

THREE APPLICATIONS OF TRANSACTION COST ECONOMICS IN ROMANIA*

Radu A. Păun, PhD
International Monetary Fund Institute
700 19th Street, N.W.
Washington, D.C. 20431
rpaun@imf.org or radupaun@yahoo.com

Abstract

We begin by investigating the use of complex contracts in Romania. A transparent transaction cost economics (TCE) model generates the hypothesis that buyer and seller relationship-specific investments have opposite effects on contract complexity. Our analysis counters the problem of unobserved heterogeneity, generates estimates of the effects of specific investments that are opposite in sign on opposite sides of the agreement, and explains the patterns in the biases of ordinary least-squares estimates. We continue by presenting a simple methodology for measuring transaction costs at agreement level. These costs are assessed as large, accounting for more than a fifth of value added. The validity of the measure is tested and quality of the data is analyzed. Finally, we investigate the determinants of transaction costs estimates thus obtained. Results show that TCE theory is very successful at predicting the existence of transaction costs and moderately so at predicting their size when incurred by firms.

1. Introduction

Part of the New Institutional Economics, Transaction Cost Economics (TCE) considers transaction costs to arise from two inherent features of the human nature: bounded rationality and opportunistic behavior. The pivotal idea in the field, attributed to Ronald H. Coase, is that firms conduct their activities, shape the governance structure of their agreements, and rely on particular institutions in an attempt to save on transaction costs. This paper fully adheres to these views and briefly presents three applications of the TCE theory in Romania.

Apart from following the same line of thought, the three applications also share the same data set, collected by a survey of Romanian companies. We present below some features of the survey, which will help the reader to better understand the types of analyses we were able to conduct. Implemented in the middle of 2001, the survey targeted middle and large companies, and two hundred fifty-four firms were included in the sample. The enterprises were located in and around Romania's largest twelve cities, conducted business in various sectors of activity, and had various ownership structures. The goals of the survey were to understand the way Romanian companies conduct business and, in particular, to assess their reliance on the formal legal system. To achieve these goals, four different respondents were interviewed in face-to-face meetings: the general manager, the head of the legal department, and the managers of the sales and procurement departments. The questionnaires of the latter two managers are very similar, the only difference being that while one asks about the activities of the company as a seller, the other inquires about its activities as a buyer. The responses offered by these two managers provide most of the information we use in this paper. The main feature of the survey, with direct implications on the types of analyses that could be conducted, is the richness of information it provides.

In what follows, we will cover the main aspects of the three chapters in Păun (2007). For obvious space considerations, we avoid going into detail here and instead guide the reader to the relevant section where such details are exposed.

2. The conditional effect of partners' relationship-specific investments on contract complexity

One of the paradigms of the TCE field, following Klein et al. (1978), is that an investment in a relationship-specific asset leads to the existence of appropriable quasi-rents. Corroborated with inevitable gaps and ambiguities in contracts, the existence of quasi-rents triggers partners' opportunistic behavior,

thus leading to the existence of transaction costs. Vertical integration (the situation when trading partners act under unified ownership and control and their actions are guided by a unique, profit-maximizing objective) is the most prominent solution found in the literature.

However, vertical integration is one form of governance, placed at one end of a spectrum. At the other end are spot market exchanges, when one-time agreements take place between independent economic actors and all the relevant information is contained in the price. According to Shelanski and Klein (1995), between these two poles there are a variety of “hybrid” modes such as complex contracts, long-term contracts, and partial ownership arrangements. Our focus is on complex contracts, seen as possible deterrents of opportunism and viable alternatives to integration.¹

The parallel between vertical integration and the use of contracts is by no means novel: in an early contribution, Kessler and Stern (1959) compared “contract integration” to vertical integration, while Lafontaine and Slade (2007) consider contracts as “almost integration”. The parallel also appears strongly in the empirical literature. Despite the low number of studies examining the choice of complex contracts, especially when compared with the vast literature on vertical integration (Chiappori and Salanié, 2002), the variables used to explain the make-or-buy decision are also those used as determinants of the choice between simpler and more elaborated contractual forms (Crocker and Reynolds, 1993; Gompers and Lerner, 1996; Saussier, 2000). To summarize, the main connection we investigate is between the existence of opportunism and the complexity of contracts, much in the same way the studies in the vertical integration literature investigate the connection between the existence of opportunism and the make-or-buy decision. Therefore, our results are comparable to those in the vast field of vertical integration. Since opportunistic behavior is particularly acute in the presence of specific investment, the commonly used regression equation is:

$$C_i = \alpha + \beta I_i + \gamma Z_i + \varepsilon_i,$$

where i represents the unit of observation (a particular transaction between two firms), I_i measures relationship-specific investment, Z_i is a vector of transaction and firm characteristics, and ε_i is an error term. C_i is a measure of the contract characteristics (length, complexity, type of pricing scheme) and is analogous to the decision to vertically integrate employed in other studies. In our particular setup, C_i is a measure of contract complexity, which we construct based on contract features.²

The common result in the TCE literature is that β is positive: a relationship-specific investment increases the threat of opportunistic behavior and, in order to counter such a behavior, partners rely on more integrated governance structures (Joskow, 1988; Gibbons, 2005). When examining vertical integration, those who contrast TCE and the property-rights theory (PRT) focus on the sign of β . PRT implies that the sign of β depends on which party is undertaking the specific investment, and that the sign will be opposite for the two parties in an agreement (Whinston, 2003; Acemoglu et al., 2005, Lafontaine and Slade, 2007). By contrast, the existing TCE theory predicts that any investment in relationship-specific assets increases the likelihood of integration (Whinston, 2003).

The possibility of a negative β in the TCE framework is shown in a transparent model which resembles that of Koss and Eaton (1997). For space consideration we do not go into the model’s details. Rather, we only mention here that it is based on the rent-seeking branch of TCE (Gibbons, 2005) and try to present it intuitively.³ The main assumption we make is that, in a regular transaction between a buyer and a seller, the two parties are not equally exposed to the opportunism of the other. In addition, corroborated information indicates that in 2001 Romania the sellers were vulnerable to the opportunism of the buyers even without undertaking specific investments.⁴ Then, if sellers need to undertake such

¹ We use the term *complex* and not *complete* contract. Williamson (2000) considers that bounded rationality, limited foresight, skill, knowledge, and time, combined with increasing costs of designing more complex contracts, imply that, regardless of their complexity, all contracts are incomplete.

² For details on the construction of all variables see section 6.2 of the first chapter in Păun (2007).

³ The model is presented in detail in section 4.3 of the first chapter in Păun (2007).

⁴ For the precise arguments the reader is guided to section 4.2 of the first chapter in Păun (2007).

investments, which will increase their exposure even more, they will do so only if the buyers agree to enter into more complex contracts. However, the buyers' situation is different: their relationship-specific investments may balance the exposure of the two parties, thus leading to an agreement which can be governed by a less complex contract. An alternative view follows the discussion on hostages in Williamson (1985). Namely, buyers' specific investments may have advantages purely for transactional reasons: they can be seen as a sign of commitment, thus increasing the trust between the partners. Such relationships again do not need to be governed by complex contracts.

There are several concerns with existing TCE studies, which we address. Chief among these concerns is the possible endogeneity of the right-hand side variables, in particular of the decision to invest in specific assets (Chiappori and Salanié, 2002; Masten and Saussier, 2002, Sykuta, 2005). If this endogeneity is not taken into account, estimated coefficients of parameters (in particular β) may not be consistent. We tackle the probable endogenous nature of the decision to invest in specific assets and rely on an instrumental variables approach. Also, our model offers precise predictions on the direction of the biases when the unobserved heterogeneity is not accounted for. Namely, the consistent estimates of β are positive for the seller and negative for the buyer, while both ordinary least-squares (OLS) estimates are shown to be biased toward zero. This means that the difference between the OLS estimates for β for the two sides of the transaction is smaller than the difference between the consistent estimates, which may explain why opposing signs for the opposite sides are not commonly found in the literature.

Acemoglu et al. (2005) is the only other empirical study we are aware of which finds opposite effects of relationship-specific investments for the two parties in a transaction in a PRT framework. Interestingly, the signs Acemoglu et al. (2005) predict are opposite to ours, but their predictions also rest on a departing prediction. Therefore, in both TCE and PRT, it is the prediction of opposite signs on opposite sides of the agreement that is likely to be a feature of the empirical studies, not which sign is positive and which is negative.

Other concerns relate to the type and quality of data being analyzed. Since contracts among firms are often confidential, the areas of research are limited to those where contracts are available: contracts between state and private entities (as governments usually publicize their contracts) or contracts between firms, which are public because the sector of activity is strictly regulated (Chiappori and Salanié, 2002). Despite the meaningful insights these contracts uncover, most of the agreements are reached between private companies acting in diverse and unregulated sectors, where the incentives for opportunism may differ, hence the findings may not easily extrapolate to the vast majority of agreements firms enter into. Our data address this issue and the firms in our sample come from various sectors of activity. A related concern is expressed by Sykuta (2005): TCE studies tend to rely on samples of reduced size, which impacts on the quality of the estimates. We also address this: given the structure of the questionnaires, we extract information on two agreements each firm has entered into, leading to a potential sample of five hundred eight observations.⁵ Lastly, another concern comes from the measurement of the primary concepts. In particular, researchers have encountered difficulties in measuring asset specificity directly, and so proxies are often used instead. The choice of proxies is open to debate (Shelanski and Klein, 1995; Masten and Saussier, 2002). Our measure of the relationship-specific investment (despite being a binary variable) captures the precise information of interest and is consistently measured across firms and sectors.

Also, given particular features of the questionnaires we use, we are able to gather information on both sides of the same agreement, while most of the studies we've surveyed rest only on information from one side. The wealth of information our survey provides makes the analysis conducted here possible.

An additional point needs to be emphasized. Contracts usually imply written agreements, designed based on a clear set of rules. Partners in a contract agree to follow certain procedures when disputes arise and to present their case before arbitrators (usually commercial courts). Thus, partners are

⁵ We chose not to use agreements between Romanian and foreign companies as they are characterized by particular features (e.g., are governed by a different body of law). This exclusion, corroborated with few missing observations, leads to a sample of four hundred twenty-three agreements.

discouraged to behave opportunistically by the penalties imposed by the formal legal system. Investigating the use of contracts between companies is therefore equivalent to investigating the use of the legal system in a developing, transition economy, such as Romania of 2001.

Our empirical results fully confirm the predictions of the model. First, when OLS is employed, both the buyer and the seller relationship-specific investments seem to have a positive impact on contract complexity, with the estimated coefficient of the former not statistically significant. These findings, though incorrect, match the overwhelming majority in the TCE literature, when researchers do not account for unobserved heterogeneity and observe only one side of the agreement. The consistent estimates, obtained by maximum likelihood estimation of the treatment-effects model, show that seller's specific investment leads to higher contract complexity, while buyer's investment decreases it, both estimates being highly statistically significant.

The results also indicate that Romanian companies use the formal legal system in the way theory would suggest, relying on more complex contracts when their exposure to partner's opportunism is greater. Additional evidence supports this view. Our regressions include a variable measuring the quality of services provided by the commercial court in respondent's area. Results indicate that firms design more complex contracts when the court quality is higher (one would only invest in a tool if he knows he can use it). These two findings contradict the view that formal legal systems in transition economies are too corrupt and costly to be used by firms, and that companies rely instead on alternative (informal) ways to solve their outstanding matters with partners.⁶

Section 8.2 of the first chapter in Păun (2007) presents the tests employed for the main results: we conduct some overidentification tests for the instrumental variables used for relationship-specific investments and several robustness tests for our specification. The first chapter continues with some additional results (we investigate the use of buyer prepayments, which can be seen as alternatives to buyer relationship-specific investments) and concludes with some final remarks.

3. A proposed way to measure (part of) transaction costs at agreement level

The TCE literature abounds with definitions of the transaction costs concept.⁷ The common view is that transaction costs cover all those expenses associated with an exchange, which are not a direct result of the physical processes of production and transportation. Masten (1996) refers to transaction costs as to those costs arising from impediments in reaching and enforcing agreements. In what follows, we adhere to this more precise definition.

By contrast, the measurement of transaction costs lags behind as only few attempts have been made (Allen, 2000; Benham and Benham, 2000; Wang, 2003). At macroeconomic level, Wallis and North (1986) have estimated that transaction costs accounted for 26.1% of US GDP in 1870, a share which has constantly increased to reach 54.7% in 1970. Cheung (1998) estimates transaction costs at 80% of Hong Kong GDP and argues that in rich countries these costs sum to more than half of national income.

The attempts to measure transaction costs at microeconomic level have been less successful. Chief among the difficulties researchers have faced is the predominant implicit nature of the concept. Also, many of the transaction costs components are not directly incurred (are hidden) or are incurred along with other costs, from which they cannot be disentangled. However, some breakthroughs have been made in narrow sectors of activity, where researchers have found easier to separate transaction costs from the costs of production and transportation: Kuperan et al. (1998) have measured transaction costs of fisheries co-management in San Salvador Island, Philippines, while Lesmond et al. (1999) have estimated transaction costs on financial markets.

The second chapter in Păun (2007) proposes a new methodology to measure (part of) transaction costs incurred at agreement level, by relying on a survey question addressed to company officials who

⁶ The essays in Murrell (2001) suggest that this view is misplaced. Johnson et al. (2000) find evidence that Romanian companies use the formal legal system more than firms in other countries in the region.

⁷ Allen (2000) and Klaes (2000) provide two extensive expositions on its history, use, and meaning.

supervise the buying and selling activities of the firm. An advantage of the method is that it solicits information from exactly those decision-makers who possess it. Also, the transaction costs estimate thus obtained is comparable across firms, sectors, regions and countries.

In essence, the proposed method is the following: first, interviewed sales and procurement managers are asked to choose one particular agreement their company was part of. The agreement can be a written or a verbal one, successful or unsuccessful, regarding the sale/acquisition of a new or traditional product. The only constraints in the choice of the agreement are that it provides for the exchange to have taken place recently (within the past six months) and that the respondent is thoroughly familiar with the agreement and its implementation. After answering many questions on the chosen agreement (to assure informative focus on problems and successes), the respondent is asked how much it would have been worth to reverse history and instead have reached an agreement with a non-opportunistic partner (precisely, one who would share business information, would keep his promises, and would negotiate equitably to solve problems). In other words, the question asks how much would the firm be willing to pay to reverse history and deal with a different partner, an imaginary one, who would have the same characteristics as the actual one, but would be frank, trustworthy, and fair. The answers are recorded as percentage of the sale price and negative values are not allowed.

We recognize that the proposed method is limited; it places more weight on opportunism (and much less on limited rationality) and focuses on the costs of haggling, bargaining, and miss-alignment emphasized especially by Williamson (1985), which are only part of all transaction costs firms incur in their activity. However, the method provides a coherent and practical procedure for measurement of a phenomenon of central interest for economists. Also, given the paucity of attempts to measure transaction costs, the proposed method constitutes a much needed first step toward a consistent estimation of the concept.

The responses we collect show that many transactions go smoothly: no transaction costs are incurred in 58.1% of agreements. However, the average transaction costs, as percentage of sale price, is 3.87% when the responding firms were sellers and 3.11% when they were buyers in the specific agreement. To appreciate the magnitude of these costs more fully, they must be placed in the context of firms' operation as a whole. Companies incur costs as both a buyer and seller, hence the two should be aggregated. Assuming that transaction costs of purchasing labor and capital are commensurate with those incurred in purchasing intermediate inputs (presented above), and that profit is a negligible component of value added, the transaction costs of a typical firm equal 6.98% of revenues. Moreover, comparing costs to prices is not the best guide to economic significance (even though it is the most useful approach for a survey question). The firm's production is best measured by value added, and transaction costs are incurred in producing this. A reasonable estimate would place value added at 30% of sales, which implies that transaction costs total an impressive 23.27% of value added for the average company.⁸ Since the proposed method captures only part of the concept, we must conclude that Romanian enterprises face large transaction costs in the course of their activity.

The second chapter in Păun (2007) continues with an assessment of the validity of the collected data by investigating the correlates of the transaction costs estimate with many variables suggested in the theoretical literature. In section 4.2 we provide evidence that the proposed method captures the sought concept.

A large section of the chapter then investigates the potential biases that may affect our measure. Namely, downward or upward biases may arise at respondent level if the interviewed managers understood and answered the question in a manner different from our intentions. Also, a bias at aggregate level may be present because the agreements we investigate have not entered the sample randomly. Apart from this sample selection bias, other sources of potential bias at aggregate level are discussed. Empirical

⁸ If we alter some of the assumptions and consider the ideal situation of zero transaction costs in purchasing labor and capital, while using the same estimate of value added (30% of sales), computations provide the lower bound of the mean transaction costs: 20.2% of value added.

investigations of all these biases are only possible given the richness of information the survey offers, and the investigations indicate our data are not affected.

4. An analysis of the factors determining the genesis and size of transaction costs

The last chapter in Păun (2007) is closely related to the second one: it relies on the data collected by the proposed method and investigates the factors determining the existence and size of transaction costs.

In his clear and concise review of the TCE literature, Masten (1996) presents the determinants of transaction costs along with predictions on their impact. These factors are: asset specificity, market uncertainty, transaction complexity, frequency of exchange, ease of measurement, reputation, attitude toward risk. Our survey permits the investigation of all these factors, to which others are added: partner location, firm age, firm organization of legal matters. All these factors are used as independent variables in regressions explaining transaction costs.

The econometric details of the analysis are presented in section 4 of the third chapter. In short, we argue that using OLS on all transaction cost responses is not advisable. For truncated data such as ours (the responses to the proposed question are continuous over the set of positive values but with a positive probability mass at one point – zero) researchers usually implement the Tobit procedure. Yet, the sample selection model is recommended for our setup (Vella, 1998; Puhani, 2000). An important feature of this model is that it includes two distinct equations, one determining the existence of transaction costs and one determining their size when such costs are incurred. By contrast, the Tobit model combines the two equations into one, which is not appropriate in our framework (Wooldridge, 2002).

We follow Heckman (1974) and estimate the sample selection model by maximum likelihood. Also, we implement the two-step procedure proposed by Heckman (1976, 1979), which is more commonly employed for such models. Particular test statistics in both these cases indicate that sample selection bias would not be a problem if we would estimate the two equations separately. We adopt this approach and estimate the selection equation (which determines the existence of transaction costs) by probit using a transaction costs binary variable⁹, and the main equation (which determines the size of transaction costs when they are incurred) by OLS using only the positive transaction costs responses. These regressions provide the main results of the chapter.

The overall image results offer is that TCE theory is very successful in predicting the existence of transaction costs (six of the eight variables theory proposes have the predicted effect, and five of these six coefficients are also significantly different from zero at the usual levels). The theory seems to be only moderately successful in predicting the size of transaction costs when such costs are incurred (even though six of the eight variables theory proposes have the predicted effect, only two of them are statistically different from zero).

At the end of the chapter we present some additional results (see section 4.4). Precisely, we take into account the two-sided nature of the relationship-specific investment (in the same way we did in the first chapter). Then, we discuss the potential endogeneity of our variables: we provide arguments why endogeneity bias should not be a major concern in our analysis and, where possible, we employ an exogeneity test. The third chapter in Păun (2007) concludes with some final remarks.

References

- Acemoglu, Daron, Philippe Aghion, Rachel Griffith and Fabrizio Zilibotti (2005) “Vertical Integration and Technology: Theory and Evidence”, working paper available at http://econ-www.mit.edu/faculty/download_pdf.php?id=1041
- Allen, Douglas W. (2000) “Transaction Costs”, in *Encyclopedia of Law and Economics, Volume 1: The History and Methodology of Law and Economics*, Bouckaert and De Geest (eds.), Edward Elgar Press, 893–926

⁹ This variable equals one if the respondent reports positive transaction costs, zero otherwise.

- Benham, Alexandra and Lee Benham (2000) "Measuring the Costs of Exchange", in *Institutions, Contracts and Organizations: Perspectives from New Institutional Economics*, Ménard (ed.), Edward Elgar Press, 367–375
- Cheung, Steven N.S. (1998) "The Transaction Costs Paradigm: 1998 Presidential Address Western Economic Association", *Economic Inquiry*, 36(4), 514–521
- Chiappori, Pierre A. and Bernard Salanié (2002) "Testing Contract Theory: A Survey of Some Recent Work", *CESifo Working Paper Series*, working paper no. 738 available at <http://www.cesifo.de/DocCIDL/738.pdf>
- Crocker, Keith J. and Kenneth J. Reynolds (1993) "The Efficiency of Incomplete Contracts: An Empirical Analysis of Air Force Engine Procurement", *The RAND Journal of Economics*, 24(1), 126–146
- Gibbons, Robert (2005) "Four Formal(izable) Theories of the Firm?", *Journal of Economic Behavior & Organization*, 58(2), 200–245
- Gompers, Paul and Josh Lerner (1996) "The Use of Covenants: An Empirical Analysis of Venture Partnership Agreements", *The Journal of Law & Economics*, 39(2), 463–498
- Heckman, James (1974) "Shadow Prices, Market Wages and Labor Supply", *Econometrica*, 42(4), 679–694
- Heckman, James (1976) "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models", *Annals of Economic and Social Measurement*, 5, 475–492
- Heckman, James (1979) "Sample Selection Bias as a Specification Error", *Econometrica*, 47(1), 53–161
- Johnson, Simon, John McMillan and Christopher Woodruff (2000) "Entrepreneurs and the Ordering of Institutional Reform. Poland, Slovakia, Romania, Russian and Ukraine Compared", *The Economics of Transition*, 8(1), 1–36
- Joskow, Paul L. (1988) "Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence", *The Journal of Law, Economics, & Organization*, 4(1), 95–117
- Kessler, Friedrich and Richard H. Stern (1959) "Competition, Contract and Vertical Integration", *The Yale Law Journal*, 69(1), 1–129
- Klaes, Matthias (2000) "The History of the Concept of Transaction Costs: Neglected Aspects", *Journal of the History of Economic Thought*, 22(2), 191–216
- Klein, Benjamin, Robert G. Crawford and Armen A. Alchian (1978) "Vertical Integration, Appropriable Rents and the Competitive Contracting Process", *The Journal of Law & Economics*, 21(2), 297–326

