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Working Paper Series

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# Measuring Transaction Costs: An Incomplete Survey

Ning Wang

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Working Paper Number 2

February 2003

# Measuring Transaction Costs: An Incomplete Survey

Ning Wang, *The University of Chicago*

**Abstract** This survey sketches the broad landscape of the field of transaction costs measurement. It surveys the main research areas concerning transaction costs and offers a taxonomy: monetary and financial economics, Williamsonian transaction cost economics, the transaction sector, non-market transaction costs, environmental and ecological economics, institutions and economic growth, and the economics of identity.

**Keywords** Transaction costs, transaction cost economics, transaction sector

**JEL classification** D23

**Date** February 2003

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**Contact** ningwang@uchicago.edu

**Suggested citation** Ning Wang. "Measuring Transaction Costs: An Incomplete Survey." February 2003, *Ronald Coase Institute Working Papers*, Number 2.  
<http://www.coase.org/workingpapers/wp-2.pdf>

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# Measuring Transaction Costs: An Incomplete Survey\*

Ning Wang

The University of Chicago

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*The identification of transaction costs in different contexts and under different systems of resource allocation should be a major item on the research agenda of the theory of public goods and indeed of the theory of resource allocation in general.*

Kenneth Arrow (1969. p. 48)

*Without the concept of transaction costs, which is largely absent from current economic theory, it is my contention that it is impossible to understand the working of the economic system, to analyze many of its problems in a useful way, or to have a basis for determining policy.*

Ronald Coase (1988, p. 6)

*When you cannot measure, your knowledge is meager and unsatisfactory.*

Lord Kelvin

(Inscription on the Social Science Building of the University of Chicago)

Ever since Adam Smith, economists have been inspired by and preoccupied with the powerful ideas that the price mechanism or the “invisible hand” can coordinate the division of labor and trade in a society, and that it is the division of labor and exchange that drives the wheels of wealth. Only recently, after a lapse of almost two centuries, did economists begin to realize that the working of the price mechanism is costly, and that transaction costs can clog the wheels of wealth. It was a slow process for the profession to catch the simple message of Ronald Coase (1937), and it will be a much slower process to work out the fundamental insight. Among many questions that need to be tackled, “What are transaction costs?” and “How to measure them?” are certainly two prominent challenges.

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\* This survey is meant to sketch the broad landscape of the field of transaction costs measurement. It was presented at the Conference on Transaction Costs organized by the Ronald Coase Institution on February 21-23, Chicago, Illinois, USA. I am grateful to all conference participants, Yoram Barzel, Lee Benham, Sam Peltzman, and John Wallis in particular, for comments and encouragement. I also like to thank Alexandra Benham for editorial assistance. I am solely responsible for all remaining errors. Please send comments to ningwang@midway.uchicago.edu

Despite the voluminous literature in the new institutional economics, a theoretical consensus on what transaction costs are is still out of sight (e.g., Allen 1991, 2000; Hobbs and Kerr 1999; Klaes 2000a). There is not even agreement on what a world of zero transaction cost could be (e.g., Hsiung 1999). For example, according to Steven Cheung (1992), transaction costs exist everywhere except in a one-man Robinson Crusoe economy. For Ronald Coase (1992), a completely communist society is the place where transaction costs would be zero. For most economists, the Walrasian world is the one with zero transaction costs. Given diverse theoretical understandings of transaction costs, it is expected that empirical investigation of transaction costs, and measurement in particular, represents a rather heterogeneous collection of work. To present a complete coverage of the literature is neither practical nor desirable. Thus no attempt is made here to do justice to the vast literature of empirical studies on transaction costs. What follows is a rough taxonomy of research programs that have contributed to our understanding of transaction costs.

Transaction costs, in Coase's (1937, 1961) original formulation, refer to "the cost of using the price mechanism" or "the cost of carrying out a transaction by means of an exchange on the open market." As Coase (1961, p. 15) explains, "In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on." In empirical studies, a direct measurement of transaction costs is simply the economic value of resources used in locating trading partners and executing transactions (see IV and V below). Another common measurement of transaction costs is the difference between the prices paid by the buyer and received by the seller (see I and III below). Some studies focus more on the secondary cost than the direct cost per se. For example, Williamsonian transaction cost economics (see II below) is primarily interested in the secondary cost of negotiation and enforcement, i.e., the cost of participating and reducing the cost of negotiation and enforcement. Some are concerned with the cost of government regulation imposed on market entry and transactions, which either reduces the size of the market (see V below) or eliminates the market altogether (see IV below). Some studies find that transaction costs can be agent-specific, that is, the identity of transactor matters for the cost of conducting transactions (see VII below).

## **I. Monetary/financial economics**

Money is the first subject whose existence economists could not understand without recognizing the cost of exchange. Immediately after the famous chapter, "That the division of labor is limited by the extent of the market," Adam Smith goes on to talk about the origin and use of money: "when the division of labor first began to take place, this power of exchanging must frequently have been very much clogged and embarrassed in its operation." The rise of money facilitates the exchange of one commodity for another, mitigating what was later named by Jevons the inconvenience of "double coincidence." If

the use of money has prompted classical economists to realize the inconvenience or cost of exchange,<sup>1</sup> the holding of money (versus capital goods) makes modern economists aware of the cost of investing (Hicks 1935).

In financial economics, transaction costs are generally understood as the cost of investing in financial markets, including brokerage fees and ask-bid spreads (e.g., Demsetz 1968; Stoll and Whaley 1983; Bhardwaj and Brooks 1992).<sup>2</sup> Empirical studies in this area do not suffer from lack of attention. Actually, there is a mature specialized business providing international transaction cost measurement services to investment professionals. In addition to demand factors, two factors on the supply side are relevant here: the widely accepted agreement on what transaction costs are in financial markets, and easy access to financial data. This body of research is by and large not self-consciously linked to the general NIE literature, with a few exceptions (e.g., Demsetz 1968).

Using spread plus commissions to measure transaction costs, Stoll and Whaley (1983) reported that transaction costs accounted for 2% of market value for the largest NYSE decile and 9% for the smallest decile. In Bhardwaj and Brooks (1992), transaction costs account for 2% for securities priced over \$20.00 and 12.5% for securities priced less than \$5.00. More complicated measures exist, for example, Collins and Fabozzi (1991) and Lesmand, Ogden, and Trzcinka (1999). Collins and Fabozzi (1991) propose a more sophisticated approach. In their scheme,

Transaction costs = fixed costs + variable costs;

Fixed costs = commissions + transfer fees + taxes;

Variable costs = execution costs + opportunity costs;

Execution costs = price impact + market timing costs;

Opportunity costs = desired results – actual returns – execution costs – fixed costs.

(Price impact captures the movement in the price of an asset that is the result of a trade plus the market-maker's spread. Market timing costs refer to the movement in the price of an asset at the time of a transaction that can be attributed to other market participants.

Execution costs arise out of the demand for immediate execution and reflect both the demand for liquidity and the trading activity. Opportunity costs are the difference between the performance of an actual investment and the performance of a desired investment, adjusted for fixed costs and execution costs.)

## **II. Williamsonian transaction cost economics**

The second body of work on transaction costs is Williamsonian transaction cost economics (Williamson 1975, 1985, 1996, 1998, 2000). The vast majority of empirical studies in NIE come from this research program. This literature is too familiar to warrant any extended

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<sup>1</sup> Some more recent literature emphasizes the cost of measurement in exchange (e.g., Brunner and Meltzer 1971; Alchian 1977).

<sup>2</sup> Readers interested in this line of work can consult Klaes (2000b), which traces the development of the concept of transaction costs in monetary economics.

discussion. Moreover, research in this tradition is well reviewed elsewhere (e.g., Joskow 1991; Shelanski and Klein 1995; Crocker and Masten 1996; Masten and Saussier 2000; Boerner and Macher 2001; Vannoni 2002). Thus, my coverage is brief.

In this research tradition, transaction costs provide the key to understanding alternative forms of economic organization and contractual arrangement. What is important is the cost of conducting transactions in one organizational or contractual form relative to the others. Therefore, what matters is not the absolute amount of transaction costs, but the relative ranking of transaction costs associated with different organizational or contractual choices. Furthermore, in empirical studies, transaction costs are not directly measured. Certain proxies, such as uncertainty, transaction frequency, asset specificity, opportunism, and so on, are used instead, which are believed to critically affect the cost of transactions. A statistically significant relationship between the chosen proxy and organizational governance suffices to make the point clear that economizing on transaction costs is the unifying logic behind various contractual arrangements of production.

Based on the transaction as the unit of analysis and conducted in the framework of comparative institutional analysis, studies in this group are able to move around the thorny question of quantifying the absolute level of transaction costs.

### **III. Transaction sector**

Wallis and North's 1986 article, "Measuring the transaction sector in the American economy, 1870-1970" launched the first effort to measure economy-wide transaction costs.<sup>3</sup> As the title of their article indicates, what Wallis and North (1986) measure is the size of what they call the "transaction sector." In their framework, the whole economy is divided into two parts, transformation or production and transaction. By measuring the total value of resources used in the transaction sector, they come up with the aggregate size of transaction costs in the economy.

Wallis and North (1986) show that the proportion of U.S. GNP in the transaction sector has grown from 25% in 1870 to 45% in 1970. The more developed the economy, the larger the size of the transaction sector. A recent study of the Australian economy has shown the similar pattern. The size of transaction sector has grown from 32 % in 1911 to 60% in 1991 (Dollery and Leong 1998). In their study of Argentina, Dagnino and Farina (1999) demonstrates that the transaction sector's share of GDP changed very little between 1930 (25%) and 1970 (28%), and then jumped to 35% in 1980, where it remained in 1990.

As a first attempt to quantify a concept as elusive and seemingly un-quantifiable as transaction costs,<sup>4</sup> the article by Wallis and North (1986) has not surprisingly stimulated a

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<sup>3</sup> See Hirshleifer (1973) for an earlier formulation.

<sup>4</sup> A group of scholars argue that transaction costs are difficult to identify and more difficult to quantify (Fischer 1977; Goldberg 1985; Davis 1986).

lot of criticisms (e.g., Davis 1986), which I will skip. However, the positive relation between the size of the economy and its transaction sector raises a deep question that is of some relevance here. On the one hand, this positive relationship is not surprising at all. Since the division of labor is the driving force of economic development, as the economy develops, the division of labor extends further, giving rise to more exchange and hence necessitating more resources to transactions. At the micro level, however, transaction costs as usually understood are something that is dissipated from the economy.<sup>5</sup> It thus becomes desirable that transaction costs are to be minimized. And the rise of the transaction sector is exactly to serve that purpose. This apparent discrepancy between the aggregated transaction sector and transaction costs at the micro level forces us to rethink the validity of the transaction sector as a measurement of transaction costs.

Following Wallis and North (1986), Polski (2000) attempts to quantify transaction costs one level down at the industry level. Her subject, commercial banking industry, is one of the most prominent fields in the transaction sector defined by Wallis and North (1986). Polski (2000) is able to specify and quantify transaction costs in the U.S. commercial banking business over the period 1934-1998. In her measurement, transaction costs have two components. The first one is interest expense, that is, total interest paid and accrued on all interest-bearing liabilities. It reflects the cost of funds for banking industry. The second component is noninterest expense, which consists of 1) employee salaries and benefits, 2) occupancy expense, and 3) other miscellaneous expenses, i.e., fees paid to directors, trustees and advisory board members, legal fees, advertising, public relations and promotion, charitable contribution, office supplies, information processing, telephone expenses, examination and audit fees, and so on. Her study shows that total transaction costs increased from 69% of total income in 1934 to 85% in 1989 and then decreased to 77% in 1998.<sup>6</sup> What is interesting about this study is its attempt to link the variation over time of interest expense and noninterest expense to institutional change (due to market competition and government regulation) in the U.S. banking industry.

#### **IV. Non-marketed transaction costs**

If, as admitted by Wallis and North (1986, p. 99), the transaction sector captures only that part of transaction costs that flows through the market, the pioneering study of de Soto

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<sup>5</sup> An example used in Wallis and North (1986, p. 98) is a good illustration. Suppose someone plans to purchase a house. As a consumer, he spends a lot of time and money examining the house, negotiating the price, obtaining information about other houses, and so on. Only part of his expenditure is transferred to the seller. Accordingly, transaction costs are “all costs borne by the consumer that are not transferred to the seller of the good.” Indeed, transaction costs are commonly conceived as the difference between what a consumer pays and what a seller gets, or what Niehans (1987, p. 676) calls “margins between the buying and selling price.”

<sup>6</sup> In Wallis and North (1986), the banking industry belongs to the transaction sector. All incomes generated there are therefore counted as transaction costs. Polski (2000) excludes provision for loan and lease losses, security losses, income taxes, and extra-ordinary expense from her analysis for reason of simplicity. But as she admits (p. 17), such costs “are also likely to reflect the costs of organizing in the banking industry.”

(1989) focuses on what is missing in Wallis and North (1986), i.e., “nonmarket transaction costs” (North 1987), such as resources spent in waiting, getting permits to do business, cutting through red tapes, bribing officials, and so on. These non-marketed transaction costs are rampant in developing and transition economies, though the size of the official transaction sector is small (see for example Dagnino and Farina’s (1999) study of Argentina).

Non-marketed transaction costs are critically important for us to understand the economy for an obvious reason. Transaction costs, as consistently emphasized by Ronald Coase, affect not only the contractual arrangement of production, but also the amount and type of goods and services that are produced and available on the market. If Williamsonian transaction cost economics is devoted to the first subject, the research in this group focuses on the second.

In his original study, Hernando de Soto (1989) documented the tremendous cost of doing business formally, i.e., the cost of meeting legal requirements for starting and running a business, and the cost of doing business informally in Peru. It is time-consuming to collect the kind of data that Hernando de Soto and his collaborators assembled. Fortunately, the World Bank is now working on a database, *Doing Business*, which attempts to collect information on the cost of doing business worldwide (for an early World Bank project, see Stone, Levy and Paredes 1996).

Alexandra and Lee Benham (1998) and their research team have undertaken comparative country studies to measure the cost of exchange. A central message emerging out of their studies is that the law of one price usually does not apply. For example, the actual price of installing a telephone in two weeks ranges from \$130 in Malaysia to \$6000 in Argentina (Benham and Benham 1998, p. 7).

In her study of Ethiopian grain market, Gabre-Madhin (2001) measures the cost of transaction that traders face. For each transaction, the author measures the cost of labor time invested in searching for trading partners and the opportunity cost of working capital during search. The latter is a measure of how costly it is for a trader to tie up working capital in grain stocks while waiting for a transaction to be executed. In her 1996 survey, transaction costs account for 19% of total costs.

An important factor emphasized in this literature is the cost of setting up a business, i.e., the cost of entry. This differs from barriers of entry as traditionally emphasized in the economics literature, such as monopoly, large initial capital investment, and so on. Instead, the emphasis is on government-imposed cumbersome rules and regulations, such as registration and licensing requirements, rules on sale or lease of real estate, export and import regulations, and taxes. These barriers force entrepreneurs to conduct some or all of their business outside the official economy or, even worse, discourage them from entry altogether (e.g., Johnson, Kaufmann, and Shleifer 1997; Hoshi, Balcerowicz, and Balcerowicz 2002).



In their world-wide (85 countries) comparative study of the cost of entry, Djankov, la Porta, Lopez-de-Silanes, and Shleifer (2002) measure the number of procedures, the official time, and the official cost that a start-up business must bear before it can begin legal operation. Zylbersztajn and Graça (2002) measure the start-up cost in the Brazilian garment industry. On average, the monetary cost is about 11.3% of the GDP per capita, and one needs to go through 9 administrative procedures, with the time cost of 64 days.

## **V. Environmental/ecological economics**

This group is very diverse (for a recent survey see Soloman 1999; Tietenberg 2002). Here the focus is on the role of transaction costs in the working of emission trading and the use of incentive mechanisms in environmental protection in general.

In her study of water transfer from agriculture to other uses, Colby (1990) stresses policy-induced transaction costs (PITC), which include attorneys' fees, engineering and hydrological studies, court costs, and fees paid to the state agencies. Not included are the price paid for the water right and the cost of implementing a transfer once it has been proved. According to Colby (1990), PITC average \$91 per acre-foot of water transferred with considerable variation among states: \$187 per acre-foot in Colorado, \$54 in New Mexico, \$66 in Utah. Another way to measure PITC is the time spent waiting for state agency approval. Time delays are 29 months in Colorado, 4.3 months in New Mexico, and 5 months in Utah.

In their study of NPS (nonpoint source) pollution control program in the Minnesota River, McCann and Easter (1999) measure the magnitude of transaction costs associated with four different policies to reduce NPS pollution. In their study, transaction costs include: information collection and analysis, enactment of enabling legislation including lobbying cost, design and implementation of the policy, support and administration of the on-going program, monitoring/detection, and persecution/inducement cost. What they directly measure through interviews with program staff and others is the amount of labor input required, which then is translated into monetary cost. Their result shows that the tax on fertilizer has the lowest transaction cost (\$0.94 million), followed by educational programs on best management practices (\$3.11 million), the requirement of conservation tillage on all cropped land (\$7.85 million), and expansion of a permanent conservation easement program (\$9.37 million).

Various emission trading systems have been increasingly used to replace the traditional command-and-control approach in environmental regulation (e.g., Hahn 1989; Stavins and Whitehead 1997. An excellent bibliography can be found from Tom Tietenberg's Web site: [www.colby.edu/personal/t/thtieten/](http://www.colby.edu/personal/t/thtieten/)). However, as a study recently points out, "transaction costs are unusually high in some marketable permits programs" (Montero 1997, p. 4. see also Stavins 1995; Gangadharan 2000). Consequently potential gains from trade are far from being realized. For example, Hahn and Hester (1989) suggest that the Fox River water-pollutant trading program failed because high transaction costs in the form of

administrative requirements ultimately eradicated potential gains from trade. Studies have identified several factors contributing to high transaction costs in emission trading: 1) there is no easy means for buyers and sellers to identify each other in some programs; 2) regulatory approval is costly and lengthy, 3) firms face enormous uncertainty in anticipating how regulators would determine their baseline emission levels and emission reduction; and so on.

## **VI. Institutions and economic growth**

The literature on institutions (law, financial markets, trust, social capital, corruption, etc.) and economic growth is another body of work that involves proxy measurement of transaction costs as broadly understood (e.g., Besley 1995; Knack and Keefer 1995; Hall and Jones 1999; Acemoglu et al 2001; Johnson et al 2002; for reviews, see Lin and Nugent 1995; Rodrik 2000; the World Bank 2002). The primary contribution of this body of work is to demonstrate empirically and systematically the simple point that institutions do matter for economic development (Matthew 1986). What is measured or indexed in these studies is not transaction costs per se, but the cost of institutional inefficiency or poor governance.

A recent New York Times article (February 10, 2003) on corruption in Russia reported that Russian citizens pay about \$3 billion in bribes annually, about half of what they pay in income tax. It costs business owners \$33 billion to keep things running smoothly, a sum just less than half of the total federal budget revenues in 2002. Traffic police officers take in \$368 million in bribes annually, exceeded only by education employees, who take in \$449 million.

In a recent NRBE paper, Rodrik et al (2002) estimate the respective contributions of institutions, geography, and trade in determining income levels around the world. Their results indicate that the quality of institutions trumps every other variable they consider.

## **VII. Economics of identity**

In contrast to most of the above studies, here the cost of transaction is agent-specific, rather than transaction-specific. In other words, the identity of economic actors matters (e.g., Ben-Porath 1980; Akerlof and Kranton 2000). Within the same industry, different economic actors may face dramatically different costs when conducting business.

The ethnic concentration of business is a good example, Jewish diamond dealers in New York City (Bernstein 1992), oversea Chinese businessmen in Southeast Asia (Landa 1994), Korean dry cleaners in the United States, and so on. Economic sociologists have made many contributions in this area, emphasizing the critical role of non-economic institutions

in the economy, presumably through affecting the cost of transaction (e.g., Granovetter 1985; Coleman 1988).<sup>7</sup>

It is relevant to point out a different type of market failure resulting from high transaction costs. In our conventional understanding, high transaction costs tend to reduce the size of the market, or eliminate it all together. As a result, the commodity disappears from the market. For example, in Socialist rural China, the market for extra agricultural products (after fulfilling state quotas) was almost non-existent due to prohibitively high government imposed transaction costs. In cases when the identity of economic actors matters, certain individuals can survive or, even prosper while others are either intentionally blocked out of the business (by various forms of discrimination) or simply lack the particular idiosyncratic quality required and are thereby excluded. In other words, the market is actor-sensitive. It may fail for some individuals, but it thrives for others.

In this research program, transaction costs are seldom quantified. The major point is that the identity of economic actors helps to smooth transactions, by mitigating various information problems.

## **Conclusion**

The diversity of approaches in empirical studies discussed above, not mentioning other relevant studies not covered here, certainly reflects a lack of consensus on important theoretical issues about transaction costs. This should not be taken as discouraging. It actually reminds me of the famous Chinese reform strategy, “crossing the river by touching stones.” In Chinese economic reforms, lack of blueprints necessitated an experimental trial-and-error approach, which proved to be quite successful, even more so than many reform plans engineered by the ablest minds and implemented with the greatest enthusiasm. The lack of theoretical consensus has obviously not deterred empirical studies. The challenge is to refine our theories in light of new empirical findings and move forward with refined theories to conduct more informed studies. We have a long journey ahead.

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<sup>7</sup> Barzel (1985) ends his article thus: “Social institutions are erected to aid in further facilitating the exchange. The study of the cost of transacting then makes economics a useful tool in the study of interactions among people” (p. 15).

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