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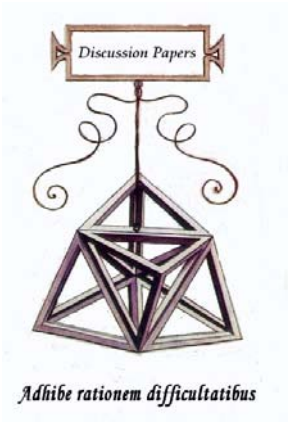

Paolo Mariti

The BC and AC Economics of the Firm

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Discussion Paper
n. 4

Paolo Mariti

The BC and AC Economics of the Firm*

Summary

The BC and AC Economics of the Firm

This paper provides an initial rational reconstruction of Coase's unmistakable way of doing economic analysis in a manner coherent with his objectives (and mine). It is founded on his microanalytics as extended, refined and clarified by Williamson, Alchian, Demsetz, Ménard, Foss, among others. It goes without saying that it does not purport to answer the impossible question of "what did Coase really say?".

Firms are normally depicted in marginal analysis as almost exclusively concerned with possible costs and revenues: as having a profit-and-loss account but no assets-and-liabilities statement (or balance sheet), i.e. as if they had no structure in terms of resources and related property-rights, and debts. That is possibly one of the main reasons why an increasing number of scholars see much of firm theory as a "bodyless discipline".

There are differences under many respects between standard treatments and Coase's but they are not desperately conflicting or diverging. Rather, it is possible to show that much of received firm economics can be reinterpreted

* On the occasion of the award to Ronald Coase of an honorary degree in Paris, Oliver Williamson reported (2000, p.53) that *"...George Stigler once distinguished between BC and AC economics, where BC refers to 'before Coase' and AC to 'after Coase"*.

and salvaged by "regionalizing" it, i.e. by showing that it is a special case plausible under the very restrictive set of assumptions most clearly spelled out long ago by Léon Walras. In most standard treatments they are all uncritically and - what is even worse - implicitly retained even when partial equilibrium analysis is at issue. I maintain that they should be abandoned to take full advantage of the AC approach, thrust and potentialities. Present paper is a starting step in that direction, first i) by giving operational definitions to such concepts as cost and "transaction", and ii) by introducing a vision of the firm as a set of activities or functions very much in line with Coase's (and Stigler's); secondly, iii) by following Klamer and McCloskey's ideas as to the master metaphor of economics, and some of Shubik's suggestions, and thus making some explicit recourse to the time-honoured micro-accounting framework of assets and liabilities along with profit-and-loss statement. Most footnotes are devoted to more technical details on these matters.
The case of a pure retailing firm offers an example embedded in a highly simplified balance sheet. It is possible to show: 1) how standard-cost minimizing analysis is useful when carefully used in solving observable problems such as the inventory problem, experienced also by most manufacturing firms, and 2) how a reinterpretation of it all is made possible thanks to the AC approach that reveals itself to be both rigorous, "down-to-earth", and potentially allowing for inclusion of a host of facets of ordinary business life. By the way, one result is that asset specificity and opportunism are not necessary to determine the size and boundaries of a firm. Some further research lines are in the end summarized.

Classificazione JEL: **B41; D23; L00; L22; M2; M4**
Keywords: **Firm Theory, Coase, Transaction Costs, Business Economics, Accounting**

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The BC and AC Economics of the Firm

A first essay

> ""…..by and large, dissatisfaction is not with the basic economic theory itself but with **how it is used**. The objection essentially is that the theory floats in the air. It is as if one studied the circulation of the **blood without** having **a body***"* (1984; p. 220). (emphasis added)
>
> "We will **not replace** price theory.....but will put it in a **setting** that will make it vastly more fruitful" (1999; p.5.) (emphasis added)
>
> Ronald H. Coase

1. The problem

The theory of the firm has undergone during the last decades a "quite revolution" [Demsetz, 1997, p.426] which is far from exhausted [Williamson, 2000a, 2002]. This has been achieved by rejecting some assumptions that are to the core of received theory of competitive firm: i) that there are not market frictions; ii) that technology and prices are know freely to all relevant parties and iii) that owners are effective in controlling the use of their assets. I will show later in the present work that other more specific and

"hidden" assumptions need to be released to expand even more fruitfully Ronald Coase's theory of the firm (1937) which is at the roots themselves of the overall revolution anyway. For the moment, if there are positive information costs, a role for managed organization is granted. If information is imperfect, incomplete and asymmetric owners and manager may well be a source of productive efficiency. Lazonick criticism [1991, p.3] that Coase's firm collapses to a passive player that emerges out of a "market failure" - very much like Venus out of the sea - rather than out of "organizational success" was perhaps well taken in itself. As a matter of fact an even rather formal theory of agency (for a survey: Eisenhardt, 1989) and much work in the field of organization has been developed thanks to Coase's fundamental insight. There is currently a well flourishing literature which cannot even be accused of totally lacking empirical flavour [Foss, N., 2002 and papers therein]. The firm as a governance structure is both an organizational construction - rather than a production function which is basically a technological construction [Williamson, 2000a, p. 25] - and a "behavioural entity" [Kreps, 1990].

Organizational aspects and agency problems are of course of much relevance but they will not be explicitly dealt with here. The same applies to firm ownership and the ownership of firm asset problems. They are phenomena that are at present in search of a deeper explanation to be used in connection with organization and efficiency issues [Foss, K., and Foss, N., 2000]. The main reason for the choice to leave them out of the picture is not that they are of small significance, rather because what appears to be in a stage of underdevelopment - both analytically and from an empirical point of view- is the theory-of-choice and behavioural side on the market of Coase's contribution [Ménard, 1997; Werin, 1997]. More particularly information, use-of-the-market (or firm-to-firm) transactions and institutional production structure problems not involving agency or internal organizational relationships have been rather neglected in spite of Coase's research proposal [1972]. Why this is so depends on many reasons that can be found elsewhere [Foss, N., 1994, 1996; Demsetz, 1997 and others].

After acknowledging the main weaknesses of his supposed archetype of firm based on the use of the employer-employee relationship, Coase clearly restates his key idea originally in "The Nature of the Firm": "*the comparison of the costs of coordinating the activities of factors of production within the firm with the costs*

of bringing about the same result by market transactions or by means of operations undertaken within some other firm" [Williamson and Winter, 1991, p.65]. In other words, though in principle the gains which accrue from the birth of the organization come from a reduction in transaction costs, the main share of transaction costs that are saved are those which would otherwise have been incurred by making recourse to market transactions between the factors presently cooperating within the organization and the organizers themselves. For these reasons, amongst many others, Coase's analytical approach is indeed considered able to lead to more realistic models to understand problems of the firm as it is [Hsiung and Gunning, 2002], in a world of fundamental or true uncertainty.

One point needs clarification. From a methodological point of view a model is realistic not because the assumptions on which it is based are realistic or because its predictions are correct most of the time (the "as if" idea), rather because the assumption are apt to shape the analysis well enough in accordance with the problem at hand and the aim of analysing it. Whether assumptions are "realistic" or not depends on the problem provided that it *is* a realistic problem in itself. By realism of the problem I mean a problem that firm do experience in their ordinary (and long run) business life and thus can be observed in a real world. Realism of the problems makes for "realism" of the assumptions together with research aims. Assumptions should not and can not be completely realistic though: there are factors that we leave out because completely irrelevant and others whose inclusion would complicate the analysis adding very little to understanding the microanalytics of a firm problem and behaviour. "*Other factors are left out because we just do not know how to handle them"* [Coase, 1993, p.97].

All this is of course at odd with the fairly common practice of making assumptions for the sake of handling "armchair" or "blackboard" problems or to solve "tractability" problems. *Ad hoc* assumptions lead to a methodological failure that can be qualified as "*ad hoc-ism*" or, paraphrasing a well known dictum: "*ad hoc, ergo propter hoc"*. For "Coase's realisticness" see Mäki [1998, p.65]

Incidentally similar considerations apply to organization economics where "...too often the questions that the latest paper seeks to answer arise not from consideration of puzzling aspects of

observed practice or from present trends in business organization but from the desire to extend the analysis in an earlier paper that, in turn, may have been only tenuously connected to observation"[Milgrom and Roberts, 1996, p.465]

In this first essay, I take a practical approach and try to give operational meaning to some concepts that are critical to theory of business decision-making. I also provide a simple model of a problem widely experienced by most firms that demonstrates how Coase's approach is indeed far-reaching, encompassing and providing coherence and cohesiveness to analysis. The two quotations appended and several of Coase's recent observations on the nature of transaction costs [1988] set the central problem discussed here. This is related to managed coordination in a world in which the future is chronically uncertain or simply "unknowable". Fundamental or radical uncertainty, i.e. non-ergodicity, is all too often ignored or conflated with bounded rationality and behavioural uncertainty [Dunn, 2000; Morroni, 2003]. Coase explains that factors organized within the firm presently and over time include both people and things that agree to obey the directions of the organization's organizer for remuneration. He also notes that the relationships between the costs of organizing and the costs of transacting "*are extremely complex, involving ...pricing practices, contractual arrangements and organizational forms*" [1988, p.47]. They include problems of product choice, inventory, investment of any type and magnitude, marketing policies, and scope of operations as well. In particular problems such as manufacturing and selling must be seen as part of the same process leading to produce goods and services *and* sell them while "[*w*]*hat happens in between the purchase of the factors of production and the sale of the goods that are produced by these factors is largely ignored*": Besides "*the times of delivery, the quantities to be dispatched, and the places to which they are to be delivered are not, for purchases of most commodities, matters of 'minor importance'* [Coase, 1988, p.41-2]. A more comprehensive understanding of the organization of economic activity, on one side, and required firm decisions, on the other, asks for a greater sensitivity to the interdependence of production and exchange relations within the firm itself and amongst firms [Madhok, 2002].

This paper is the first of a broader research to show that there is indeed an "AC economics of the firm". Though under several respects diverse from the more standard, it is not devastatingly

conflicting with it nor is it an alternative to it. Much of standard (comparative static) economics of the firm can be preserved. In many cases it can be "regionalized" by showing that it is often a special case of the broader, more cohesive and yet rigorous Coasean economics. An attempt is here specifically made: i) to provide an operational meaning to some crucial concepts and definitions such as "transaction" and "cost" in order ii) to reach a point where the use of some formal analytical tools can be introduced to obtain neater results. This will allow to extract both heuristically and operationally richer analyses from what are often very powerful insights about the organization of industry while (critically) retaining some of the more standard ones. Unless all this is done, (I think) the subject of transaction cost economics would all too often risk to remain on a general level only and could even collapse into vagueness when used by apprentices. A somewhat similar point and line of thought is the work by Dietrich [1994]. His treatment is more bending than present paper towards what Foss [1994] would qualify as the tradition that has developed Coase's "neoclassical" side.

2. "Il faut reculer pour mieux sauter"♦: back to the master metaphor of economics

Foss [1994] shows neatly that there are two Coasian traditions leading to differences in terms of conceptualisation of behaviour, mode of explanation and development of his insights and ways of theorizing. The problem is now to show how to provide substance to all that. This is done through a more critical use of some of the rigorous analytical armoury of the orthodox approach.

Standard treatments of the firm decision-making are very unapt under too many respects to host matters of "major" importance such as those indicated by Coase. This happens because of the very restrictive set of assumptions on which they are based. Firms are normally depicted as almost exclusively concerned with possible costs and revenues: in other words, as having a profit-and-loss account but no balance sheet, as if they had no structure in terms of assets and liabilities, property-rights and resources. "*The firm and the market appear by name but they lack any substance*" [Coase, 1992, p.714] . That is possibly one of the main reasons why

♦ "One must take steps back before making a leap" French proverb; "You have to know your Song to know your Path".

an increasing number of scholars see much of firm theory as a "body-less discipline"[1].

To provide a reconstruction of and to operationalize Coase's microeconomics of business decision-making in a way consistent with his own objectives a close scrutiny is done of his workings and of relevant literature [Williamson, 1975, 2000a; Alchian, 1959, 1981; Foss, N., 1994, 1996; Demsetz, 1988, 1997], amongst others. Williamson [2000a] provides a most interesting scheme of the various settings to frame New Institutional Economics. My claim is that a further step backward is also needed for jumping ahead when the institution or decision-making entity to be analysed is the firm, i.e. the sole producer of goods and services for sale to others on and through the market. The latter is, in its turn, the institution where property rights to these goods and services are exchanged. Markets do not produce goods or services; they signal and reveal opportunities of production and exchange upon which firms can build their operations, organize their activities and prosper by selling their products and services [Kirzner, 1963][2].

Klammer and McCloskey [1992] discuss convincingly (I think) that sometime "*economics went ashtray*". Their main tenet is that the double-accounting principle is the master metaphor of economics and by pushing it off the scene, economics was made a body-less discipline. They argue that "*Economics is ....dominated by accounting ideas and ....little else. Cost and benefit, rationality calculation depend on a set of books as a closed system....,stocks and flows, capital and income; output net of depreciation; expenditure equals cost; the circular flow; scarcity, choice under constraints. Economists thinks and calculate with accounting*". (p.

[1] Note that in the appended Coase's quotations "blood" can be looked at as a *flow* variable while "body" as a *stock* variable. A Profit and Loss Accounts riproduces only flows; a Balance Sheet reproduces stocks.

[2] In Coasean economics the firm and the market are sometimes presented as being alternative institutions. This is certainly true as regards allocation of resources: in the market resources are allocated *via* the price system while in the firm by fiat or hierarchy. This is the more developed area of research. Markets and firms are nonetheless complementary: most of production happens in firms; the great bulk of exchange takes place in markets. Markets can exchange anything but they produce nothing and the great part of exchange is firm-to-firm. That is why we need a closer analysis of production and exchange as complementary phenomenon as suggested by Coase in his proposal of 1972 and more recently[1992;1994,ch.1] by introducing the perspective of "*institutional structure of production*". I owe this point to a discussion with Prof. Lorenzo Bianchi, University of Venice.

145). Further examples are provided by National (or Social) Accounting in Macroeconomics, Balance of Payments in International Economics, credit multipliers in Monetary Economics; and Ronald Coase "theorem" of 1959 "*was merely a careful accounting of costs and benefits from pollution"* (p.153). And "*What gives Coase's paper its magical power, aside from its fine attention to legal details, is the accounting framework it imposes on the world*"(p. 154).

Nicolaj Foss's reconstruction of the two Coasian traditions [1994, p.48] and the work by Klammer and Mc.Closkey have had much impact on present work and research agenda. Recent invitations towards a reconciliation of economic theory and, among other things, micro-accounting can also be found [Shubik, 1992, 2003]. The idea is to provide the economics of the firm with a set of definitions taken from micro-accounting as is the case with macroeconomics and national accounting, international economics and balance of payments and the like[3]. The key relevance of working with definitions- such as those provided by accounting - in which appear many different variables is that they are *meaningful truisms*: i) the component variables are quantitative descriptions of relevant and significant aggregates or component parts of a firm and ii) they are determined with some degree of independence of each other. From a pure double-accounting point of view they should square up (unless mistakes were made). From an economist point of view a definition may be used as an equilibrium condition (when variables are suitably defined and measured). Very useful relationships in the form of ratios may be obtained by using the interlocked variables appearing in these definitions (e.g. asset or debt preference ratios). They describe the general frame of preferences of people in the firm, they are rather stable (though changeable) and are expressed in quantitative terms.

There are also many other places where accounting theory and principles are useful. Interesting developments for didactic purposes are geared to the "Business-Plan approach" [DeBoer, 1998]. In European competition policy and antitrust cases more and more

[3] For quick references to basic accounting see the following entries: "d*ouble-entry bookkeeping"* [Yamey];"a*ccounting and economics*" [Whittington]", and related entries such as "*balance of payments*", *"assets and liabilities", "cost accounting", "inflation accounting",," overhead costs",* and the like in Palgrave's Dictionary of Modern Economics (1987), Mac Millan, London.

economics is introduced and the two contiguous disciplines come toa very close touch: a mastery of the two is surely a prerequisite for holding a good position in antitrust agency [Jovanovic, 1997, p.148] . One should like to note incidentally that recent financial scandals should also draw attention on the sharp split-off of formal education in economics from modern accounting theory and practice. This progressive gap may jeopardize a deeper understanding of the world of firms and represent a waste of a much relevant information for new ideas and testing of theories [Coase, 1990; Pin, 1999; Stonemann and Toivanen, 2001; Shubik, 1993, 2003].

Here there is no room to discuss *when* economics went ashtray and *who* is most responsible for that. It all can be found in Klammer & McCloskey's. Rather I take a more constructive view by digging out some places *where* it surely did, it still uncritically does and showing through an example how to get back to more down-to-earth and encompassing paths for analysis of firm economics. The very restrictive set of assumptions on which standard treatments are based are precisely those which were originally made by Léon Walras, the great father of general equilibrium, for the sake of finding a *mathematical* general equilibrium of prices. Such assumptions are almost invariably soft-pedalled if not outright unmentioned in standard treatments of the firm. Walras's assumption are uncritically retained and - what is even worse - they are passed unnoticed even there when what is at issue is partial equilibrium analysis[4]. What is required for a leap forward is that assumptions that Walras himself regarded as implausible be abandoned. Reading his *"Lesson 19"* [1954, pp.227-236] – carrying the title "*The Entrepreneur. Business Accounting and Inventory* "- is most rewarding indeed. He explains at some length both the profit and loss Account of a business and the balance sheet and many other related ideas. Then, just a few pages

[4] Take any of the best introductory, intermediate or advanced texts of Microeconomic to check these points. By way of an example Stiglitz, J. Microeconomics. The Author is one of the few to introduce a Profit&Loss Account explicitly in the main text of chapter 13. He also devotes some space to explain differences between economics and accounting. In ch 22. In general, economics and accounting definitions, concepts and analysis rarely go toghether and they do appear to be inversely correlated with the degree of advancement in the treatment of microeconomics. One may even ask if and when and to what extent an economist is exposed to accounting theory and principles during his training.

before starting to elaborate formally his general equilibrium theory, in § 198 he writes statements that are worth quoting in full [p.233; underscore provided]:

> ."We have made things as simple as possible. In practice, however, there are certain complications of normal and not exceptional character to which we must call attention :
>
> (1)The entries [in business accounts] are neither found nor made in the aggregate, but always piecemeal.....not in a single transaction, but in a series of transactions".
>
> (2) I do not necessarily sell for cash, but on credit.....;
>
> (3)... My customers.....do not usually settle their accounts in cash, but either in promissory notes.....,or in bill of exchange..."
>
> (4) there is still more to this. Ordinarily I do not collect my bills, but negotiate them with a banker...."
>
> (5) Moreover I do not usually buy for cash, but on credit."....
>
> (6) Here again, after a certain period of book credit, I pay the bills of my suppliers....not in cash....either in promissory notes or bills of exchange...."
>
> (7) Finally, I never let myself run completely out of stock, whether of raw materials or products, at my inventory dates. If I did, it would mean that at the end of each period I should be interrupting the operations of my business, which would be entirely useless, if not wasteful. Consequently, as I sell [furniture] I constantly replenish my stock [of lumber and cloth]"

While enumerating all the assumptions made to simplify, Walras explains carefully the key principle and methods of double-accounting bookkeeping providing many numerical examples, and ends with pointing out:

> " these methods, which are derived from everyday experience, will be found to be completely in harmony with our earlier concepts, thus proving that our theory of production is indeed founded on reality" [p.228]

and again (p.231):

> "We have here a striking example of the way in which theory and practice owe it to each other to be of mutual assistance, for surely,

> industrial practice, when translated into accounting terms, can help enormously in the formulation of a theory of production...".

At the very end of *lesson 19*, just before starting to develop his general equilibrium theory he writes (p.236):

> "Having established our definitions both in theory and in practice, we are going to suppose that our entrepreneurs make neither profit nor loss; and we shall leave out of consideration, as we have said [before],..... the entrepreneurs' working capital in the form of raw materials, new capital goods, new income goods and cash on hand.....And we shall show how current prices of products and of services are mathematically determined in a state of equilibrium"(underscore added).

Walras emphasis is on the efficiency of coordination and resources allocation through the market, i.e. relative prices. So long so good. The great refinements and developments that general equilibrium has received after Walras are astonishing contributions to economic science. However, it looks as if they have veiled the actual business economics and its structural, institutional and evolutionary (or dynamic) nature. What is truly disturbing is that all previous assumptions are uncritically retained in modern standard treatments of firm microeconomics even in a partial equilibrium setting. What Walras qualify as "*complications of normal and not exceptional character to which we must call attention"* are not even mentioned in most standard treatments. That accounts for Coase observation [1978, p.244]: "*It is not general theories which we lack, but theories which explain the working of our actual economic system*".

The typical argument in favour of such a way to proceed is of course: a thing at a time. That time rarely comes though. Starting with this paper I attempt to show how some concepts that are crucial to solve real (not imaginary) problems can be made operational and incorporated in a Coasean model more able to host many aspects of business life at an earlier stage. Assumptions must be evaluated and proportioned in relation to the analytical purpose at hand. Of course, the aim of removing some assumptions that were explicitly made for the purpose of general equilibrium analysis is not to give new answers to traditional questions posed in that context. Rather, it is to find answers to different questions.

This require as a first step that : i) the two related concepts of "transaction" in Coase's be clarified; ii) the notion of cost be made operational in line with the suggested approach, and iii) the firm and its boundaries (and ultimately scope) be circumscribed or demarked. What under i) and ii) is defined in a way that owes much to Coase's own work [and Stigler's (1951) too] and, respectively, to accounting theory and practice. Point iii) sheds light on Coase's firm overall vision. The problem presently chosen to provide an example is, in the word of Walras, that of *"constantly replenish[ing] the firm stock"* or the inventory problem. This is a problem that almost all firms do face.

The level of treatment is kept simple. Some authors beside Coase find that there is an use as well an abuse of economic theory, where abuse means that there is frequently excessive focus on sophisticated theory at the expense of elementary theory even in practical policy and decision making [Klemperer, 2003]. Definitions and tools used should not be out of proportion with the problem at hand and be properly matched with it. Why to use a pistol to kill a mosquito? Of course that does not mean that all economics or indeed all firm economic problems can be tackled using introductory economics alone. One cannot possibly be against deeper economic theory. Coase surely is not [Mäki, 2003] (nor am I). Nonetheless it is necessary to first agree on simple ideas before going on to more complex ones.

The basic or *simple transaction* of a business is customarily defined as "*a part of the normal operating activities of a firm"*, [Pratt, 2000, p.765] , i.e. an identifiable operation carried out by (or thanks to) a firm that transforms or converts or sells (or provides a service to) an asset or a resource whatsoever. All transactions imply a contract - which may be written or not. In either case there are transaction costs. There is always a danger that the concept of transaction cost be defined too broadly [Hodgson and Knudsen, 2003, p.5]. Negotiating the terms of purchase of goods on the phone is a cost of using the market. Searching, negotiating and defining labour force contracts leads to transaction cost. Prescribing a work assignment is instead a cost of management. By the way, the invitation by Coase (and Williamson) to study contracts should be taken very seriously particularly when activities of the firm are at the stage centre [Coase, 1991]. Contracts are the basic means for firms to organize their transactions with resources suppliers and exchange property rights on such resources. They modify the assets

and liabilities structure of a firm and thus their overall organization and market thrust.

Most if not all transactions conform to the double book-keeping principle[5]: every transaction affects at least two accounts by the *same* amount: examples are the sale of a firm's merchandise inventory or the provision of services expected in the normal course of a business; when inventories are sold on a "pay-out-of-cash system" their value decreases, on one side, by as much as cash increases, on the other. Should the payment system be different, e.g. deferred, the offsetting figures may be more than two and accounting problems of economic and financial nature may arise because of the passage of time. The mere double accounting principle works its way out anyway. This obeys the fundamental accounting equations **A=L+V,** i.e. assets (**A**) equal liabilities (**L**) plus owners' equity or net value of the firm (V), and for the same reason debits equal credits. As to profits they arise not because of the mere act of production and of exchange; rather by the fact that at the very moment of sale an asset (inventory) is transformed into another asset (cash or money) at a valuation ratio or unit price greater than the total cost per unit. For the operation to be profitable the value of increase of money should be greater than the value of the decreases in the other asset. Profit is nothing but an increase in total value of the firm.

A transaction according to above meaning is amenable to a *flow* concept: it carries a period-of-time label and is (in some cases only with approximation) measurable in money terms. As Coase puts it [1994, p.44], economics advantage over other contiguous disciplines is not so much that it is the more developed: "*...the great advantage which economics has possessed is that economists are able to use the* 'measuring rod of money'. *This has given precision to the analysis, and since what are measured by money are important determinants of human behaviour in the economic system, their analysis has considerable explanatory power*" (inverted commas in the original).[6] See also Mäki on the role of

[5] See Yamey (1987) for a quick review. For a much deeper and updated study, Pratt (2000).

[6] In passing, Posner's [1993] criticism of Coase being too restrictive as to the realm of economics with respect to other social disciplines and field of study is not well taken. The possession of a typical unit of measure such as money is extremely useful to economics but it inevitably circumscribes its boundaries. This is true for any scientific discipline.

money in Coase 's methodology [1998, p.66]. An economist works most often with vectors of physical items, while a business accountant has to transform each item into a value to sum them up and obtain what in linear algebra is a scalar. An obvious measure is price which a central topic in economics. A price as such is a ratio. If a price is not available to find the money value of a given item recourse must be made to valuation ratio which may be rather arbitrary unless laws, commercial norms, customs, accounting principles dictate how to do that. We can see here how important is a closer approach of economics to theory and practice of accounting and viceversa. And indeed to avoid combining strawberries with bananas adoption is here made for operational purposes in line with present aims of Alchian's definition of cost [1959, p.228]:

> "… the change in equity caused by the performance of some specified operation, where for simplicity of exposition, the attendant change in income is not included in the computation of equity. …Because of logical difficulties in converting this present value concept into a satisfactory rate (per unit of time) concept … I measure costs in units of present value or equity. Hereafter, the unmodified expression "costs" will always mean the present worth, capital value concept of cost."

From now on in this research the term cost means the change in equity due to the performance of some specified operation *or transaction* where, for the sake of simplicity, the ensuing change in income is not included in the computation of the change in equity

3. The two meanings of "transaction" and the theory of firm

Now that a definition of both *simple transaction* and *cost of a transaction* [7] have been given in an operational manner that seems

[7] Note that the "cost of a transaction" is of course not the same thing as a "transaction cost" or the "cost of using the market". The latter be measured in money terms, if properly individualized, as in the inventory example that will be later discussed. To not conflate transaction costs with other costs one should first distinguish between organizational (or within the firm) costs and across the market cost (or cost of using the market proper) [Demsetz, 1988, p.161]. The boundaries of the firm (is the transaction on the market or out of it?) and the precise dimensionality (and aim) of its activities with respect to them are of much help in determining which type of cost is at issue and measure it. Neither the type of resource, factor or service, nor even their characteristics may be of

consistent with Coase's and accounting principles, some points should be discussed. By introducing the concept of exchange costs Coase's corrected one of the major flaws of mainstream economics that had assumed them away . The realization of the existence of costs for the organization of exchanges, or transaction costs, makes clear that for firms to supersede the market they have to make continuous cost-benefit analyses, both daily and over their life-time, in order to increase the volume of transactions while reducing their costs[8]. At first glance it may seem as though by adding a new element – a category of cost - Ronald Coase did not change the basic behavioural structure of received microeconomics. And indeed Coase is not so much critical of mainstream microeconomics but *"with how it is used"*[1984, p.220]. But he did achieve a great shift of perspective since the vector of costs is provided by each and every transaction and a transaction - no matter how small or difficult to measure - is nothing but a transfer of property rights: it is in itself a reallocation of rights and involves in the end a change in the asset and liabilities level and structure of the firm. It requires often costly institutional supports and takes place in several and ever-changing settings [9]. They create not only complexity faceable with bounded rationality but also endemic uncertainty. In turn, transactions and their costs depend: i) on how property rights are defined; ii) on practical aspects of their transferral (e.g.: contracts) and iii) guaranties surrounding such transfer. By pointing to obstacles to markets, such obstacles and their causes and remedies are put to the stage centre. The economics of business is down to

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greater help. Negotiating and defining labour force contracts originate mostly transaction costs. Organizing, monitoring and managing the same human resources originate mostly internal organization costs. Enforcing the signed contract may again contain much transaction cost. Much the same can be said for purchases of goods.

[8]. Production costs are technologically determined .From an analytical point of view one must initially assume that production cost are *given,* i.e. they are the same at firms that enter , for instance, a "make or buy" relationship so that choice is solely attributable to differences in transaction costs. But of course production cost may differ from one firm to another simply because one firm is specializing and able to turn out products at lower prices. These aspect must wait till a theory of the firm as set of function is discussed.

[9] Such settings are discussed in Williamson [2000a]. I add an accounting setting or framework because not only it is internal informational system that helps firms to take many decisions but it discloses informations that are relevant to other firm and to other actors in the market in general and this provide a net of connections of the utmost importance.

earth tied as it is to the ordinary way (and actual experience) of business life and organization.

Economics and Accounting: some aspects

Two items need now some comments. The first is that the crucial point of double bookkeeping from the point of view of the suggested approach is that any change or transaction (as distinct from an internal organization move) corresponds to the acquisition or dismissal of a property rights, no matter how small or limited. Factor of production are acquired to perform certain actions on them in a particular way. An asset or a given resource *is* in fact valuable to the firm if it can be changed, transformed, destroyed, sold or resold according to both legal and economic rights. *Legal rights* are entitlements that the state helps to enforce; *economic rights* are what people can do with their commodities or assets [Barzel, 2001b, p.10]. The "measuring rod of money" - through prices (money ratios) - is what helps to give a monetary value to all this. Of course, there are both transactions and aspects of a transaction carried out by a firm that are not recorded in its accounts. This may seem at odd with the apparent exactness of double-entry book-keeping. The equality of double accounting is a mere formal principle that does not imply that the two registered values are in themselves correct being often subject to rather arbitrary valuation procedures. Double-entry bookkeeping is nothing but a systematic method for arranging and classifying firm informations of a reporting, economic and financial nature. The key idea behind it is that every event (transaction or other change) that happens to a firm must be recorded twice *and* for equal values or same money amounts, once as a debit and once as credit. Debit is off-set by a credit and viceversa. This duality of entries for each transaction (or other recorded change) interlocks a firm informations. Since firms entertain most of their relationships with other firms, interlocking inevitably spreads to firm-to-firm relationships and their activities, thus providing much fuel for understanding the institutional structure of production. For the very reason that the two recorded values are equals, the whole system of accounts is always in automatic and numerical equilibrium, unless mistakes were made.

The opposite is absolutely not true. The duality property of double-accounting merely provides a methodological structure to

decisions that have economic, financial, reporting, law and institutional implications for the firm. It merely provide arrangements to and organization of informations, it does not provide in itself though any key to the scope, content and details of the informations. The only constraints that it imposes on entrepreneurs, economists, managers, accountants and consultants is that each and every transaction be recorded twice with perfectly off-setting entries in money terms. It does not even dictate which changes (transaction or event) are to be recorded, to what extent or degree and when to record them [Yamey, p.918, I col.]. All this caveats do not diminish the relevancy of the suggested approach; rather they point to a closer collaboration of economics and contiguous disciplines such as the theory of accounting [Coase, 1990] to solve many puzzling problems. As said before, accounting definitions - as all definitions- are of the utmost importance. They are fundamentally tautologies in themselves that can be transformed into meaningful truisms by connecting analytically the various component variables that appear in them and whose values may be not be directly related. An important step further for an economist is to look at definitions as equilibrium conditions and by doing so putting limits to the values (or to be less stringent to the range of values) that each component can take. Incidentally, when a firm does not care of limits of values of some variable according to "implicit" equilibrium conditions, bankruptcy may be around the corner to remind it.

Single transactions, bundles of transactions and activities of the firm

A second and most important point to be discussed is that in my view Coase's (and others as well) use the word "transaction" with two different though strictly related meanings: the first may be characterized as "*single transaction*" already defined, such as the act of buying or selling a given item which can be done on spot or with all sorts of contracts even in the long run; assuming or firing workers (but not assigning a given work to them); rent or lease a machine (but not deciding to use it on a two or three shifts system). The use of the word in this way is crystal clear and meaningful in "*The Nature of the Firm*" where the analysis is admittedly "*at the margin*" [1937] : in that paper Coase makes recourse to a simple marginalist cost calculus to explain the emergence of the firm. He goes straight to the limiting case to stress most strongly the point he

wants to make. His analysis is beautifully marginalist there, and *pour cause*.

In successive works and analytical contexts what Coase and Williamson (and many others) really mean for transaction is a given number (or a set of similar and complementary) transactions leading to what can be termed an activity or a function of the firm very much in the sense of Stigler's theory of integration [1951, 1968]. An activity or a function is the summation of many single transactions or operations that may be segregated in specific internal organizations – sales departments, R&D laboratories, administrative services, and the like - and there may be sub-additivities or super-additivities in costs among such activities. The theory that can be built on this concept of the firm is much more than a mere theory of vertical integration. The firm is conceived of as a bundle of activities or functions that are organized to physically turn out and sell products and all there is before (e.g., research and development, searching for new financial means), in between (e.g., marketing, granting credit) and after (e.g. credit collection, after-sale service). Coase shares, by his own admission[10], an utterly similar vision of the firm and it is worth noting that both Coase and Stigler were both well aware of their strong affinity on the issue [Mariti, 1993][11]. The bigger the bundle, the larger the firm, but of course there are both internal organizational costs, on one side, and costs for using the market, on the other [Williamson, 1975]. Coase sees a firm as a bundle of things or assets (and of people of course).

Transactions may be so numerous within a given activity to be best performed by neatly separate organizational departments or services within a given firm or organized by and through other firms especially if the are complementary but dissimilar or antagonistic as to resources, abilities, knowledge [Richardson, 1980; Mariti and Smiley, 1996]. The Stigler-Coase theory of the firm explains the boundaries and the scope of a firm and by so doing why industry is organized the way it is [Coase, 1972] There

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[10]. Coase reporting about the origin of his theory writes : "*In any case I thought the way to proceed was to examine the effects of costs on bringing various combinations of functions under one control and I illustrated my position with diagrams somewhat in the manner of Stigler in his 1951 article....*" (Williamson and Winter, eds, 1991, p.40).

[11] Stigler's paper builds upon Smith's well known principle of division of labour among firms. At the very end of it Stigler writes in the main text, i.e..not in a footnote ["*Reference should have been, and now is made to R.H.Coase, "The Nature of the firm*"]. (Square brackets in the original).

are is a masterful pieces of theoretical and empirical research in this direction using what I call the Smith-Young[12]-Stigler-Coase (or SYSC model). [Stuckey, 1984; Masten, 1984].

As a bundle of functions the firm is a *stock* concept. It is a rather well dimensioned reality at a point in time though his boundaries vary over time and so does its scope of activities [Coase, 1972]. It can and usually will include both "fixed" capital and working capital[13]. "Fixed" capital can be both tangible assets (e.g., real property, plant and equipment, etc.) and intangible assets (human capital, technologies, trade marks, patents, distribution channels, etc.). Working capital is the difference between short-term or liquid assets -- such as cash, inventories, accounts receivable, and prepaid expenses -- and short-term liabilities. Activities of the firm could not be organized unless such resources are present in a firm, and both the legal entitlement to each of them and the economic property rights may also differ with effects both on organizational structure and performance. These important aspects are not for simplicity sake taken care of in what follows.

In sum, the firm is amenable to a *stock* concept and can be represented by a Balance Sheet *at a given date* while costs and revenues are *flows* and appear in a Profit-and-Loss Account *over a given period.* Costs and revenues reflect changes in the firm stock (the "body" of the firm) over a fixed temporal interval (typically a year[14]). The two notions of transaction – simple transaction and activity or function - are by no means contradictory. A firm activity or function is a set of single transactions, a series of transactions that can be somehow grouped together and structured as a sub-organization within a firm or given out totally or partially with recourse to another firm. They are facets of the same basic vision of the firm and should be used in the proper context lending to

[12] Young (1934) wrote a paper developing the smithian idea of division of labour leading to increasing return external to the firm but internal to an industry.

[13] Coase does not accept such a sharp dichotomies as that between fixed costs and variable cost. That is why the term is within inverted commas. While this aspect will be taken up in a paper to follow one can see his work (1934 reprinted in 1988, p.100-01)

[14] . However, Profit&Loss and Assets&Liabilities Accounts can be done at any time, if valuation problems and computation costs are negligible. To day computational devices allow firms to check their profits, cash- flows and several other operational aspects at short intervals for control and decision-making (Pin, 1999).

somewhat different though complementary analysis. If one is interested in inner mini-workings of a firm than the single transaction concept - e.g. a single contract, an act of purchase or sale - is what is more useful in most cases. If one is interested in focusing on explaining how the legal, contracting and transaction entity provided by a firm has been and is the instrument of market economies for carrying out the processes of production and exchange [Chandler, 1992, p.99], or to study division of labour at large among firms in an economic system, than the idea of a firm a set of functions should be used [Coase, 1972].

I then take as self evident that the point where economics and accounting principles, norms and practice come closest together is the economics of the firm. Present work is an initial attempt to uncover and explicate a more satisfactory way of discussing some of the micro-analytic features of firm economics, operations, choices and behaviour and show how this can be done by using some accounting ideas and informations that, if carefully interpreted, allow to explain and understand the firm ordinary life as it is (not imagined).

4. Making the concepts of "single transaction" and related costs operational

For the moment, I will use in what follows the term transaction with the meaning of single transaction, which may include more operations or transactions of a very similar type as is the case with a series of buying contracts of goods or services with the same supplier without reaching the stage of fully organizationally segregated firm activity or function. In other words, for present purposes only the most elementary definition of transaction is needed. "[It] *is necessary to have a base large enough on simple matters before going on to more advanced*" [Coase, 1972]. The firm as set of activities or functions will be dealt with in a further essay [or Mariti, 1993]

The Retailing Firm and the Inventory Problem

To show both the heuristic and operational potentiality of economics *cum* accounting I will discuss the problem of the pure

retailing firm, i.e. with no manufacturing[15]. An examples may be provided by food and textiles supermarkets not selling own production goods. To start from such firms allows to put aside for the moment the problems related to "fixed" assets, since buying, selling and inventories take the scene. The problem of inventories is an important problem in itself. According to Walras [1926, p.233] is crucial to both firm operations and existence over time. In standard treatment the problem is circumvented by assuming that all what is produced - in the present example, what is expected to sale - in a given period is also sold in the same period so that the firm has no inventories at the end. Operationally the timing of (production and) stocking is an important problem to most firms. So the previous assumptions takes care of only part of the inventory problem: during the relevant period the firm has to replenish its inventories that run out (physically *and* in money terms) with sales to face consumers demand with its peaks and vagaries. The end of period, be it a year or a semester, a month or even a day is of course crucial both for planning and accounting purposes. The period horizon is however a rather conventional concepts if the firm existence is planned for more than a single period. That is why Walras says: the firm will"... *never let* [itself] *run completely out of stock, whether of raw materials or products, at ...inventory dates. If* [it] *did, it would mean that at the end of each period* [it] *should be interrupting the operations of* [its] *business, which would be entirely useless, if not wasteful. Consequently, as* [it] *sell...* [it] *constantly replenish* [its] *stock .*"

The balance sheets of firms that specialize in selling final or consumer goods are indeed dominated by working capital in the form of raw material and parts, stocks and work-in-progress and finished-goods inventories. When this happens, it may be said that firm size is basically a function of inventory levels[16]**.** The implication here is that if inventory were the retailing firm's only asset and its inventory fell to zero, the firm would have zero size, i.e., the boundary between the market and the organization would

[15] Assume also that buildings, machinery and equipment are all rented or otherwise leased so there are no valuation problems as to them in the Assets & Liabilitie Account or Balance sheet of our firm. Of course ownership and the forms it may take may be crucial.

[16] In principle a retailing firm could contract out with an outside firm, say a warehouse, to handle reordering, shipping, and storage services for it and it could even buy administrative and accounting services.

disappear. We can look at the decision of the organizers to hold inventory in house as directly analogous to the "make or buy" decision that tends to dominate the literature [Milgrom and Roberts, 1992]. It is an agreed upon question in economics that some transaction costs - to be carefully identified in what follows- determine optimal inventory levels, i.e. the minimizing cost level. It follows that insofar as inventories are concerned, transaction costs directly influence the design of the kind of jig-saw-puzzle boundaries that exist between the firm and the market. To show that this is the case, a basic inventory model and its solution are discussed[17].

The inventory problem is similar to all other asset and acquisition decisions, including the maintenance level problem and the "make or buy" decision. Its formulation is as a capital planning problem proper . The inventory problem is also a typical optimality problem in microeconomic analysis. Besides it is a problem that even most firms in the manufacturing sector of the economy have to face and thus it is far more general than the example of the retailing firm would lead one to believe. Note that the results of an optimal decision-making choice will be analytically reframed according to the suggested approach showing how it can be used to enlarge and deepen the understanding of firm behaviour and to achieve broader results. For this purpose, the crudest of the models of inventory analysis is of help. The reader must keep in mind that for expository present purposes it is necessary to ignore many crucial features of real inventory problems. In particular attention is focused on the problem of stocking one good only, while a retailing firm may hold thousands of goods on its premises since the scope or variety, and the deepness of its assortment are ultimately the "good" or service it provides. In spite of the very little initial information the analysis carries us quite far in relation to present analysis.

Consider a retailer who (perhaps on the basis of contracts) confidently expects to sell some fixed amount, call it Q* units, of one of his commodities over the next year at a predetermined price, with demand spread evenly throughout the year[18]. He sells precisely

[17] This part of the paper – including footnotes - is heavily and freely based on Baumol [1977, pp. 5-10].

[18] An asterisk is written after the Q to indicate that this letter represents a definite number which is known to the firm. This convention will be used throughout this section to distinguish such numbers from the variables whose values are the unknowns of the analysis. Note the assumption of demand

Q* units of commodity each year. Note that Q* is given and known to the retailer. The retailer is a price taker in both retail and wholesale markets. The price of the commodity n is predetermined. How much inventory should he keep on hand? He has considerable choice in the matter. It is well known result that by ordering more and more frequently, the required average inventory level can be made smaller and smaller since there are stochastic economies of scale.

The range of possibilities which our optimality analysis must consider leads to the basic question: how far should the process of cutting down on inventory be carried? "*A smaller inventory, of course, saves money on inventory carrying costs: that is, on storage costs, interest cost on the cash used to buy the inventory , etc. But, on the other hand, there is a reorder cost involved in placing and delivering an order, and since a smaller inventory involves more frequent orders and deliveries, if management decides on too small an average inventory level these costs may become prohibitive. Determination of the optimal inventory level involves a systematic balancing of the savings in inventory carrying costs against the increased reorder costs which reduced inventory will require*" (p. 7; underscore in the original).

Note that reorder costs are here transaction costs proper since they are typically represented by negotiating costs, ordering costs, deliveries checking costs and the like. If demand is spread evenly throughout the year, inventory would fall at a steady rate from the day it is delivered until it is used up. Thus the inventory must fall gradually from **D** to zero[19], so the average inventory level must be **½(D+0) = ½ D** . Now let *k** (dollars) represent the interest and other *carrying* cost involved in holding one unit of inventory for one year. Then the *total carrying cost* will be *k**(**½ D**)**.**

As to the other component of total cost - *reorder cost* - generally , if **Q*** is to be sold over the whole year and **D** is

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spread evenly over the period. What if demand has peaks and vagaries? Unexpected demands or delays in deliveries could embarrass the businessman who had no stocks on hand to service the waiting customers. A more encompassing model can always be build for such purposes.

[19] Of course, recalling Walras, in practice it is normally never planned to have inventory run out altogether. In the analysis which follows the reader can, therefore, if he wishes substitute some minimum inventory quantity M* for this zero whenever it appears. He will find that no change in the analysis results [Baumol, p.6,footnote 2].

delivered each time, the required number of deliveries is **Q*/D**. Suppose, moreover, that the cost per delivery is related to the amount delivered by the expression $a^*+b^*\mathbf{D}$ where a^* and b^* are some numbers. Here b^* may be interpreted as the shipping cost per item so that the cost , of sending **D** items is $b^*\mathbf{D}$ dollars. Similarly, a^* represents costs such as bookkeeping and long-distance telephoning for specifying the size of orders (not for bargaining or contracting), i.e. costs whose magnitude is not seriously affected by the amount involved in the shipment.

Baumol [1977, p.8] finds the total cost curve which expresses the entire relevant range of values, our retailer can lay out on his inventory . It is the sum of carrying and reorder cost and is equal to $\mathbf{C} = k^*(\frac{1}{2}\mathbf{D})+a^*\mathbf{Q}^*/\mathbf{D}+b^*\mathbf{Q}^*$.

This is the inventory cost equation for the firm and of course contains all the information *in money terms* needed for solving the problem. The only unknown in the preceding equation is the cost minimizing value of **D**, the amount to be delivered per shipment. Once this number is determined the entire problem is solved, because we can know the corresponding average inventory level ($=\frac{1}{2}\mathbf{D}$)and the number of times per year shipments should be ordered ($= \mathbf{Q}^*/\mathbf{D}$).

From the cost equation, by standard optimizing technique, another equation is obtained that gives the cost-minimizing value of our variable **D**. This equation is

$$\mathbf{D}= \sqrt{(2a^*\mathbf{Q}^*)/k^*}.^{20} \qquad [1]$$

The most important result of this analysis *taken by itself* is that inventory should increase only in proportion to the square root of sales. In other words, if sales of some item double, inventory should not be doubled. This equation can be of course used to see what happens to the-cost minimizing value of **D** when some of the other variables change. Thus if firms – as many of them do - follow a simpler rule of thumb by which their inventory are taken at some constant percentage of sales volume they experience additional cost or lower profits.

[20] For a formal proof see Baumol (1977, p.9, footnote 3).

Size and Boundaries of a Firm

Recasting the above analysis from this paper standpoint, a first observation comes to mind. Even with a highly over-simplified models standard optimality analysis can - if caution is used with defining the different types of costs and making suitable assumptions to shape down the problem - produce significant and even practical results and that is why such models should be preserved and developed in firm economics. As to the "added value" of the suggested framework, note that in this problem there are two kinds of cost: (1) *carrying* costs, which include the cost to the retailer of capital invested in inventory, storage costs, etc., and (2) *transaction* costs, which include the cost of contracting with suppliers, processing orders, checking received orders, monitoring and handling deliveries and so on. One could also argue that carrying costs are transaction costs, especially where some buffer stocks are held against uncertainty. The distinction between carrying costs and transaction costs is meaningful in itself though. If every relevant cost is a transaction cost, transaction costs cannot possibly explain anything in particular. Once Stigler [1987] wittingly pointed out that the danger is that "*transaction costs [be] the transportation cost of going from ignorance to omniscience*". Much road has been covered since by Williamson, Alchian Demsetz and others to identify the defining properties of transaction costs.

From expression **[1]** we draw that the cost-minimizing average inventory level increases when transaction costs in the form of reorder costs increase. The best measure of a debt-free organization's size is its share value. According to the capital asset pricing model, the share value of such firm is equal to the risk-adjusted discounted net present value of its future cash flows (or, given long-term liabilities, both explicit and implicit, expected future cash distributions to shareholders). If a firm's Balance Sheet were complete and accurate, it too would accurately measure firm size. Balance sheets, however, are neither complete nor accurate as discussed before based as they are often on rather arbitrary valuation criteria. Their incompleteness and inaccuracy has a direct relationship to the firm's purpose as a profit seeking entity and is

due in good measure to asset specificity[21].If it were costless to find alternative uses to an asset or resource, its selling value would by definition be equal to its contribution to the firm. And if an asset's value were its market price, its selling for cash or liquidation value would also be equal to its replacement cost (a proxy for its opportunity cost). Hence, if all of a firm's assets were valued at replacement cost (rather than historical cost as is most often done in accounting), their sum - as depicted in its balance sheet - would equal the firm's market value.

The discrepancy between an asset's historical cost and its contribution to organization value, between replacement cost and liquidation value, or between opportunity cost (an *ex ante* concept as is typical of economics) and measured cost *ex post* - (such as are those provided by accounting) is likely to be greatest where intangible fixed capital - human and intellectual capital - is concerned and least where "working capital" is concerned, as is the case with the above example. At the other extreme, a firm's cash balances are presumed to be absolutely liquid and perfectly reusable. Tangible capital in the form of plant or equipment is usually an intermediate case. The implication here is that we can in theory (and in practice with much care) *look at the overall process of production and exchange by a firm as a process of transformation or change of an absolutely unspecific asset as money into other valuable (and to be valuated) resources and the other way round.*

Much of the dissatisfaction and inconclusiveness of the transaction cost analysis is that it all too often focuses on difficult, not only complicated but rather complex problems involving intangible capital, fixed assets, or even capital structure, switching abruptly in the same context from *ex ante* to *ex post* concepts and definitions where both the former and the later are often somewhat fuzzy. I think I have been able to show that it is possible to make several points of fundamental importance about the nature of transaction costs (an *ex ante* concept) and their relevance to the boundary between the market and the firm by focusing on simple problems involving working capital only, for the time, and thus using a highly simplified accounting system. This was of course made possible by taking a pure retailing firm as there exist many.

[21] That is resources that have a significantly lower value in alternative uses so that they are in large measure sunk expenditures and a such be accounted for in Profit-and-Loss account.

Other problems more relevant to manufacturing firms, such as capital resources and debts will be dealt with in further essays.

As to the scope of a firm, i.e. the number, types and range of activities carried out within a given firm, and why in a firm and not in another, one cannot say much at this stage. It is required the use of the concept of firm functions and this issue must now be postponed . What the previous exercise tells us is that there cannot be any mechanical relationship between size and scope of a firm or between boundaries of a firm and the scope of its functions. This distinction by itself appears to be worthy, for the moment.

5. Some implications and main lines of further research

In the most elementary formulation of the inventory problem the assumptions are that demand is certain, opportunism is absent, and note also that inventories are *implicitly* assumed to be convertible to cash at any time (recall Walras assumptions). The example demonstrates that firm size (and therefore the boundary between the market and the firm) is uniquely determined by the cost of carrying out transactions. This may be reframed in different words by saying that opportunism and asset specificity are not necessary to explain the boundary between the market and the firm[22]. A careful reading of Coase's work (1988) leads to consider that opportunism nor asset specificity is needed to explain the existence of the firm or its size. In his own words, many economists "*…seem to believe that vertical integration comes about mainly when there is asset specificity, because of the incentive for opportunistic behaviour to which this gives rise*," but there are doubts that "*there is such a systematic relationship*.". Indivisibilities, compactness, transport costs, and perhaps ultimately ignorance will suffice to explain size and boundaries of the firm. This is an example of what makes AC economics broader and yet rigorous. It goes straight to the core of problems and allows a sound understanding of it leaving details to more complex but also more specific models, i.e. models segregating smaller parts of observable world.

This does not mean that uncertainty, opportunism, and asset specificity are unrelated to the question of firm size, boundaries (and scope of activities). The inventory problem can easily be

[22] A similar result on a more intuitive level is discussed in Slater and Spencer [2000].

expanded to show that uncertainty about prices and demand increases the level of the retailer's optimal inventory. On the other hand increased risk would also increase the cost of capital, which would tend to have an offsetting effect on inventory. Assets specificity and opportunistic behaviour though relevant are most useful for short-medium term analyses: they may help to deepen the main results and explain important details of the phenomenon. Since they are most apt to be dealt with the tools of marginal analysis, they often end up with obtaining the centre of stage with an elegant use of analytical and technical resources whose value is often counterbalanced by fuzziness and vagueness on more basic aspects. Furthermore, insofar as variables such as opportunism increase the cost of conducting transactions, they also have the effect of increasing inventory levels and, in the case at hand, firm size, as well as decreasing technical efficiency in precisely the same way that friction reduces an engine efficiency. For example, the possibility of error may be sufficient to explain accounting for the receipt of shipments and the like, but cannot account for the over-abundance of administrative controls observable in practice. Clearly the chance of employee money embezzlement, steal of small values or quantities, kickbacks in purchasing leads to an increase in the scope and severity of a firm's accounting controls, which increases the cost of ordering, shipping and receiving, processing, and otherwise handling deliveries and therefore the size of its inventories.

These predictions could easily be tested and corroborated or refuted. The assumed absence of uncertainty does not allow to say much on the highly controversial issue of uncertainty and the emergence of firms. To Knight radical or true uncertainty is at the foundation of firms while Coase identifies the neglected costs of using the price mechanism as the key reason for its superseding. Supersede Coase recognizes however that "*It seems improbable that firm would emerge without the existence of uncertainty*". To some authors this is nothing but afterthought [Slater and Spencer, 2000,p.3]. To put it in a nutshell, Coase seems to consider a firm as an institution to circumvent (parts of?) radical uncertainty.

It has been shown that something can be done to gain neater and deeper idea of the world of business economics, without compromise with rigour and without leaving out important details. That has been achieved i) by suitably defining and making operational the concept of "transaction", "cost-of-a-transaction" and

"transaction costs" (in the context provided by inventory replenishing) and ii) by properly choosing assumptions and carefully redefining variables. The inventory problem has provided the crudest, most elementary case for the relevance of transaction costs to the demarcation and change of the boundary between the market and the firm. Transaction costs are subjective - they exist in the mind of the decision maker and are "*tied to*" the decision at hand [Coase, 1934, p. 128]. They are forward looking or *ex ante* concepts.

The After Coase approach reveals itself to be both rigorous and "down-to-earth" allowing for direct inclusion into the analysis of many facets of ordinary business life and a host of organizational, institutional as well as law aspects [23]. This can be done by adding explicitly (but not taking it at face value) the most suitable setting or frame for assets, resources, liabilities and value of a firm – the balance sheet - along with and beyond the profit-and-loss statement. In an interview Sir John Hicks said: "*I have actually seen business decisions being made on the basis of projected balance sheets. I think that this is the rational way to make a business decision. A lot of these mathematical models, including some of my own, are terribly much in the air. They lost their feet off the ground*"[Klamer, 1989, p. 180; underscores provided].

In future papers it will be shown that uncertainty (as a matter of life) and the provision of flexibility via incomplete contracts can be introduced at the very outset of analysis thus making the economics of business somewhat more meaningful, viable and operational at the same time. The research programme will basically deal with:

a) the case of the manufacturing firm by relaxing (some of) Walras's assumptions and introducing the concept of a firm as a set of similar (from the point of view of knowledge and

[23] By way of an example, relaxing the assumption - as Walras strongly suggests should be done- that inventories are not all sold within a given period, then there is the problem of stocks valuation. In most advanced countries commercial law prescribe that firm publish their balance sheets and proft and loss accounts at least once a year with an accompanying note about criteria used to evaluate the various items in them. There exist deep-rooted accounting principles and practices. Inventory should be valued according to most commercial law "at the least cost between purchasing cost and current market prices". The suggested approach can host this and show directly the impact on firm performance in terms of *realized* profits.

skill) and complementary (from the point of view of an integrated process of production and sale) activities;

b) an almost didactic exercise of how a firm decision-making behaviour is discussed in all too many contemporary standard textbooks and how the AC approach could make economics of the firm more promising for researchers, more motivating for students and more operational and rewarding for consultants and, perhaps, businessman.

References

Alchian, A. (1959),"Costs and Outputs", in *The Allocation of Economic Resources, essays in Honour of B.F. Haley*, Stanford University Press, 1959, 23-40, reprinted in Townsend, H., ed. (1973) *Price Theory*, Penguin Education, Middlesex, 228-249.

_____**and Demsetz**, **H**. (1972), "Production, Information Costs, and Economic Organization", American Economic Review, 62, 777-95.

Barzel, Y. (2001a), "A Measurement Cost Based Theory of the Firm", January, preliminary mimeo.

Barzel, Y. (2001b), "A Theory of Organizations to Supersede the Theory of the Firm", September, preliminary mimeo.

Baumol, W. (1972), *Economic Theory and Operations Analysis*, (fourth edition), Prentice-Hall International, London.

Chandler, A. (1992), "Organizational Capabilities and the Economic History of the Industrial Enterprise", Journal of Economic Perspectives, vol.6, n. 3, Summer, 79-105.

Coase R., (1999), "The Task of the Society" - *Opening address to the Annual Conference*, September 17, ISNIE Newsletter, vol. 12, n. 2, Fall.

____ (1994), *Essays on Economics and Economists*, The University of Chicago Press, Chicago and London.

____ (1993),"Coase on Posner on Coase", Journal of Institutional and Theoretical Economics, 149(1), 96-98.

____ (1992), "The Institutional Structure of Production", American Economic Review, 83, 713-19.

____ (1991), "Contracts and the Activities of Firms", Journal of Law & Economics, XXXIV (October), 451-52.

____ (1990), "Accounting and the Theory of the Firm", Journal of Accounting and Economics, vol.12, 3-13.

____ (1988), *The Firm, the Market and the Law*, Chicago, University of Chicago Press.

____ (1988), "Business Organization and the Accountant", in *The Firm, the Market, and the Law*, Chicago University Press, Chicago. The paper also appeared in Buchanan, J.M. and Thirlby, G.F., eds., (1981), *LSE Essays on Cost*, New York University Press, 97-132 (originally published in 1934).

____ (1984) "The New Institutional Economics", Journal of Institutional and Theoretical Economics, March, 229-31.

____ (1978) "Discussion. Economics; Biology - Economic Aspects", American Economic Review, May, vol. 68, Issue 2, 244-5.

____ (1972), "Industrial Organization: A Proposal for Research", in *Policy Issues and Research Opportunities in Industrial Organization*, Fuchs, V.R. (ed.), NBER, Columbia University Press, New York and London, 59-73.

____ (1937), "The Nature of the Firm", Economica, vol.4, n.6, 386-405.

DeBoer, D. (1998), "The Business-Plan Approach to Introductory Microeconomics", Journal of Economic Education, n.1, winter, 54-64.

Demsetz, H. (1991), "The Theory of the Firm Rivisited", Williamson,O. and Winter, S., Eds., *The Nature of the Firm: Origins, Evolution and Development*, Oxford University Paper, New York, ch.10, pp.159-178

Demsetz, H. (1997a), "The Firm in Economic Theory: A Quiet Revolution", American Economic Review, May, vol. 87, Issue 2, 426-29.

Demsetz, H. (1997b), *The Economics of the Business Firm – Seven Critical Commentaries,* Cambridge University Press, Cambridge.

Dietrich, M. (1994**),** *Transaction Cost Economics and Beyond: Towards a New Economics of the Firm*, Routledge, London.

Dunn, S. (2000), "Fundamental Uncertainty and the Firm in the Long Run", Review of Political Economy, vol. 12, n.4, 419-33.

Eisenhardt, K. (1989), "Agency Theory: An Assessment and Review", Academy of Management Review, 14, 57-74.

Foss, N. (1994), **"**The Two Coasian Traditions", Review of Political Economy, vol,6, n.1 (January), 37-61.

____ (1996), "The 'Alternative' Theories of Knight and Coase, and the Modern Theory of the Firm", Journal of the History of Economic Thought, vol. 18, spring, 76-9.

____ (2002), "Coase vs. Hayek: Economic Organization and the Knowledge Economy", International Journal of the Economics of Business, (Special Issue) Foss, N. (ed.), vol. 9, n.1, February, 9-35.

Foss, K. and Foss, N. (2001), "Assets, Attributes, and Ownership", International Journal of the Economics of Business, vol.8, n.1, 19-37.

Hodgson, G. and Knudsen, T. (2003), "Firm-specific Learning and the Nature of the Firm: Why Transaction Cost Theory May Provide an Incomplete explanation", March, (mimeo)

Hsiung, B. (2001), "A Methodological Comparison of Ronald Coase and Gary Becker", American Law and Economics Review, vol. 3, n.1, 186-198.

____ **and Gunning, P.** (2002), "Ronald Coase's Method of Building More Realistic Models of Choice", Review of Political Economy, vol.14, n.2, 227-239.

Jovanovic, M. (1997), *European Economic Integration – Limits and Prospects,* Routledge, London and New York.

Kirzner, I. (1963), *Market Theory and the Price System,* Van Nostrand, Princeton.

Klamer, A. (1989), "An Accountant Among Economists: Conversations with Sir John. R. Hicks", Journal of Economic Perspectives, vol. 3, n.4, Fall, 175-183.

Klamer A, and McCloskey D. (1992), "Accounting as the Master Metaphor of Economics", The European Accounting Review, vol. 1, n.1, may, 145-159.

Klemperer, P. (2003), "Using and Abusing Economic Theory", Centre for Economic Policy Research, Discussion Paper, n. 3813, 1-29.

Kreps, D. (1990), "Corporate Culture and Economic Theory" in Alt, J., Sheplsle, H. (eds.), *Prospectives on Positive Political Economy,* Cambridge University Press, New York.

Madhok, A. (2002), "Reassessing the Fundamentals and Beyond: Ronald Coase, the Transaction Cost and Resource-Based Theories of the Firm and the Institutional Structure of Production", Strategic Management Journal, vol. 23, n.6, 535-550.

Mäki, U. (1998), "Coase, R.H", in Davis, J., Hands, W. and Mäki, U.**, (**eds.), *The Handbook of Economic Methodology*, Edward Elgar, Celtehham London, 64-67.

____ (2000), "Against Posner against Coase against Theory, Cambridge Journal of Economics, 587-595.

Mariti, P. (1993), "Constructive Cooperation between Smaller Firms for Efficiency, Quality and Product Changes", in O'Doherty, D. (ed.) *The Cooperation Phenomenon-Prospects for Small Firms*, Graham and Trotman, London.

____ **and Smiley**, **R.** (1996), Cooperative Agreements and the Organization of Industry, in Buckley, P.J. and Michie, J. (eds.), *Firms, Organizations and Contracts - A Reader in Industrial Organization* (with a foreword by Ronald Coase) Oxford University Press, Oxford and New York, 276-292.

Masten, S. E. (1984), "The Organization of Production: Evidence From the Aerospace Industry," Journal of Law and Economics, 27, 403-418.

Milgrom, P. and Roberts, J. (1992), *Economics, Organization and Management,* Englewood Cliffs, Prentice Hall.

____ (1996), "Economic Theories of the Firm: Past, Present, and Future", in Buckley, P.J. and Michie, J. (eds.) *Firms, Organizations and Contracts - A reader in Industrial Organization,* Oxford University Press, Oxford and New York, 459-475.

Morroni, M. (2003), *From Constraints to Opportunities – Toward a New Theory of the Firm*, (forthcoming).

Ménard, C. (1997), "Ronald H. Coase and the Emergence of a New Approach to Economics", in *Institutions, Contracts and Organization – Perspectives from New Institutional Economics*, Mènard, C. (ed.), Elgar &Elgar, Cheltenhamme, 54-58.

Pin, A. (1999), "La partita doppia di Luca Pacioli. Conquista del mercante medievale assurto ad imprenditore e base dell'odierno sistema informativo d'impresa", Studi e Note di Economia, n. 3, 7-44.

Posner, R.A. (1993), **"**The New Institutional Economics Meets Law and Economics", Journal of Institutional and Theoretical Economic, 149(1), 73-87.

Pratt, J. (2000), *Financial Accounting in an Economic Context*, (4th Edition), South-Western College Publishing, Cincinnati.

Richardson, G.B. (1971), "The Organization of Industry", Economic Journal, 82, 883-896, reprinted in Buckley, P.J. and Michie, J. (eds.), *Firms, Organizations and Contracts - A Reader in Industrial Organization,* Oxford University Press, Oxford and New York, 276-292.

Shubik, M. (1993), "Accounting and its Relationships to General Equilibrium Theory", Economic Notes, Proceedings of the Conference Accounting And Economics, Siena, 18th-19th November 1992, edited by Martin Shubik.

____ (2002), "Accounting and Economic Theory", Yale School of Management, WP Series Accounting and Economics, Strategy, n.16, 2-15.

Slater, G. and Spencer, D. (2000), "The Uncertain Foundations of Transaction Cost Economics" Journal of Economic Issues, vol. 34, Issue 1, 6-27.

Stigler, G. (1951), "The Division of Labour is Limited by the Extent of the Market", The Journal of Political Economy,

June, 185-93; reprinted in Stigler, G.J. (1968), *The Organization of Industry*, Irwin R.D., Homewood, ch. 12, 129-141.

____ (1988), "Palgrave's Dictionary of Economics," Journal of Economic Literature, Vol. 26 (4), 1729-36.

Stiglitz, J. (1997), *Principles of Microeconomics*, W.W. Norton, New York - London.

Stoneman, P. and Toivanen, O. (2001), "Recommended Accounting Practices on R&D Reporting by UK Firms", International Journal of the Economics of Business", vol.8, n.1, 123-36.

Stuckey, J. (1983), *Vertical Integration and Joint Ventures in the Aluminium Industry*, Harvard University Press, Cambridge (Mass.).

Yamey, B. (1987), "Double-entry Bookkeeping", entry in Eatwell, J., Milgate, M., Newman, P. (Eds.), *The New Palgrave–A Dictionary of Modern Economics*, vol. I, MacMillan, London.

Walras, L. (1873, 1926, 1954), *Elément d'économie politique pure,* English translation *Elements of Pure Economics*, by William Jaffé of the Edition Dèfinitive (1926) of (1873), published for The American Economic Association and The Royal Economic Society ,George Allen and Unwin, London.

Werin, L. (1997) "Ronald Coase and the New Microeconomics", in *Institutions, Contracts and Organization – Perspectives from New Institutional Economics*, Mènard, C. (ed.), Elgar & Elgar, Cheltenhamme, UK.

Whittington, G. (1987), "Economics and Accounting", entry in Eatwell, J., Milgate, M., Newman, P. (Eds.), *The New Palgrave–A Dictionary of Modern Economics*, vol. I, MacMillan, London.

Williamson, O. (2000a), "The New Institutional Economics: Taking Stock, Looking Ahead", Journal of Economic Literature, vol. XXXVIII (september), 595-613.

_____ (2000b), "Empirical Microeconomics: Another Perspective", mimeo, 1-31.

____ (1994), *Correspondence,* Journal of Economic Perspectives, vol.8, n..2, spring, 201-09.

____ **and Winter, S**., Eds. (1991), *The Nature of the Firm: Origins, Evolution and Development*, Oxford University Paper, New York.

____ (1975), *Markets and Hierarchies: Analysis and Antitrust Implications*, The Free Press, New York.

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