via the effects of income, wealth, and tastes — will impact prices. Moreover, the "efficiency proposition" of the theorem in its initial formulation simply states that a complete definition of property rights, when the parties could engage in costless bargaining, would eliminate inefficiencies. Given the equivalence between the definition of efficiency and the description of an exchange equilibrium, such a statement is a tautology. Although tautologies, as we have seen, are not "false," they do not refer to any real situation, but only to the logical consistency between the component parts of a proposition. Here the proposition at stake is that, if there are only two parties involved, costless "contracting" and "recontracting" on an external effect could have an efficient outcome. Shifting from the purely logical ground to the empirical one — that is, to the analysis of the correspondence with possible real phenomena — the truthfulness of the proposition could indeed be ascertained, depending on the specific circumstances.[29] What we want to highlight is that, when analyzing such circumstances — and, more generally, when answering the question of whether market mechanisms might indeed be adequate to address externality problems — it is important to clarify what we mean by externalities, rights, and property rights, and how market forces operate in the real world, including by specifying what exactly "transaction costs" are.

On the other hand, given the very nature of external effects, any attempt at extending the validity of the Coase theorem's efficiency to competitive markets, as opposed to bilateral negotiations, causes a contradiction. The Coase theorem, therefore, should be considered either a tautology (when interpreted with reference to a single bilateral bargain) or a contradiction (when extended to competitive markets). That is, the theorem is one of two extremes that Wittgenstein identified as the boundaries of meaningfulness of propositions:

[29] See footnote 25.

> The proposition shows what it says, the tautology and the contradiction that they say nothing. The tautology has no truth-conditions, for it is unconditionally true; and the contradiction is on no condition true. Tautology and contradiction are without sense. (Wittgenstein ([1921] 1981, Prop. 4. 461)

A non-arbitrary use of the terminology and a correct application of the analytical method makes it clear that — contrary to what the relevant literature has proposed — it is impossible to apply the efficiency features of competitive markets to the case of external effects. The statement that, "under perfect competition private and social costs will be equal,"[30] must thus be rejected.

Coasian vs. Pigouvian Solutions: Market, Equity, and Institutional Problems

The Pigouvian approach, based on the idea of "market failures," recognizes the need for public policies in order to "internalize" external effects. Although a Pigouvian tax would eliminate neither the violation of the Pareto criterion (they do not prevent a reduction in the welfare of those who suffer from the effect), nor the increase in production costs, it could be used as a compensation mechanism. Moreover, the need for preliminary assessment of benefits and costs, associated with the economic activity before a market mechanism may generate "efficient" reference prices, makes it clear that a reference to something other than the ability to the involved parties to pay can still preserve efficiency.[31] Choices concerning the quality of the environment, as well as other problems relating to rights and distributional equity, may preserve their independence and autonomy from the market laws.

The Coasian approach, on the other hand, treats externalities as commodities, and the problem of determining the prices and costs of external effects is taken as solved *a priori*. Reference to the Pareto criterion, coupled with the Coase theorem, leads to the conclusion that public intervention, if needed, would be legitimate only in the absence of a market. Public policies are thus judged in the context of the free market logic and are limited to interventions intended primarily to favor market functioning — that is, to reduce transaction costs, or even to impose market mechanisms where they do not exist.

Even though both approaches refer to the concept of Pareto efficiency, they diverge regarding the role the criterion plays and the domains that it covers. In the

[30] Stigler (1966, 113; see also Conley and Smith [2005] and Cerin [2006]). Medema (2011, 21) also considers this point, arguing that "under Stigler's version of perfect competition, perfect knowledge preclude the sort of bilateral monopoly situation that could interfere with the bargaining process contemplated by the Coase theorem." The statement stems from the proposition by which, essentially, the hypotheses that define perfect competition necessarily include the absence of transactions costs (in its broadest definition, inclusive of those relative to imperfect information). As we demonstrated, such an instrumental use of the concept of transaction cost is intrinsically contradictory.

[31] We must, however, emphasize that, although the Pigouvian position implies such a possibility, the prevailing attitude is still that of trying to evaluate any externality in monetary terms by making direct or indirect reference to market valuation methods (see, for example, Freeman 2003).

Pigouvian approach, the efficiency of *actual* markets in the presence of externalities is assessed through the use of the Pareto criterion, and the conclusion is that there is a "market failure."[32] Within the Coasian tradition, the inefficiency is explained by the absence of a market**,** but not of any real market — rather, it is an abstract, purely *ideal* market. The circularity of the argumentation creates an illusion by which what is *assumed* (that is, a specific efficiency definition that coincides with the logic of market exchanges) appears as proof (that is, that market operation leads to efficiency). It is only because of this illusion (created by a logical truth, i.e., a tautology, rather than by an empirical test) that the Pareto efficiency becomes a fundamental reference for the definition of a legal system and optimal public policies. A truly *political* decision — that of organizing our economic systems according to market criteria, as well as of evaluating any resource based on hypothetical market values — is presented in most economic literature as if it were a scientific result.

To illustrate how the different use of the Pareto criterion in the two approaches could lead to different conclusion, we refer to the work of James M. Buchanan and W. Craig Stubblebine (1962). Following Coase (1960), these authors introduce the definition of "Pareto relevant externality": There would be economic inefficiency only in so far as potential economic gains from the elimination of the damaging effects exist. The difference between this and the Pigouvian approach (which considers inefficient any externality that is not reflected in the system of prices) is striking: Now the same external effect can generate inefficiencies or not, depending on the income of those who are impacted by it. Moreover, the focus is shifted from the need to internalize the damage cost, to the objective of maximizing wealth, as far as the latter can be measured in monetary terms. The hypotheses of the Coase theorem become normative prescriptions:

> Overcoming transaction costs is seen as simply removing an obstacle to what the parties would do with their current distribution of assets, but overcoming income effects would amount to meddling with distributive elements, and the orthodox consensus is that it lies outside the scope of an economic approach to law. (Halpin 2011, 98)

What is disturbing is the lack of consideration of distributive elements (associated with the idea that transaction costs have to be reduced as they are a source of inefficiencies), the existing impediment to bargaining, and the fact that "the law should determine the outcome of competing interests so as to encourage a result that would have occurred through a process of unimpeded bargaining" (Haplin 2011, 100). Within the Posnerian law and economics (and not only there), "wealth

[32] We think that the expression "market failure" is nevertheless ambiguous. If we consider that virtually any element of reality introduced in the neoclassical model determines a discrepancy between market outcomes and efficiency, it would be proper to say that the "failure" is not of the market, but rather of the neoclassical economic model of the market. Particularly valuable is, in this respect, Julia Black's (2013) suggestion that, to be meaningful, economic analysis should borrow from other social disciplines and abandon the absolutely abstract conception of the "market" typical of neoclassical economics.

maximization" becomes the key principle of evaluating pollution damage, the assignment of property rights, and assessing the consequences of legal decisions on the economic activity in general.[33]

The Coasian view justifies choices on the use of economic and natural resources based on free market logic when such choices are mainly political or legal in nature. This leads to a complete abandonment of both the original context and significance of the Pareto criterion and of the basic justification of its acceptance in economic theory. Initially accepted by Lionel Robbins and the neoclassical economic theory, the Pareto criterion assumed the role of a device to separate economic efficiency from distributive equity — that is, to separate claims in positive science from political, legal, or equity claims. Consistent with methodological individualism, the Pareto criterion aimed at protecting individual choices from external interferences based on the fundamental argument that the economic agent must be the only one entitled to evaluate his/her own interest. In such context, Pareto improvements are true welfare improvements only in so far they are the result of free individual choices. By excluding the legitimacy of interpersonal comparison of utility, it also implies that no economic argument could ever be used to support redistributive intervention.

All this is at odds with the Coasian view of markets and the Coasian applications of law, public choice, and environmental policy. In the latter case, applications of the Pareto criterion always imply unacceptable value judgments, hidden in the interpersonal comparison of utility and rights based on one's ability to pay. There must be something clearly wrong in a line of reasoning that starts from a definition of efficiency which treats interpersonal comparisons as illegitimate when they call for improvement of the conditions of the poor, but declares them valid when they entail worsening of said conditions.

Conclusions

We analyzed the Pareto definition of efficiency, showing that it coincides with the definition of a social relationship based on the exchange mechanism. We then argued that the result of Pareto efficiency of competitive equilibria could only be interpreted as a tautology.

Using Wittgenstein's reflections on the cognitive value of tautologies, we deconstructed some fundamental ideas from the economic debate about externalities, highlighting that a tautological core and analytic contradictions can be identified in

[33] Although not directly linked to the theorem, one logical conclusion of treating externalities this way has been the idea that it is possible to arrive at a decision to export toxic waste to poor countries in compliance with economic efficiency. *The Economist* (February 15, 1992), for example, published a memorandum by the then chief economist of the World Bank, Lawrence Summers, stating: "The measurement of the costs of health-impairing pollution depends on the foregone earnings from increasing morbidity and mortality. From this point of view a given amount of health-impairing pollution should be done in the country with the lowest cost, which will be the country with the lowest wage. I think the economic logic behind dumping a load of toxic waste in the lowest-wage country is impeccable and we should face up to that. ... I've always thought that under populated countries in Africa are vastly under-polluted" (cited in Peter 2004, 2).

the Coasian tradition. Our opinion is that the origin of these contradictions is in the logical impossibility to devise a competitive market for externalities. Competitive markets are such precisely because every dispute among individuals is settled through voluntary exchanges, so that an individual action becomes irrelevant in the sense that it is not causing any harm to those who are not involved in the transaction. Such *social irrelevance of the individual action* is, in other words, a defining feature of competitive markets.

The concept of externality is related to those elements of direct interrelation among individuals that characterize any conceivable social context. Externalities are not a problem because of the "absence of markets," in turn, due to the presence of transaction costs. Rather, they are linked to the intrinsically social nature of the context within which *any* human action — including the economic activity — is performed. The analysis, grounded on the Coasian tradition, first conceals the social aspect of economic relationships and then applies the Pareto criterion (which refers properly only to market relationships) to non-market contexts. A proposition on competitive market efficiency that is true only on a logical-formal ground is proposed as if it were derived from sensible propositions (i.e., propositions that can be subject to empirical validation): A political proposition is presented as if it were the result of a scientific inquiry.

In distinguishing purely logical truths from truths based on facts, we referred to Wittgenstein's theses in *Tractatus*. Even as we are aware that the current debate on methodology in social sciences (including economics) is no longer confined by the boundaries of the logical positivism of the 1930s, we still believe that a theory must not be formulated in tautological terms.

In spite of its evolution over the years, neoclassical economics has kept a link with the original foundation established by Walras and Pareto. Even Robbins's proposal to exclude any value judgment from the scope of economic science can be interpreted as an attempt to separate opinions from facts — that is, to build an "economics" with the characteristics of a positive science. The debate over externalities has revealed that the Pareto criterion, given its roots in positivism, cannot be properly applied in this case.[34] In particular, Arrow's attempt to extend the proposition on efficiency of competitive markets to the case of externalities can only proceed through *ad hoc* linguistic adjustments that violate the very definition of competitive markets — and thereby failing. It causes contradictions that render "analyticity" — the method of verifying the internal consistency of a set of hypotheses and definitions — not properly used to its purpose. In the example we discussed, the

[34] An essential element of logical positivism is to maintain that only propositions that are empirically verifiable have a cognitive value since they can affirm the existence or non-existence of the phenomena they describe. By contrast, a purely logical inference that does not refer to any real things necessarily ends up in a "tautological transformation." "The second basic error of metaphysics consists in the notion that thinking can either lead to knowledge out of its own resources without using any empirical material, or at least arrive at new contents by an inference from given states of affair. Logical investigation, however, leads to the result that all thought and inference consists of nothing but a transition from statements to other statements that contain nothing that was not already in the former (tautological transformation)" (Neurath [1929] 1973, 308).

debate has failed, in our opinion, to reach the conclusion that analyticity would have suggested: namely, to recognize the impossibility of treating an externality in the context of competitive market models.

Despite its notable legal and institutional implications, the economic debate over externalities has progressed without the necessary criticism toward the non-neutrality of its underpinning positions. It has remained the case notwithstanding the fact that, thanks to progress in the philosophy of science, in linguistics, and other social sciences — including some heterodox strains of economics itself — it had been recognized that any form of knowledge is historically conditioned. The substantial lack of attention to any historical, social, or political elements of mainstream economics is particularly evident in the fact that the Pareto criterion has not been recognized as a specific form of social relationship — namely, a market relationship. Moreover, as we noticed, the debate over externalities has failed to recognize that the nature of the "efficiency" concept would change, depending on its use relative to the problem of social cost. The Pareto criterion, originally devised to protect the individual's freedom of choice from external interferences, becomes its opposite when it is utilized outside of the market setting. It becomes the justification for the right to expropriate some of the individual's rights to benefit others, thus violating the fundamental objective of neoclassical economics as a science that should avoid interpersonal comparisons of utility.

Our main conclusion is that generalizations of the Pareto criterion, extended to the case of externalities, cannot be defended by any argument based on positive science. The Pareto criterion, and any reference to market efficiency based on the Coase theorem, should not be used to justify institutional, legal, or environmental policy.

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