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Research Note: An Analysis of Specificity in Transaction Cost Economics

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Abstract

The transaction specificity of assets yields dependence, and hence transaction costs in case of opportunism and bounded rationality. However, this dependence need not be symmetric between buyer and supplier, and there may be dependence without transaction specific assets. There are many forms of specificity, yielding different patterns of more or less symmetric dependence. These different forms of specificity are analyzed in terms of a formal, generalized relation of specificity. The implications for dependence are discussed.

Introduction

In Transaction Cost Economics (TCE), as developed by Williamson (1975, 1985), so-called transaction specificity of assets is crucial, in combination with opportunism and bounded rationality. If there are assets which are specific to the transaction, i.e. have no, or substantially less, worth outside the transaction, this will cause dependence between transaction partners which yields transaction costs if there is risk of opportunism and if rationality is bounded. Mostly, symmetric dependence is assumed: if a producer uses assets specific to the transaction, this yields a unique or at least differentiated product, and discontinuity of the transaction will then be a problem, not only for the producer but also for the user (who will not immediately find an alternative supplier of an equivalent product, and thereby suffers discontinuity, lower quality or higher costs of production).

'Specificity' means something like this: 'to achieve a given purpose there is no alternative for a given means'. For example, there is no alternative use for a given asset — the asset can be used to make this product, but not another; or, there is no alternative technology (asset) to produce this product — the asset is required to make this product; or, there is no alternative demand for a given product — a product is required by this customer but not another. Together, these conditions yield transaction specificity of the asset, which means 'no alternative transaction': the asset is required for this transaction, but is useless elsewhere. Another example is where there is no alternative for a given product and no substitute; the buyer requires this product but not another. The claim of the present

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article is that in standard TCE there is too much looseness in the application of the concept of specificity, leading to a misrepresentation of relations of dependence between buyer and supplier. A rigorous, more formal, analysis of specificity shows up more complicated patterns of dependence. With different forms of specificity there can be more or less symmetric dependence or unilateral dependence on the part of the supplier or the buyer.

Complications of Specificity

Upon close scrutiny, TCE, as formulated by Williamson (1975, 1985), raises a number of questions. While the garment of TCE is well-designed, has a reasonable fit, and is certainly doing well in the fashion houses of economics, the seams are badly stitched. The questions concern the ways in which dependence and asset specificity hang together, and the symmetry of dependence between buyer and supplier. There is a range of possibilities. Consider the following cases.

- A. There can be investments which are specific with respect to the transaction, without their being specific to the product that is exchanged. These investments are directly related to the transaction and there is no alternative use for them. Here one can think of search costs or costs of marketing: investment in knowledge about the transaction partner (her/his needs, decision-making, logistics, operating procedures, administrative procedures, . . .). They may be symmetric or completely unilateral, on the part of only the supplier or the buyer, thus causing one-sided dependence.
- B. Suppose we have transaction specificity in the paradigmatic form that the supplier has investments specific to the product (no alternative use for the asset) which is, in turn, specific to the buyer (no alternative demand for the product). Then there is no alternative use for the asset, outside the transaction. While the supplier stands to lose his investment (in case the investment is fully sunk)— when the transaction is discontinued, the buyer only stands to incur some compromise in cost, quality or time. The latter dependence appears less binding than the former and the switching costs would appear to be lower, in general. The dependence of the buyer rests on how unique the supplier's product is (alternative supply); on the price elasticity of demand; on the extent to which the product is differentiated between suppliers or is protected by patents or other entry barriers. This is not a direct consequence of asset specificity, so that the issue of buyer dependence requires further analysis.
- C. When there is supplier dependence, as under B, one question could be whether it can be circumvented. Could the product be made in a different way, with less specific assets; or is there no alternative, more flexible, technology? In other words, is the product specific with respect to that type of asset (technology); is the supplier incapable of

using such alternative technology; or does the buyer demand that specific technology of production, and no other?

- D. If one assumes that supplier dependence is inevitable, as under C, then the degree of this dependence will be linked to whether the supplier has other products and markets to fall back on; on whether, for the supplier, there are alternative products, or, in other words, we might say on whether the supplier is specific with respect to the product. If this condition also obtains, then the supplier is fully and inevitably bound to the buyer. This often applies to smaller firms, with a limited product range. Effectively, then, *all* assets are specific to the product, even if some of them could technically be used for other products, if only the firm carried them.
- E. There may be a specialized product on which the buyer, along with other buyers perhaps, is highly dependent. Here, there is no alternative product; no substitute — the buyer is specific with respect to the product. If, in addition, there is no alternative supply, i.e. if the product is specific to a given supplier due to patents or other proprietary resources, there is monopoly and the buyer is highly dependent on the supplier.
- F. There may be buyer dependence, as under E, without supplier dependence, even if the product is specific to a given buyer (no alternative demand for the product). This situation occurs if the product can be produced with assets that are not specific to that particular product. One could, for example, use standard components to assemble a product tailored to the demand of the focal buyer. Although the costs of switching to a different assembly for a different buyer may be slight, the supplier may still be so expert in the activity of assembly that buying becomes preferable to making, from the perspective of the buyer.

The concept of transaction specificity of assets and its consequences seemed simple enough at the start but, on closer analysis, we find ourselves asking questions about other relations of specificity of (x) with respect to (y), and not just assets that are specific with respect to a transaction, but intermediate and extended relations of specificity as well. In order not to get entangled in a mess without system or survey, we now turn to a more systematic and formal analysis of specificity. In fact, the above cases A to F have been derived from that more formal analysis.

A Formal Analysis of Specificity

In its most general terms, specificity is a two-place predicate: x is specific (with respect) to y . This means that for x to apply, there is no alternative for y ; y is a necessary condition for x . In logically equivalent terms: non- y implies non- x .¹ We use a formalized notation, as follows: x being specific with respect to y is represented as xy . We can then make strings as

follows: xyz , which means that x is specific with respect to y , which in turn is specific with respect to z . The binary relation of specificity is reflexive and transitive, but not symmetric. In our notation, these properties can be represented as follows:

- reflexivity: xx
- transitivity: xyz implies xz
- asymmetry: xy does not imply yx .

These properties can easily be demonstrated by looking at sets of truth conditions.²

In application, these logical categories become less stark. When we say that for x there is no alternative to y ; non- y implies non- x . This means that if y does not apply in some sense, then x does not apply in some sense either.

If, for xy , we substitute $x=a$ (asset) and $y=t$ (transaction), yielding at , we obtain *transaction specific assets*. For the asset a to have use, there is no alternative to the transaction t ; if the transaction no longer applies (is discontinued), the asset no longer applies (has no, or limited, alternative uses). This is the case A discussed in the previous section. We can experiment with other substitutions for x and y . This can help as a conceptual laboratory for an exploration of different conditions and opportunities of exchange.

We could turn it around and consider ta : *asset specific transaction*. This would mean that for the transaction t to occur, there is no alternative to the asset a and if the asset a does not apply (is not in place), the transaction t does not apply (would not occur) either. Due to the asymmetry of specificity, this is not necessarily the same as the previous case. The condition that an asset has value only in some given transaction is not the same as the condition that the asset is necessary for the transaction. An asset may be necessary for a transaction while having value in other transactions as well.

Due to the transitivity of specificity, we can have direct transaction specificity of assets (at), because one or both parties have to invest directly in the transaction (costs of search or contract). It can also arise indirectly, with the product³ as an intervening entity: ap with a =supplier-asset and p =product – *product specific asset* – and pb with p =product; b =buyer – *buyer specific product* – together yields ab . For the asset a to apply, ap says that there is no alternative to the product p ; if the focal product does not apply (is not made), the asset does not apply either (would have no value; would not be used). For the product, pb says that there is no alternative buyer. If this transaction did not occur, the product would not be sold. In other words the buyer is a *monopsonist*. This would bind the supplier. This is the case B discussed in the previous section. Alternatively, perhaps the product could be made with assets that may also be used for other products. *Ex ante*, before investments are made, the supplier would be bound by the transaction only if, in addition to ap , we also have the reverse, pa (*asset specific product*). The product is specific to the asset; to produce the product there is no alternative to that asset (which is

specific to the product). This is the case C considered in the previous section. If, in addition, the supplier cannot supply any other product (*sp*; *product specific supplier*), which yields case D, the supplier is fully and inexorably dependent on the buyer (*sb*; *buyer specific supplier*).

Now let us again make a reversal. Consider *bp* with *b*=buyer; *p*=product (*product specific buyer*). This says that, for the buyer, there is no alternative product, no substitute; if the product is not available, the buyer does not buy. Here is an opportunity for the supplier to achieve a competitive advantage by catering to the special demand of the buyer. This is the setting of *product differentiation*, where different suppliers cater to different demands. This yields a potential dependency of the buyer, which becomes real and complete when also *ps*, with *p*=product; *s*=supplier (*supplier specific product*) indicates that there is no alternative supply. This is *monopoly* where, due to transitivity, *bs* (*supplier specific buyer*) follows from *bp* and *ps*. Then the buyer is bound. This is the case E discussed in the previous section.

Table 1 gives a summary of the forms of specificity discussed above. The second column of the table refers to the cases discussed in the previous section, and indicates which forms of specificity they include.

The table does not exhaust all possibilities. It does include all 12 possibilities for substituting *a* (supplier or producer asset), *b* (buyer), *p* (product) and *s* (supplier) for both *x* and *y*, excluding the reflexive substitutions (*xx*). However, there are more candidates for substitution. We could more systematically separate supplier and producer assets. A distinction could be made between, on the one hand, a transaction and on the other hand, a transaction partner or a transaction relation, if we treat a transaction relation as a series of transactions in time with a given transaction partner. Implicitly, we viewed the buyer as the user and the supplier as the producer, but a buyer or supplier could also be a distributor, and the distinction might yield further refinements. Also, we can add product features as an intervening variable between product and buyer preference, and technical properties as an intervening variable between a product and the assets used to produce it.

Forms 5 and 6 represent the transaction specific assets of ordinary TCE: one form for the supplier and one for the buyer. Note that forms 5 and 6 can apply directly. Dependence due to transaction specificity, without the product as an intervening variable, arises if the supplier has invested directly in the buyer, by getting to know him or by building up non-transferable trust (form 5), or vice versa (form 6). This is the case A discussed in the previous section. Due to transitivity, form 5 can arise indirectly from form 2, followed by form 3. The latter would be the paradigmatic case: supplier assets are specific to the buyer because they are specific to a product which is specific to the buyer. This is case B discussed in the previous section. Supplier dependence is further enhanced if the supplier is dependent on the single product (form 7) and there is no alternative, less transaction-specific technology, because there is no more flexible technology to make the product (form 12), or the

Table 1 Forms of Specificity

No.	Case	x	y	Name	Context	Dependent party
1	E, F	buyer	product	product specific buyer	differentiated product	buyer
2	B, C, D	supplier asset	product	product specific asset	dedicated machine	supplier
3	B, C, D, F	product	buyer	buyer specific product	single buyer product (monopsony)	supplier
4	C, D	product	supplier asset	asset specific product	inflexible technology	supplier
5	A, B, C, D	supplier asset	buyer	buyer specific asset	transaction specific asset	supplier
6	A	buyer asset	supplier	supplier specific asset	ibid.	buyer
7	D	supplier	product	product specific supplier	single product supplier	supplier
8	E, F	product	supplier	supplier specific product	single supplier product (monopoly)	buyer
9	E, F	buyer	supplier	supplier specific buyer	captive buyer	buyer
10	D	supplier	buyer	buyer specific supplier	captive supplier	supplier
11	C, D	buyer	supplier asset	asset specific buyer	single technology buyer	supplier buyer
12	C, D	supplier	supplier asset	asset specific supplier	single technology supplier	supplier

buyer demands the specific technology (form 11). This yields cases C and D.

There is a particularly important class of specificity which appears to be neglected in TCE. This is the case of product differentiation, which is reconstructed as form 1: *product specificity of the buyer* — for the buyer there is no alternative for the product and there is no substitute. This is a threat to the buyer if, in addition, the product is specific to a particular supplier (form 8: monopoly), which yields form 9 (captive buyer). This is case E discussed in the previous section, by means of product differentiation. The product offers a feature that is tailored so well to the need of the buyer, and substitutes are so lacking in this valued feature, that the buyer has little demand for the available substitutes. Note that, due to the property of asymmetry, this case is not equivalent to form 3 (x =product, y =buyer). A product may have only a single buyer, while there are close substitutes available to the buyer; one can make a differentiated product for a significantly large group of buyers. The two are equivalent only when a special feature is offered which is of value to one, and only one, buyer. Note that the dependence of a buyer on a supplier (form 9) may arise in several ways, due to the property of transitivity. It can arise as form 1 followed by form 8: a buyer is interested in a feature offered only by the particular product of a particular supplier. One can also have form 9 via form 5, without the product as intervening variable in instances when the buyer depends on the supplier because of sunk investments in the relation such as costs of getting acquainted and investments in trust. One can even have 9 directly, without the product or transaction-specific investments as intervening variables in the case of family ties, personal attachments or lack of information. The issue of product differentiation merits closer attention.

Product differentiation

It is important to note that one can have product differentiation without much transaction specificity of (producers) assets. This is the case F discussed before. This case is important because if it arises, it binds the buyer without binding the supplier. A producer may create a differentiated value by building it into the product, which entails a relatively high degree of specificity of assets (with respect to the product), or by adding it onto the product (in the form of logistic properties, accessories — as in the car industry — and services) with diminished asset specificity, or by assembling standard components in a specific way, with highly restricted asset specificity, or by only creating a special appeal or image by advertising, with asset specificity virtually zero.⁴ One may argue that to the extent that asset specificity is less, (potential) competition is higher, and there will soon be closer substitutes, weakening the dependence of the user. This may not necessarily be true, however, due to the possibility of entry barriers.⁵

Several features come together in the following strategy for a producer: create a differentiated product for a segment of the market — trading off number of users against product specificity of use — do this in the least asset-specific fashion possible — to be as little dependent as possible on the product/market combination at issue —, and add features, directly or subsequently, that create switching costs for the user,⁶ as an additional insurance against novel competition, including innovation. If that strategy is feasible — it is in fact often used —, what additional safeguards does the producer still need? He has kept his options open because his assets are hardly transaction specific, and his buyers have no viable options for moving out. To the user, the only alternative to sitting it out on the conditions of the producer may be to take him over.

Conclusion

Given the assumption of risk of opportunism and bounded rationality, standard TCE suggests a too simplistic relation between transaction specificity of assets and dependence. We grant that the paradigmatic case of a supplier who applies transaction-specific assets for the production of a product that is tailored to the demand of a single customer is an important one, and may yield mutual, symmetric dependence. However, a closer look yields qualifications, resulting in a wide range of relations of dependence, which may be more or less symmetric or unilateral on the part of the buyer or the supplier.

It remains true that transaction specificity of assets is a sufficient condition for dependence, but this may be unilateral on the part of the buyer or the supplier. Furthermore, transaction specificity of assets is not a necessary condition: there can be dependence on the part of the buyer or the supplier, without significant asset specificity. The supplier can be independent, even in the case of a differentiated or unique product that creates buyer dependence. This situation arises if differentiation or uniqueness is created towards the end of the production process, in assembly, by means of flexible machinery and installations, which make increasing use of information technology. This situation is particularly important, since it allows for lower supplier dependence, thus creating more opportunities for suppliers. To the extent that supplier dependence was an obstacle to an expansion of external production of inputs (a shift to 'buy' in the 'make or buy decision'), that obstacle now appears to be reduced.

The analysis was facilitated, and could be systematic, by a formal analysis of specificity as a generalized relation of 'absence of an alternative means for a given purpose'. This relation is transitive but not symmetric. It is specified in a simple formula in which one can substitute different values for the means and the purpose; to explore different forms of specificity, yielding various patterns of dependence, or which one can use to trace how a given pattern of dependence might be generated from intervening

variables. Here we substituted assets (mostly suppliers assets), the buyer, the product and the supplier. The method can be used for more complicated analyses, where distinctions are made between transactions and transaction partners or transaction relations; between producers, distributors (acting as both buyers and suppliers) and users; between products, product features and technical properties of products.

Notes

1. Or, in yet other equivalent terms: the set of truth conditions for x (X) is a subset of those for y (Y), whereby the complement of Y is a subset of the complement of X .
2. Something (product, asset, supplier, user) is specific to itself (reflexivity) because the set of its truth conditions is a subset of itself. If x is specific to y and y is specific to z , then x is specific to z (transitivity), because the subset X of a subset Y of a set of truth conditions z is also a subset of that Z . If x is specific to y , y need not be specific to x (asymmetry), because if X is a subset of a set of truth conditions Y , Y need not be a subset of X .
3. By 'product' we mean anything that is 'produced' i.e. that carries added value, including services.
4. Particularly if the promotion expense also rubs off on a more general brand image of the producer, with value for other products as well.
5. In a wide sense, including not only patents or proprietary material or human resources, but also firm specific communication skills.
6. Switching costs are related to, but not the same as, product specificity. Product specificity refers to a feature of a product which is both valued and unique (not on offer from a competing supplier). Switching cost refers to a valued or necessary feature that entails sunk costs on the part of the user. For example, the use of the product requires a method of operation or complementary assets that are different for competing products. Thus switching costs are transaction specific; they arise after transaction and entail investment specific to that transaction.

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