

Keyword: Long-term contracts; Transaction costs; Inter-firm relationships; Asset specificity

Alessandro Arrighetti

**EXCHANGE OPERATIONAL COSTS AND
LONG-TERM RELATIONSHIPS
BETWEEN FIRMS**

WP 7/1998

June 1998

1.Premise

In transaction costs economics long-term contractual regimes are linked to exchanges that are supported by high specific investments, demands legal commitments and guarantees between the parties and therefore require significant negotiating costs. On the other hand, whenever the efficiency of the exchange is not based on asset specificity, the absence of negotiating costs makes irrelevant the identity of the parties and induces the development of short-term, 'competitive' relationships presenting no constraints (or benefits) stemming from the duration of the contract¹.

Such prescriptions are contended by a wide empirical evidence signalling the presence of long-term contracts (or relationships) even when the exchanges does not need specific investments² or the negotiating costs are so low that the resort to a complex contractual regime is not justified. As a result severe shortcomings in the coherence of the neo-institutional model arise as well as difficulties in providing a satisfactory framework to explain continuity in the exchanges between firms³.

The starting hypothesis of the present work is that overcoming the conflict existing on this issue between theoretical assumptions and empirical evidence requires us to widen the neo-institutional model by introducing a long disregarded category of transaction costs that will be named, for the lack of a better word, 'exchange operational costs'. Generally such costs are added to the negotiating costs and are made up of the investment necessary to do the following : (i) inform the potential exchangers of the possibility and benefit of the transaction; (ii) single out the technical, economic and organizational solutions able to maximize the mutual benefit the parties draw from the exchange;

¹ See Williamson (1985): "The influence of uncertainty on economic organization is conditional. Specifically, an increase in parametric uncertainty is matter of little consequence for transactions that are nonspecific. Since new trading relations are easily arranged, continuity has little value, and behavioral uncertainty is irrelevant. Accordingly, market exchange continues and the discrete contracting paradigm holds across standardized transactions of all kinds, whatever the degree of uncertainty. That is no longer so for transactions that are supported by idiosyncratic investments. Whenever assets are specific in non trivial degree, increasing the degree of uncertainty makes it more imperative that the parties devise a machinery to "work things out" -since contractual gaps will be larger and the occasions for sequential adaptations will increase in number and importance as the degree of uncertainty increases" (p.59).

² See, among others, Lorenz (1989). In addition, recent work carried out by the author together with G. Ariu and G. Seravalli, concerning a sample of 214 Italian firms belonging to food and mechanical engineering industries, confirms such conclusions. Although the presence of long-term relations binding buyer and suppliers is high, cases where the buyer imposes the realization of specific investments on the supplier are rare and often economically unimportant. In addition a comparative study concerning contractual regimes in manufacturing industries in Great Britain, Germany and Italy (Arrighetti, Bachmann and Deakin 1997) has shown that in long-term relationships between buyers and suppliers specialised investments for the production of customised products do not lead automatically to continuous, legally binding contracts.

³ For an explanatory theory of long-term relationships between firms not based on the presence of relevant negotiating costs see Telser (1980).

(iii) communicate the content of the transaction to the parties and (iv) carry out the transaction logically, administratively and financially. Savings in this class of costs, as argued further below, represent an important reason for resorting to long-term contracts.

This paper is organised in the following parts. In sections 2 a simplified version of the model is provided: the relevance of the exchange operational costs in developing transactions between firms is discussed and the effects of decreasing of numeric variance of transactions on such costs are examined. The empirical tests of the interpretative scheme, preceeded by a methodological section (§3), are illustrated in the second part of the work. In the section 4 the costs structure and the profitability levels of two samples of firms with a different propensity in producing for the final market and for other firms are examined. The validation of the hypothesis that the profitability differentials are not due to the presence of technological exclusivities is developed in the section 5. The impact of exchange operational costs on profitability is explored in the last section (§6).

2. Exchange operational costs

For a single firm, the exchange function encompasses negotiating costs as well as a set of variables linked to the informational and co-ordination costs of the transaction. The former have been extensively analysed, whereas the latter have undeservedly received less attention. Accordingly economic debate neglects the fact that firms in context of incomplete information consume time and resources not only in choosing what and how produce, but also in assessing how many potential costumers to inform of the benefits of the exchange; and which amongst them to involve in the subsequent exchange relationships. In addition, apart from the strictly contractual features, firms have to sustain costs in specifying the technological, economic and organizational content of the transaction and to employ administrative, managerial and financial inputs to carry out the exchange. Finally, once the good to be exchanged is manufactured, the firm has to convey it into the different markets and pay the transport costs. This set of non-negotiating costs will be named 'exchange operational costs'.⁴

In more analytical terms such expenses can be divided in two features: (i) 'market-widening' and (ii) 'administrative' costs. The 'market-widening' expenses precede unsalvageable investments and concern the costs the firm has to sustain as alternative to negotiating costs with the aim of protecting the investment from opportunistic conducts of the agents involved in the transaction. The characteristics of such costs and the main differences from negotiation costs can be summed up as following. The firm carrying out an investment aimed at supporting the exchange with a single customer (asset specificity) has, in addition to the two solutions in the transaction costs scheme, a third mechanism of preserving the exchange: the search and the involvement in the transaction of (at least) one new firm that is willing to purchase part of the output produced through the specific investment. Let K_S = specific investment; I_S = firm carrying out K_S ; PK_S = property rights of K_S ; Y_S = output produced through K_S ; I_C = firm purchasing Y_S ; Y_{SC} = product purchased by I_C ; PI_S e PI_C = property rights concerning respectively I_C and I_S , T_S = negotiating transactional costs, the above

⁴ If the economic agents are imperfectly informed and opportunistic, the negotiating (contractual) costs >0 unless the asset specificity=0 and exchange operational costs >0. If agents are non-opportunistic the negotiating costs=0, but exchange operational costs remain >0.

mentioned hypothesis are:

- | | |
|---|--|
| H ₁) $PK_s \in PI_s, PK_s \notin PI_c, Y_{sc} = Y_s$ | $\Rightarrow T_s > 0$ |
| H ₂) $PK_s \notin PI_s, PK_s \in PI_c, Y_{sc} = Y_s$ | $\Rightarrow T_s = 0$ |
| H ₃) $PK_s \in PI_s, PK_s \notin PI_c, Y_{sc} = \alpha Y_s$ | $\Rightarrow T_s = 0 \text{ with } \alpha < 1$ |

In Hypothesis 1, I_s carries out the specific investment, holds the property rights of K_s , but sustains high transaction costs in defining with I_c a (complete) long-term contract for buying the whole output (Y_s). In Hypothesis 2, I_s invests in specific resources provided that I_c buy the property rights of K_s . Hypothesis 1 and 2 are standard transactional solutions: the risks of hold-up are reduced either by supporting huge costs of defining the contractual regime or by transferring the property rights of the specific investment to the other party.

On the other hand, Hypothesis 3 shows the presence of transaction costs=0 as well as the endurance of the property rights to the firm carrying out the specific investment. This result stems from the fact that I_s , making adequate transactional search investments, is able to single out and involve in the exchange the firm $I_{cc}=I_c$ that purchases $(1-\alpha)Y_s$ and acts, according to the hypothesis of 'second sourcing' (Riordan e Sappington 1989), as deterrent of the opportunism of I_c . In other words, the agent realizing the specific investment, instead of conveying the property rights or defining a complete contract, could prefer to assign a part of the internal resources to wide the market (increasing the number of subjects involved in the exchange relationship) with the purpose of decreasing the specificity of the investment and transforming the negotiating costs of a monopsonistic or bilateral monopolistic contractual solution into 'market-widening costs'.

The possibility of replacing the negotiating costs with these costs is based on the assumption that frequently asset specificity is not a technological issue^{5,6}, but depends on the characteristics and size of the markets and, on the investments necessary to introduce agents that are different from the initial ones⁷ into the exchange

The 'market-widening costs' (C_p) can be expressed as:

$$C_p = N_s e \quad [1]$$

where N_s = number of buyers (suppliers) involved in the exchange and e = search (fixed) costs of each (new) buyer (supplier). According to our hypothesis, it is foreseen that exists $N_s=N_s^*$ sufficiently great to cancel the specificity of the initial investment as well as the constraints or risks stemming from the unevenness of the transaction that are implicit in contractual regimes involving a plurality of anonymous agents in spot markets. Since N_s^* is strictly dependent on the variance of the

⁵ See also Seravalli 1993.

⁶ The asset specificity is not a technological matter in the sense that an innovation in the technology of firm A that generates an innovation in the output of firm B is 'specific' only until firm B is not imitated by firm B_{+1}, \dots, B_n . Extending the concept, highly 'generic' equipment might be 'specific' in a small market and highly 'specific' equipment might be 'generic' in a wide market. In addition the resource K might be 'generic' at time t_0 and 'specific' at time t_1 and vice versa.

⁷ The firm will choose among the different alternatives on the basis of a comparison between the relative costs of the workable solutions.

quantities of output traded in time with each buyer/supplier the more unstable the relationships are between the parties, the higher should be the number of firms involved in the exchange, and, according to equation [1], the greater should be the resources assigned to 'market-widening' investments.

On the other hand, whenever the stability of the exchange between the parties increases, the quantitative variance of the transactions related to each single buyer/supplier will decrease, and the exchange operational costs can be reduced avoiding an increase in the hold-up risks at least until when the constraint of having an alternative buyer/supplier is satisfied. Therefore, the high elasticity of 'market-widening' costs to the variance of the volume of the exchanges can explain the significant interest shown by firms in most industries in adopting measures aimed at reducing the instability of the transactions⁸. In addition, and this is a major point in the present analysis, the benefits achieved by reducing the 'market-widening' costs could justify the resort to co-ordination regimes of the transactions able to increase the stability of the exchanges (long-term contracts), even when the negotiating costs are very low⁹.

The 'exchange administrative' expenses are the second feature of the costs we are examining. Firms have such expenses before as well after the writing of the contract. They are related to the costs

⁸ See the set of incentives (or constraints) that the firms introduce in the transactions in order to renew them with the same parties. Significant share of advertising expenses and many investments to bring about switch costs and create reputation are spent on this (Milgrom and Roberts 1982; Stiglitz 1989).

⁹ It could be maintained that long-term relationships are based on 'implicit specific' resources, that is specific investments aimed at achieving mutual knowledge and are carried out routinely by the parties before and after the beginning of the exchange. The subjects involved in repeated exchanges are not at the time able to evaluate them but become conscious of the importance of such costs when an exchanger decides to exit from the relationship: the presence of specific resources hinders the replacement of the party with a more efficient one and tends to extend the duration of the exchange even when better alternatives are feasible. However the preceding argument is an unsatisfactory explanation of long-term relationships for the following. The mutual knowledge investment may be divided into two parts: (i) an initial, preceeding-the-exchange expense; (ii) a post-contractual cost related to the acquaintance of skills, procedures, current economic objectives and scheduled technological improvements of the other party.

The only investment that precedes the exchange concerns 'selection' expenses for picking up among different (buyers) suppliers the most efficient/profitable one. Generally such an investment is not specific but, even if it is, it cannot hamper the substitution of the party. The reason is that specific search investments are inversely correlated to the differential of efficiency between the firms: if the differentials are low and the ranking of population of firms is difficult, the 'selection' costs are high; on the other hand, if some feature of technological exclusiveness or monopoly exist, the selection process is readily performed and its costs are low. Thus whenever selection investment is high, the replacement of a party is easy because the alternatives are numerous. Alternatively, if search costs are low, substitution is more difficult but not on account of 'specific selection' investments.

As far as post-contractual costs are concerned, the resources labelled 'mutual knowledge' are mostly learning effects stemming simply from the repetition of the exchanges and not demanding any (specific) expense by the firms for gaining or exploiting them. However, even if 'specific knowledge investments' were carried out, they could not impede the substitution of one party. The investment in knowledge of the subject involved in the transaction presents two main features: a) it cannot be protected contractually since such an investment is not observable; b) it is continuous because it is subject to obsolescence and hence has to be frequently and repeatedly renewed. Consequently, the 'specific' investment is divided in time and realized with an temporal horizon of short period. So if the efficiency of the transaction carried out with the previous agent, apart from the learning effects, is lower than a feasible choice supplied from other parties, the knowledge investment is stopped and the exit of the exchange is accomplished without sustaining significant sunk costs. Therefore the investment in mutual knowledge cannot hinder significantly the replacement of the exchanger and is unable to affect the duration of the transaction.

concerning the handling and the co-ordination of the transaction¹⁰ that are independent of measures addressed to check the risks of moral hazard. Let y = average value of the (output sold to) input bought from a single (buyer) supplier, $Y = (yN)$ = total (output) input, N = number of (buyers) suppliers, the level of the 'exchange administrative' costs (C_a) depends on the number of transactions (T), the unit costs of the transaction (E) and the parameters r and w :

$$C_a = \frac{(rE)T}{w} \quad [2]$$

where

$$r = \alpha \left(\frac{Y}{T} \right)^{-1} \quad [3]$$

and

$$w = \beta \left(\frac{T}{N} \right) \quad [4]$$

For a given level of output, a rise in the number of transactions yields an at least proportional increase in the internal co-ordination costs (Radner 1992) and in the costs of resorting to the market (channel diseconomies, delivery expenses, etc.). On the other hand, an increase in the volume of transaction for each client produces opposite effects generating relevant savings in the 'administrative' costs¹¹.

As for 'market-widening' costs, significant savings in 'administrative' expenses can be achieved by modifying appropriate variables. Among those a relevant role is played by N (number of subjects involved in the exchange) and by T (number of transactions necessary to sell the output out (to buy the input)): *coeteris paribus*, a reduction of such variables determines significant economies in the 'administrative' costs.

¹⁰ Such costs encompass the formal specification of the technical and economic content of the exchange, the communication of information about the times and the modalities of carrying out the transaction, the financial and organizational management of the exchange and the conveyance of the goods to the final market.

¹¹ Most of expected benefits concern costs of specifying the contracts and transport costs, but savings in 'administrative' expenses may affect positively the production costs too. Given the output, the increase in the concentration of the exchanges upon a circumscribed number of clients and the enhancement of the temporal continuity of the transactions enable the supplier to schedule its own activity, maximising the percentage of the optimal batches on the production as a whole. As a secondary benefit he can pursue a policy of purchasing raw materials and intermediate inputs which is more profitable for prices as well as storage costs. Consequently a shift in the contractual regime from the short to the long term can entail significant reductions in production costs. This conclusion, as we know, contrasts with the prescriptions of the new institutionalist economics that explicitly establishes the separability of the transaction costs from the production costs. As Dow (1987) notices: "in comparing costs across governance structures, it is essential that the relevant transaction be specified independently of the governance structure which is superimposed on it. Otherwise, the claim that 'transaction X is organised under governance structure Y' would express not an empirical truth, but only a concealed tautology. If the attributes of a transaction do not remain invariant when one governance structure is replaced by another, the transaction costs involved are meaningless"(p.18). For a discussion of the independency of production costs from transaction costs and of the consequence of such an assumption on the development of the debate of firm theory, see Dietrich (1994).

That is, substituting [3] and [4] into [2] we obtain

$$C_a = \frac{\alpha ET}{\beta y} \quad [5]$$

This highlights the existence of a negative relationship between the average value of output sold to (purchased from) a single buyer/supplier (y) and the 'administrative' costs.

In addition,

$$C_a = \left(\frac{\alpha EN}{\beta} \right) \frac{T}{Y} \quad [6]$$

This again shows a negative correlation between the 'exchange administrative' costs and the number of transactions per unit of (output) input.

From the preceding discussion we can draw the conclusion that whenever transactions demand high exchange operational costs, relevant benefits are attainable:

- i. in decreasing the number of transactions per unit of (output) input;
- ii. and meanwhile in replacing frequent and widespread but unstable exchanges between firms with relationships constrained to few parties, but continuous and durable.

3.Methodology of the empirical analysis

Shortcomings in the availability of statistical information hinder the verification of the exchange operational costs hypothesis. However, access to the QRTE.ARC data base has recently been opened, and as this contains figures on the cost composition of a large sample of small manufacturing firms, some progress in this direction can now be made¹².

It should be pointed out however that because of particular assumptions on the relationship between variables and the extensive use made of proxy variables in testing the hypotheses, the discussion which follows is purely exploratory. The analysis is limited to a comparison between the costs structure and the profitability of two subsets of small firms. These two subsets operate in the same sectors, but they have a different propensity to continuous exchange. The first subset contains those firms which work mainly, if not exclusively for other firms¹³ and the second subset are those which produce goods exclusively for the final market¹⁴.

¹² This data base contains figures collected for the input-output table of Lombardy Region in 1982, which was organised by the EEC and the Lombardy Regional Council. There are more than 606 firms in the survey, but if firms with more than 20 employees are excluded, and the criteria illustrated in Note 14 are applied, there are in fact only 406. The variables used in the direct survey were the following: costs composition, personnel employment and expense, formation of fixed capital, purchasing expenditure on services, output and sales. Thanks are due to Dr Guido Gay and the IRER for making these figures available.

¹³ Firms where over 50% turnover (the average is 83%) goes on work commissioned by third party firms, who supply raw materials and semi-finished goods.

¹⁴ In fact firms were selected in order to exclude cases where the classification into one subset or another could be for strictly technical reasons. Firms operating into industries which our data base showed to work exclusively for the

The first subset was expected to contain firms that are more likely to be involved in stable exchange relationships with other firms, or which are more frequently oriented to develop relatively continuous contractual relationships with purchasers. In the second subset on the other hand, very much less stable relationships would probably prevail because of their nearness to the final consumer. Before presenting the results of our testing, some of the features and methodological options for constructing the main variables should be illustrated.

Exchange operational costs

Two strategies for constructing this variable were originally considered. The first was narrower and concerned a limited set of expenditures on services purchased by the firm as a direct function of carrying out market transactions. The second strategy was broader and included, as well as the preceding costs, also the cost of staff and the share of internal resources used directly in the running and administration of transactions (costs of staff responsible for purchasing and sales, part of the costs of accounting and book-keeping staff, and a share of depreciation of fixed capital). An intermediate strategy was adopted in the end, because it was difficult to measure precisely and separate out the individual costs. The exchange operational costs were thus approximated to the IEM/CT variable. This is the sum of services carried out by third parties, (supply agents and intermediaries' fees, various expenditure and consultancies), travel and freight costs, telephone and postal charges and running costs (advertising, supplying, bank commissions excluding negative interest, market research, data processing) as a share of total net costs¹⁵.

Net profitability

This is measured in terms of mark-up on net total costs and is shown by the variable PROF1

Net total costs

This is the sum of fixed costs and running costs net of costs of raw materials and semi-finished goods (variable CT). The two subsets show a great difference with regard to this costs, and it is worthwhile to point this out because otherwise the set of firms working with other firms would appear to have consistently lower costs structures, as well as higher profitability, than the firms which operate for the final market.

4. Relationship between companies and costs structure

An empirical test of the hypothesis illustrated above will include statistical confirmation of the following relationships.

- a) Operational costs are expected to be negatively correlated to the incidence of work for other companies on a firm's total turnover;
- b) It is expected that a significant concentration of internal resources in manufacturing activity will be associated with a reduction in exchange operational costs, and that consequently there will be a relative decrease in importance of internal tertiary resources;

final market or exclusively for other firms were therefore not included. These criteria, and the low number of firms examined, meant that those we selected belonged either to the textiles/clothing or to the mechanical sector.

¹⁵ The IEM/CT variable also contains a share of negotiating costs. We presume that in small firms, these costs can be born by the entrepreneurial function and therefore do not largely appear in the set of costs examined.

- c) There is expected to be a higher degree of output differentiation in companies oriented to the final market than in firms working for other companies;
- d) It is predicted that the costs structure of the two groups will not be significantly different. In fact the decision of whether to produce for the final market or to work within exchange relationships with other companies, considering the selection criteria adopted, should not depend on the technology used, on the type of product or on the production phase specialisation;
- e) The level of profitability is less simple to predict. In fact it is expected that firms working mainly for other firms will not show lower levels than final market oriented companies. There is disagreement here with neo-institutionalist economics. It may be however, that where exchange relationships between companies are long term, the savings in operational costs and economies of specialisation allow the company working with other companies to exceed the average level of profitability.

The method of testing these hypotheses is based on a logistical equation with dependant variable SETIMP=1 if the firm is mainly oriented to working for other companies and SETIMP=0 if the firm produces for the final market. The independant variables are described in Table 1. The results of the calculations confirm to a great extent the hypotheses discussed (see Table 2). No significant differences between the subsets regarding costs structure in fact emerge. The importance of labour costs (W/CT), maintainance costs (MAIN/CT) fixed capital (K/CT) and financial charges interest (INC/CT) on total costs show a negative coefficient. This confirms that the production units in exchange relationships with other firms are able to make significant savings in this category of costs. Moreover, there are very clear differences between the two types of firm regarding the degree of specialisation of internal resources in carrying out manufacturing activity. Firms producing for the final market dedicate a significant share of their resources to tertiary activities, but supplier companies show a much lower level of internal services. They consequently show higher specialisation of resources in manufacturing activity (see MANIF).

*TABLE 1
INDEPENDENT VARIABLES IN LOGISTIC EQUATION*

K/CT= FIXED CAPITAL OVER NET TOTAL COSTS

W/CT=LABOUR COST OVER NET TOTAL COSTS

MAIN/CT= EQUIPMENT MAINTENANCE COSTS OVER NET TOTAL COSTS

W/L=LABOUR COSTS PER EMPLOYEE

INT/CT=FINANCIAL CHARGES OVER NET TOTAL COSTS

IEM/CT=EXCHANGE OPERATIONAL COSTS OVER NET TOTAL COSTS

MANIF=NON MANUAL WORKERS OVER TOTAL EMPLOYMENT

DIV=DEGREE OF DIVERSIFICATION (INCIDENCE OF MAIN PRODUCT OVER TOTAL TURNOVER; 4-DIGIT ATECO 1981)

PROF2=LEVEL OF PROFITABILITY (PI) (DUMMY: 1=PI≥PI; 0=PI<PI)

The limited use made of tertiary input has notable effects on the demand for labour as well as on unit cost. The lower incidence of tertiary work input means that the average cost of labour (W/L) is significantly lower in the first subset than in the second. The hypothesis of a greater diversification of output from firms which produce for the final market is not in fact confirmed. Probably the limited size of the production units examined and perhaps the sector classification of output weaken the discriminating capacity of variable DIV.

TABLE 2
LOGISTIC EQUATION OF SETIMP

	Coeff.	T
<i>K/CT</i>	1.3601	.7229
<i>W/CT</i>	.4086	.3347
<i>MAIN/CT</i>	3.5101	1.0734
<i>W/L</i>	-.0001**	-2.2207
<i>INT/CT</i>	4.1824	1.3488
<i>IEM/CT</i>	-5.0451**	-2.2767
<i>MANIF</i>	3.8571***	3.2621
<i>DIV</i>	.4131	.5865
<i>PROF2</i>	.5836**	1.9431
<i>COSTANT</i>	-3.9975**	-2.3436
LIKELIHOOD RATIO	58.016***	
DF	396	

**=Level of significance 5%

***=Level of significance 1%

The significance and the positive value of the proxy of firm profitability (PROF 2) also support the framework we are proposing. The fact that companies involved in exchange relationships with other production units have a high probability of achieving better than average profit margins supports the hypothesis of a positive correlation between development of inter-firm relationships, efficiency improvements and profit sharing. Linking this fact with the preceding results, it seems that a first

provisional conclusion can be reached regarding the nature of exchanges between firms in examination. The overall evidence collected in fact indicates that the increasing manufacturing specialisation of companies, associated with the reduction of operational costs, does not lead to a systematic weakening of the contractual capacity of the supplying company or expropriation by the commissioning firm of the profits made in the transaction.

5. Profitability differentials and input composition

As we have seen, the results of the logistic equation show that belonging to one or other of the two subsets of firm cannot be explained by variables like the nature of input or the incidence of labour costs on total costs. The evidence seen so far however does not preclude that production technology characteristics and in general the composition of input vary considerably among supplier firms. Verifying this hypothesis involves two distinct methodological operations. The first is classifying supplier firms on the basis of input features utilised so that eventual structural differences between the first subset of companies are clear. The second step is to use the results of this classification to examine the relationship between input quality and profitability.

The classification of supplier companies was carried out by cluster analysis with non fixed centroids, based on variables:

LNW/L = labour cost per employee

LNK/L = fixed capital (approximated to the value of annual costs of fixed capital net of annual leasing charges and machine and equipment maintenance costs) per employee (logarithm)

$LNIEM/L$ = exchange operational costs per employee (logarithm).

The maximum Euclidean distance was reached for two groups with the following features (see Table 3):

- Cluster 1- These are firms which have high levels of technology and high quality of input. There is a comparatively high ratio of fixed capital per employee, they have high operational costs of coordinating exchanges and their labour force receives higher than average remuneration or has higher than average qualifications;
- Cluster 2- These are the firms that on the basis of indicators chosen appear to have a low level of labour and technology inputs. The ratio of fixed capital per employee and labour cost per employee are notably lower than average values of cluster 1. The value of $LNIEM/L$ (exchange operational costs per employee) is very modest. Finally the second group shows a high incidence of labour costs over net total costs (W/CT), and low incidence of capital costs, and labour demand with average - low qualifications (see W/L).

Statistically significant differences in the composition of input between the two groups are confirmed. Labour costs and the annual costs of capital investment as a proportion of total costs (W/CT and K/CT respectively) are in fact noticeably different. Technology used by the first group of firms is also relatively more complex than that used in cluster 2. (See the values given for $MAIN/CT$ = maintainance costs over total net costs¹⁶.

¹⁶ The difference in input composition gives rise to a ratio of total net costs over employees (CT/L) which is noticeably higher in the first cluster than in the second, but these costs are not reflected in the incidence of financial

TABLE 3

COSTS AND PROFITABILITY IN FIRMS GROUPED IN CLUSTER 1 AND 2

	Cluster 1	Cluster 2	F	Sig.
W/CT	0,493	0.769	48.025	.000
K/CT	0.184	0,063	23.435	.000
MAIN/CT	0.046	0.021	5.272	.025
W/L	14.800	11.645	8.424	.005
CT/L	33.644	15.575	40.297	.000
INT/CT	0.040	0.035	0.169	.682
LAVIND/CT	0.074	0.043	1.124	.293
SUB/Y	0.820	0.876	1.144	.289
IEM/CT	0.146	0.058	20.592	.000
PROFI	0.107	0.158	1.204	.277
PROF2	0.524	0.650	0.902	.346

Keys:

W/CT=Labour cost over net total costsK/CT= Fixed capital over net total costsMAIN/CT= Equipment maintenance costs over net total costsW/L=Labour costs per employeeCT/L=Net total cost per employeeINT/CT=Financial charges over net total costsLAVIND/CT=Value of subcontracting over net total costsSUB/Y=Value of subcontracting over turnoverIEM/CT=Exchange operational costs over net total costsPROFI=Mark-up over net total costsPROF2=Level of profitability (Pi) (Dummy: 1=Pi≥Ppi; 0=Pi<Ppi)

From the information available, it is predicted that cluster 1 firms will have technological exclusivity high enough to determine stable contractual advantages with regard to the subcontractor and higher

charges or subcontracting costs over net total costs (INC/CT and LAVIND/CT respectively). Lastly, they do not modify the propension to offer subcontracting services of the two groups (see SUB/Y).

than average profitability. The information collected seems however to be very different from this hypothesis. Profitability, as measured by two indicators (PROF 1 and PROF 2) in fact appears higher, although not to a significant level, in cluster 2 companies rather than in cluster 1 companies. Thus the hypothesis that profitability differentials would be explained by the difference in production technology and the capacity of protection of the quasi rents is not born out by the empirical evidence. The analysis of the difference between the two clusters does seem to confirm that there is a negative relationship between exchange operational costs (in terms of percentage importance on total net costs IEM/CT)) and profitability. The results of the calculations therefore appear consistent with the proposed model. There are in fact sufficient reasons to believe that a) it is possible for production units with no access to the final market and which have no exclusive technology to develop exchange relationships with other companies; b) they should be able to do this without being automatically exposed to the risk of expropriation of the surplus of the exchange or the risk of being confined below the normal levels of profitability for the industry.

The relationship between exchange operational costs and profitability will be examined in more detail in the next section.

6. Exchange operational costs and company profitability

Within the interpretation framework we are proposing here, the measurement of the impact of exchange operational costs and other variables on firm profit levels is particularly crucial. The analysis is however partial since in the model estimated profit differentials are compared exclusively to proxy variables for fixed and semi-fixed costs. This limitation is partly a result of the shortage of information, but it is also partly intentional.

The objective in fact is to verify whether:

- i) firms producing for the final market and supplier firms face exogenous sunk costs that are very similar and have a similar impact on profitability.
- ii) the two types of firm differ with regard to decisions on exchange operational costs and with regard to the relationship between these costs and profitability.

The following analysis examines in more detail the relationship between efficiency and long-term inter-firm relationships. It also brings out an apparent area of conflict between the conclusions of the present work and much of the literature on this subject. In fact it is commonly supposed that the costs defined as 'exchange operational costs', in that they are investments aimed at widening the market, bring about positive effects on profitability. This supposition is based on the fact that as elasticity of demand for non-salvageable endogenous investment is higher than unit (Sutton 1991), firms with high exchange operational costs can dispose of demand that is constantly in equilibrium with production capacity. This has important consequences on the efficiency of the production system and profit levels. It is predicted that the results of the preceding discussion will be valid for firms producing for the final market (2nd typology), but not for companies working for other companies (1st typology). In fact, firms which produce exclusively for the final market, using investments of operational coordination of exchanges as an instrument of extension and consolidation of activity, are expected to show a positive relation between exchange operational costs and profitability. Companies working mainly for other companies will be different. For them, efficiency is based at least in part on limiting such costs. According to our hypothesis, savings made in resources invested in the coordination of exchanges constitute one of the main advantages in

defining contracts or developing long-term relationships. It is therefore expected that a reduction in exchange operational costs be associated with an increase in profitability, and a negative relationship is thus expected. The other hypotheses which need to be verified are the influence that fixed costs born by the firm and its size, can have on profitability. If these relationships were unambiguous, the typologies proposed would be supported, as it would confirm a high level of evenness in conditions of technical efficiency between the companies examined. This result would indicate that apart from the choices regarding the destination of the product (final market or other companies), the companies do not differ significantly with regard to the use of fixed input¹⁷.

The model to be verified was thus specified as follows:

$$PROF_i = b_0 + b_1 DIM_i + b_2 INT/CT_i + b_3 K_i + b_4 W/Li + b_5 IEM/CT_i$$

where

*PROF*_i= mark-up over net total costs

DIM= firm size (number of employees);

INT/CT=net financial charges over net total costs;

K=turnover net of purchasing of raw materials and intermediate inputs over fixed capital;

W/L=labour costs per employee;

IEM/CT=exchange operational costs over net total costs.

Except for *IEM/CT*, the variables require some explanation. *K* is used as a proxy of production capital intensity and indirectly as an indicator of the degree of non-salvageability of the production technology. Variable *DIM* is introduced in order to record the effect that growth usually determines on the level and variance of profits. Variable *INC/CT* is intended to capture the effect that a recent cycle of investments, financed by credit capital, can have on company profits. The coefficient of the independent variables is expected to be negative, except for *IEM/CT* which for the above stated reasons is hypothesized to assume a different sign according to which of the two categories of company it is applied to. The other exception is *K*, which because of the way it is constructed will be positive when it indicates an inverse relationship between profitability and capital intensity.

Table 4 shows the results of the calculations. The calculations of the equation 1 show that while proxy variables of fixed production costs and size are important in explaining the profitability differentials among companies, the coefficient of exchange operational costs is mainly insignificant. This evidence supports the hypothesis that, whether companies produce for the final market or work mainly for other companies, there is little difference between the two types regarding effects of fixed or semi-fixed costs on the profitability of production units. The non-significance of the exchange operational costs variable does not seem, on the other hand, to permit conclusive comment.

¹⁷ It should be remembered that this was partially verified through estimates of the logit model illustrated in Table 2.

TABLE 4

REGRESSION EQUATIONS OF PROF1 (T TESTS IN BRACKETS)

	Eq.1	Eq.2	Eq.3
DIM	-.11650** (-2.370)	-.13330** (-2.502)	-.11918** (-2.430)
INT/CT	-.09776** (-1.987)	-.10896** (-2.049)	-.09424* (-1.918)
K	.16886*** (3.456)	.18559*** (3.502)	.16544*** (3.393)
W/L	-.17855*** (-3.610)	-.15011*** (-2.806)	-.16978*** (-3.414)
IEM/CT	.07339 (1.482)	.11431** (2.133)	.10937** (2.090)
YTIP	-	-	.15983** (2.209)
YTIP*IEM/CT	-	-	-.09961 (-1.397)
F	8.0297***	7.5757***	6.4822***
R ² a	0.0832	.0913	0.0902
n. cases	406	340	406

*=Level of significance 10%

**=Level of significance 5%

***=Level of significance 1%

Progress in interpreting the role of this variable is made possible by the calculations of equation 2, from which the first group of companies was excluded. The new equation shows a more significant coefficient IEM/CT, as well as an increase in the level of explained variance. Equation 3 gives better results. It broadens the initial model by introducing dummy YTIP, identifying which typology the companies belong to. (1 = supplying other companies, 0= working for the final market) and the interaction YTIP/IEM/CT. As expected, the estimated coefficients indicate that interaction is

negative. It is thus confirmed that the two types of company show different effects of exchange operational costs on profitability. It is positive in production units of the second type, which shows that higher investment in this direction improves the竞争力 of the company on the final goods market. It is negative for the first type of company (those working for other companies) which confirms that the development of relationships between firms can largely be explained by the profitability advantages stemming from limiting exchange operational costs.

8. Conclusions

In the present work, an explanation model of the long-term relationships between firms attempting to overcome some of the shortcomings implicit in neo-institutionalist hypothesis has been presented. Applied to long-term exchanges, the transaction costs scheme can provide an interpretation exclusively of the relationships that are based on specific investments and therefore are justified by savings in the negotiating costs between the parties. Except in particular circumstances, such a model prescribes that long-term contracts are affected by high risks of instability on account of the emergence over time of asymmetries between the parties, and the worsening of the profitability of the production units less-informed and more distant from the market. Such prescriptions differ with much of the evidence available on the relationships between firms. In fact it indicates a widespread resort to long-term relationships even when the exchanges are not linked to specific investment, and shows that the profitability of the firms involved in such contractual regimes is not statistically different from the average.

The interpretative scheme proposed in surmounting such deficiencies refers to a class of costs neglected in the current neo-institutionalist literature: it concerns the resources the firm has to employ, apart from the need to check the opportunism, to acquire information about the possibility and the benefit of the exchange and to carry through operationally the transaction. Such expenses, named exchange operational costs, are mostly unsalvageable and are a direct function of the number of transactions per unit of product traded, the size of the relevant market and the (temporal) variance of the transactions. In this approach, long-term contracts are justified by the fact that the beginning of continuous relationships between the parties entails significant savings in the operational costs on account of decreasing the number of clients and lessening the variance of the exchanges. This result is achieved avoiding the rise of contractual asymmetries since exchange operational expenses are able to reduce the idiosyncratic content of the transaction and to preserve a second source alternative.

The implications are that the long term contracts/relationships, instead of regulatory devices aimed at safeguarding specific investments carried out *before the beginning* of the exchange, might be viewed as a co-ordination framework able to generate significant economies of specialization and efficiency improvements *after the beginning* of the transaction.

A first empirical verification of the proposed explicative scheme has been successfully undertaken. On the basis of information concerning the costs structure of a wide sample of small-medium manufacturing firms, it has been possible to argue that:

- i. the exchange operational costs represents an important feature of the total costs and therefore significantly affect the profitability of the firm;

- ii. the firms more oriented to establish exchange relationships with other firms have (i) lower operational costs and (ii) profitability equal or higher than the firms mainly oriented to trade with the final market;
- iii. the reduction of exchange operational costs influences positively the profitability of the supplier firms.

The previously discussed outcomes allow us to draw the conclusion that the exchange operational costs represent a useful analytical tool in understanding some economic issues like the temporal duration of the exchange relationships and features of the vertical integration choice that currently lack a satisfactory explanation. Finally the relaxation of the constraints stemming from asset specificity shed a different light on the role of the transactional non-negotiating variables and more generally the importance of the learning factors in shaping and conditioning the improvement of the division of labor between firms.

References

- Ariu G, Arrighetti A. and Seravalli G. (1994), *Crescita e relazioni di scambio tra le imprese*, mimeo, Istituto di Scienze Economiche, Università di Parma.
- Arrighetti A., Bachmann R. and Deakin S. (1997), "Contract Law, Social Norms and Inter-firm Cooperation", in *Cambridge Journal of Economics*, n. 2, March
- Dietrich M. (1994), *Transaction Cost Economics and Beyond*, London, Routledge
- Dow G.K. (1987), "The function of authority in transaction cost economics", in *Journal of Economic Behavior and Organization*, vol. 8
- Hart O. (1989), "An Economist's Perspective on the Theory of the Firm", in *Columbia Law Review*, November
- Lorenz E.H. (1989), "Nè amici, nè estranei: reti informali di subappalto nell'industria francese", in Gambetta D. (a cura di), *Le strategie della fiducia*, Torino, Einaudi
- Milgrom P. and Roberts J. (1982), "Predation, Reputation and Entry Deterrence", in *Journal of Economic Theory*, vol. 27, August,
- Radner R. (1992), "Hierarchy: the economics of managing", in *Journal of Economic Literature*, vol. 30, September
- Riordan M. and Sappington D. ((1989), "Second Sourcing", in *Rand Journal of Economics*, n. 20,
- Seravalli G. (1995), Labour Division and The Organization of Inter-firm Relations, in *Dundee Discussion Papers in Economics*, n. 63

Stigler G.J. (1951), "The Division of Labor is Limited by the Extent of the Market", in *Journal of Political Economy*, June, pp. 185-93

Stiglitz J.E. (1989) "Imperfect Information in the Product Market", in Schmalensee R. e Willig R.D. (eds.), *Handbook of Industrial Organization*, Amsterdam, North Holland

Sutton J. (1991), *Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration*, Cambridge (Mass.), The Mit Press

Williamson O.E. (1985), *The Economic Institutions of Capitalism. Firms, Markets, Relational Contracting*, New York, The Free Press