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Greasing the Wheels of Trade

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Greasing the Wheels of Trade:

Measuring the Dutch Transaction Sector with Occupational Data*

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Abstract

How much does a nation spend on resources to 'grease the wheels of trade'? To examine this question the Dutch economy is used as an exemplary case as the Netherlands are known as a nation of traders. This image was derived in the seventeenth century from successes in long distance trade, shipping and financial innovations. Despite its historical background in trading the potential to 'truck and barter' has never been adequately measured. In this paper we present a first attempt in measuring and describing the Dutch transaction sector. Measurement by means of occupational data points out that approximately 25 percent of Dutch workers are employed in transaction jobs, and 29 percent if one includes transport and distribution tasks. From a historical perspective this may seem large, but we make the case that traditional sector categories underestimate the true trading character of an economy. Furthermore, we find that in enhancing transactions cities or agglomerations remain important, suggesting that face-to-face trade remains an important element of modern transactions. In contrast to the history of immigrants in the Netherlands, the main immigrant groups of today do not fulfill a brokerage function in bringing about trade between different cultures.

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1. Introduction

The Netherlands are widely recognized as a nation of traders, or to rephrase this in the words of Adam Smith, "a certain propensity in human nature" of the Dutch seems to be especially well adapted "to truck, barter and exchange one thing for another" (Smith, 1976, volume 1, chapter II). Efficiently transferring property rights is the very essence of a modern economy and by the look of present-day internal and external trade flows this picture seems to be as relevant today as it was in the Golden Age (WRR, 2003). But this status did not come out of the blue. In the course of history, innovations, like middlemen, contract law, courts, accounting practices, money, banks arose that lowered transactions costs considerably. These innovations affected cost margins directly and increased trade and productivity or made exchange possible that previously was missing. As a result of these institutions the mobility of capital increased, information costs were lowered, and avenues were found for spreading risks that could not have been covered before. The importance of such institutions is also gaining importance in international trade theory as more and more economists (cf. Rauch, 2001) have come to realize that reaping the gains from trade is no 'free lunch'. Transaction costs are substantial in concluding a transaction and perhaps the largest productivity gains are *not* to be reaped by improvements in production technology but in institutional improvements thereby lowering transaction costs (cf. North, 1991). This simple insight may be the very reason that international trade theorists like Trefler (1995) find that 50 percent of trade is 'missing', i.e. transactions that should have occurred according to general equilibrium trade theory but did not actually happen in practice. Or stated slightly differently: factor endowments correctly predict the direction of factor service trade about 50 percent of the time.

Despite the widespread agreement that "transaction costs matter" the empirical 'proof' of its relevance is sadly lacking. Of course, the reason why theory is ahead of empirical proof is to be traced to the fact that there is no standard terminology, the heterogeneity of transactions costs across individuals and groups within society is abundant and rarely transparent to outside observers and, of course, it is inherently difficult to separate transactions costs from standard (national) accounts as production activities and transactions are jointly determined (Benham and Benham, 2000). Some even claim, like Niehans (1987: 677) that because of the complexity of most contracts "transaction costs become difficult, and perhaps impossible, to quantify." Although measurements of transaction costs may be a scarce commodity in economics, economic historians have been very keen on unraveling the 'fundamental problem of exchange' (see Greif, 2000) and the same seems to apply to

attention historians pay to the case of the Netherlands. The extensive descriptions of Dutch trading endeavors before the turn of the nineteenth century by economic historians - like Landes (1998), De Vries and Van der Woude (1997), North (1990), Irwin (1991) and Israel (1989) - are in marked contrast with the present day understanding of the alleged success story of Dutch international trade. Economic historians may perhaps not agree on what really is behind the 'exceptional' case of the Dutch economy (see, e.g. Van Zanden, 2002a), they do, however, recognize that making trade and designing markets is not a free lunch.

This paper offers a first attempt for the Netherlands in assessing the size and structure of the transactions sector of the present day. We pose four questions. First, how large is the size of the transaction sector? Second, what characterizes the typical transaction worker? Third, are we witnessing a dramatic increase in the size of the transaction sector? Finally, is the transaction sector geographically concentrated? A Dutch occupational data set forms our main source of analysis. We rely on this data set as it offers the best opportunity for the Netherlands of gaining a detailed insight into tasks carried out inside organizations. Of course, the disadvantage of relying on one data source is that we give a partial account of the transaction sector (*i.e.* the labor market). We leave a complete picture for future research.

The structure of our account of the Dutch 'state of transaction' follows the above set and sequence of questions. We first define and measure in section 2 the transaction sector in the Netherlands and show that the Smithian propensity to truck and barter is not a costless affair and employs approximately 25 percent of the Dutch work force in 1997, and 29 percent if one includes the transport and distribution sector. We also examine the question whether trading tasks are rewarded differently in the Dutch economy. Core trading tasks (selling, bargaining) and complementary trade tasks are rewarded higher in the manufacturing industry than in the traditional trade sector.

The subsequent issue concerns discovering which personal characteristics determine the choice of a particular transaction task. This is described in section 3. The reason for delving into this question is to be traced to the common conjecture that transacting is not a task or job that requires high-level formal schooling or a profession that employs high level or scientific skills. Furthermore, with respect to trading it is often asserted that immigrants embody tacit knowledge of specific foreign markets. The idea behind the role of ethnicity is that the ability to trade is a highly personalized character trait as the 'trader' can speak the language and understands the culture of the other party and generates trust by being a member

of a (ethnic) network.[1] The role of ethnicity in trade is a recurrent theme in explaining the rise and fall of nations as it seems to play a crucial role in opening the possibilities of long distance trade (see Curtin, 1984). An open question that triggered our curiosity is whether ethnicity still plays a role in making job choices. In our analysis we look at the main non-western ethnic groups in the Netherlands: Moroccan, Turks, Surinam and Indonesian. We find that these groups are often less likely to be involved in trading tasks. This stylized fact contrasts strongly with the entrepreneurial status that immigrants had at the end of the nineteenth century.

Having established size and structure of the transaction sector, we can look a bit further and seek to understand parts of the trade story of the Netherlands. In section 4 we deal with the historical question whether the transaction sector of the Dutch economy has grown over time. Simple addition of workers tied to the different transactions sectors suggests that over almost two centuries the transactions sector has tripled in size: from 13 percent in 1807 to 39 percent in 1998. But an illustrative counterfactual based on the number and structure of transaction tasks across sectors of today suggests that this spectacular rise is far too high and based on adjusted historical employment statistics the trade sector has increased from 19 percent in 1807 to 27 percent in 1998.

The relative stability of the transaction sector suggests that its development is path dependent. The geographical dimension may have played a key role in explaining this development as there are transaction costs tied to the exchange of ideas or tied to knowledge concerning techniques of trade and production. Transfer of this tacit knowledge makes face-to-face contact highly important. The obvious question that we pose in this section is: does the place of trade still matter? In other words, we will pay attention to the *geographical* dimension of trade. As it turns out the geographical dimension remains important in today's economy, thereby suggesting that knowledge in bringing about trade is highly tacit and personal and carrying out trade is much facilitated by visible handshakes. North and South Holland and the cities Amsterdam and Rotterdam remain important focal points in bringing about trade, although a surprising yet understandable finding is that ports like Amsterdam and Rotterdam do not heavily employ workers for transport and distribution tasks. Labor saving technical progress in transport obviously has claimed its toll.

Much of our macroeconomic estimates are unfortunately not comparable to other empirical work as most contemporaneous stories of trade do not take transaction costs into

[1] Cf. the work by Landa (1994) who makes ethnicity central to her description of the trading networks.

account. The empirical evidence of this approach is far less abundant than what the traditional growth accountants produce. The only exception to this rule is a paper by Wallis and North (1986) who put considerable effort in measuring the US transaction sector for the period 1870-1970. According to their measurements (and definitions) the number of people involved has grown over time from roughly 10 percent in 1870 to 38 percent in 1970 and in terms of the aggregate amount of resources employed, they estimate that the transaction sector has grown from roughly one quarter of GDP in 1870 to over one half of GDP in 1970. The empirical research in the domain of transaction cost economics seems to concentrate more on the microeconomic side of exchanging property rights and organizing governance structures that minimize transaction costs (Boerner and Macher, 2002). In the absence of real comparable research, it is rather difficult to assess the plausibility of our results and only future research in an international perspective can shed some light on whether or not the Dutch case is an extraordinary one.

2. Measuring the Transaction Sector

The most daunting, yet tedious task is to discover how many people and resources are involved in bringing about trade or, more generally formulated, what are the transactions costs tied to bringing about trade? Standard neoclassical models give economists the impression that trade, besides shipping costs, is 'a free lunch'. Arbitraging comparative advantages is a task which involves no transaction costs whatsoever. Actual trade practices are far more complex and the theory about the microstructure of markets is slowly catching up with this element of everyday life (see, e.g., Rubinstein and Wolinsky, 1987; Johri and Leach, 2002; Spulber, 1999; Ellis, 2000, 2001). For instance, Spulber (1999) gives a number of problems of trade that intermediaries resolve, varying from reducing uncertainty and moral hazard in trading relations to resolving adverse selection in markets and lowering search costs for both buyers and sellers.

We measure the transaction sector by looking at the number of individuals that perform tasks that are explicitly directed at making trade possible. Besides the number of individuals, we also look at the number of working hours and the total wages of the individuals performing tasks that we describe as transaction tasks. This final exercise can be seen as a first attempt to describe the total transaction costs of firms against market prices, because wages of individuals form a lower bound of marginal productivity of those workers performing transaction tasks. More in particular, marginal productivity and wages are equal when the labor markets are fully competitive. This also implies that individuals performing

transaction tasks in firms that do not have trade in their core business (for example manufacturing firms), would earn as much as those workers who are employed by firms that use trade as their prime activity. This restriction is tested at the end of this section.

Needless to say, in constructing measurements one has to make definitional choices of what constitutes the transaction sector. Such choices are bound to be imperfect and can verge on the absurd as the concept of transaction cost can mean anything if one is not careful.[2] In this paper we will perform a measurement exercise that has much in common with the Wallis and North (1986) study, although we will focus on a more narrow definition of transactions. In their view, the firm is, just like Coase (1937) assumed, a bundle of contracts and within the firm there exists a sequential series of contracts, between owners and managers, between managers and supervisors, and between supervisors and workers. The focus of the present paper is explicitly oriented towards the exchange of goods between actors of different organizations and not exchange of goods and services *within* an organization, which would imply a far broader concept of transactions. Activities or tasks that occur inside the walls of firms and the government which are directed at the coordination of production are therefore excluded from our exercise. Our aim is to remain close to the 'task of trading' and to distill all elements of a transaction function in the (Dutch) labor force statistics[3] and by means of doing so obtain an estimate of the size of the transaction sector.

Definitions

The lack of specific definitions or a standard terminology in transactions cost economics is pervasive. Arrow (1969: 48) defines transaction costs as the "costs of running of the economic system", Niehans (1987) sees transactions costs arising "from the transfer of ownership or, more generally, of property rights. They are concomitant of decentralized ownership rights, private property and exchange," and Barzel (1997: 4) comes up with a definition that is close to one provided by Niehans: "the costs associated with the transfer, capture, and protection of rights." North (1991: 24) is more precise in his wordings: "transaction costs involve not only the economic costs of making bargains and enforcing contracts and agreements, but also the political costs of devising a framework of rules and enforcement so that bargains can be extended over time and therefore allow us to capture the gains from trade." The trouble is, of

[2] Similar criticism can be found in Davis (1986) who comments on the work of Wallis and North (1986).
[3] The Standard Occupations Classification (SCO) of Statistics Netherlands (2001) is to some extent related to the ISCO (International Standard Classification of Occupations) 1988 (see www.ilo.org) but the level of detail of the SCO is far higher and makes it possible to distinguish jobs that come close to our definitions of trading jobs.

course, that the translation of these definitions will yield different measurement outcomes and hence different interpretations.

Our aim is not to encompass all these different definitions and we will approach the subject of transaction costs somewhat differently. By focussing on job tasks, c.q. services (as summarized in occupational data) that come close to initiating and concluding exchanges we approximate the *transaction sector*. The reason for looking at occupational data and not some monetary measure of individual transactions is that one is left with an inherently difficult aggregation problem if one takes transaction costs of individuals as a starting point. As Benham and Benham (2000: 369) point out: "the law of one price does not apply in questions of transactions." Each and every participant who carries out transactions faces different transaction costs – stemming from information, social networks, political connections, ethnicity, skill etc. - and therefore one would need many estimates of these costs.

As mentioned earlier on, our approach is more indirect. In order to assess the Dutch transaction sector we sum up the number of people performing tasks related to trade. We distinguish the following five 'transaction' tasks:

1. *Pure trade*. This activity concerns the buying and selling that one associates with brokers, merchants and traders. Of course, buying and selling is not restricted to these intermediaries as buyers and sellers are also employed by full-fledged production firms.
2. *Complementary activities*. Buying and selling is accompanied by such activities as registering trade and making sure that payments are made.
3. *Trading ideas and information*. Trade is not only restricted to goods. It also covers the trading of ideas and information and related services.
4. *Monitoring*. Trade is generally transacted within the legal bounds of contracts and in order to "grease the wheels of trade" property rights have to be monitored and wherever necessary defended.
5. *Transport and distribution*. One reason for including 'transport' in the transaction sector is that there can be no trade of physical goods or services without distribution. Goods and services have to be delivered at the doorstep of buyers. Although this activity can be split from trade, we acknowledge the fact that trade and transport are

up to the present day complementary (see Casson, 1998).[4] Especially for the Netherlands the transport function would is an important element in sketching a picture of the Dutch transaction sector.

Of course, more is involved in delineating the various transaction tasks, but this tedious weeding out of transaction tasks among the wealth of other production tasks is described in the appendix to this paper.

Data

The main data set used in this paper is the Structure of Earnings Survey (SES). The data set is created by matching three data sources: the Wage and Employment Survey (WES), the Register System of the Social Security Funds (RSS) and the Dutch Labor Force Survey (LFS). The records of the WES and the RSS are matched with the LFS on the variables address, postal code, city, date of birth and gender. Only the records from the RSS that match with the LFS are considered for inclusion in the SES data set. Some observations of the data set are imputed by Statistics Netherlands. The number of observations is almost 150,000. For more details about the SES data set we refer to Schulte Nordholt (1998).

As variables, we use the registration number of the firm, the first digit SIC number of the firm, the city where the firm's head office is situated, and the hourly wage including extra payments for overtime hours. We also use variables on gender and the level of education, based on the highest level of education obtained from the International Standard Classification of Education. As mentioned above, we use the Standard Occupations Classification (SCO) of Statistics Netherlands to find the transaction tasks performed by individuals. Table 1 summarizes statistics on the most important variables of the data set.

Besides the SES data set, we also use the Production Survey (PS) of Statistics Netherlands. In this data set, only manufacturing firms with 20 or more employees are surveyed and a sample is drawn from the firms with less than 20 employees. The total number of sampled firms is about 6,000 per year. Many firms are present in both years. The PS is used to find out which firms are either nationally or internationally oriented. We do this by looking at the percentage of turnover used for exports in the total turnover of the firm. We use the

[4] Of course, one could make that the case that transportation costs and tasks are entirely different from the pure transactions tasks, like Wallis and North (1986) claim it to be. To take an agnostic position we take the transport and distribution tasks into account in our calculations of the transaction sector, but one can easily subtract the contribution of this sector if one disagrees about the transaction nature of transport costs.

registration number of the firms to match this information with the individuals in the SES data set. Since the PS only contains information about the manufacturing firms, we can only use individuals employed in manufacturing for the SES data set. We will use this option to check on claims that are often made about the differential character of transaction costs tied to international trade. The total number of these individuals is equal to around 22,000.

Table 1: Summary statistics of the Structure of Earnings Survey

Variable	Mean
Sex	
Female	0.415
Education levels	
No completed primary education	0.004
Only primary education	0.075
Lower secondary education	0.226
Upper secondary education	0.449
Higher vocational	0.179
College	0.064
Ph.D.	0.008
Regions (of place of work)	
Groningen	0.025
Friesland	0.028
Drenthe	0.023
Overijssel	0.059
Flevoland	0.008
Gelderland	0.103
Utrecht	0.090
Noord-Holland	0.187
Zuid-Holland	0.257
Zeeland	0.016
Noord Brabant	0.136
Limburg	0.068
Number of observations	148,993

Measurement

Table 2 summarizes the size and structure of the transaction sector in the Netherlands according to three different measures: persons, hours worked and wages. In particular, we determined the number of individuals performing a particular transaction task and when we sum up the individuals who perform at least one of the tasks 1-5 defined above, we obtain the total measure of the transaction sector in the Netherlands as summarized in the final row of Table 2.

Table 2: The Dutch transaction sector, 1997

	Employment in persons		Employment in hours worked (incl. overtime)		Value of wages of persons employed	
Definitions of transaction tasks	x 1000	% of total	X 1000 hours	% of total	Millions €	% of total
1. Pure trade	776	12.8	1,108,747	11.4	14,575	11.5
			(11065)		(167)	
2. Complementary trade	335	5.5	372,635	3.8	3,624	2.9
			(5961)		(66)	
3. Ideas and information	177	2.9	286,043	3.0	5,660	4.5
			(5160)		(113)	
4. Monitoring	126	2.1	209,390	2.2	2,846	2.2
			(4583)		(64)	
5. Transport and distribution	336	5.5	510,617	5.3	6,413	4.8
			(7450)		(105)	
Total[a]	1,750	28.8	2,682,663	27.6	32,028	25.7

Source: Own calculations based on SES, Statistics Netherlands (1997). Monetary values were stated in SES in guilders but for matters of comparison we have recalculated these values in this and subsequent tables into euros (€ 1 = 2,20371 guilders).
(a) The total does not necessarily equal the total of the subdivisions as people with different tasks may belong to different categories.

We find that the Dutch transaction sector in 1997 constituted approximately 29 percent of the Dutch labor force (measured in number of persons working) or 28 percent of the labor force if we weight the number of persons by the number of hours (as laid down in contractual labor agreements). Multiplying the total number of 'traders' by their annual wage rate the transaction sector becomes slightly smaller, viz. 26 percent. The largest sector within the transaction sector is the job category representing 'pure trade' activities. The 'complementary trade' category and the category involved in transport and distribution is almost half that of

the pure trade category and monitoring and trading in ideas and information are by far the smaller categories, although in terms of money value, the ideas traders become more important. The latter fact makes sense as workers who fall in this category are generally highly skilled and have invested heavily in human capital and as a consequence they earn above average wages, as shown in Table 3. We find that the average wage per hour is € 18 for 'idea traders', which is practically twice the wage of people working in the complementary trade jobs.

Table 3: The Dutch transaction sector worker, 1997

Definitions of transaction tasks	Annual hours per worker weighted	Gross hourly wage rate weighted[a] (in €)
1. Pure trade	1429	11.6
	(14.3)	(0.137)
2. Complementary trade	1111	9.2
	(17.8)	(0.172)
3. Ideas and information	1663	18.0
	(29.2)	(0.356)
4. Monitoring	1480	12.5
	(36.4)	(0.284)
5. Transport and distribution	1519	11.3
	(22.1)	(0.220)
National average	1564	13.5

Source: Own calculations based on SES, Statistics Netherlands (1997) and for national average the national accounts of CBS were used. (see http://www.cbs.nl/nl/cijfers/statline/index.htm)

Note that the numbers in Table 3 cannot be interpreted as the rewards of individuals performing particular transaction tasks. These rewards cannot be identified directly from the data, since we do not know what individuals would have earned did they not perform these tasks. In addition, we do not know how much would have been earned by individuals that do not perform the transaction tasks and it would even be rather stringent to assume that the individuals that perform tasks in the trading ideas and information are about the same as those individuals that do not perform these tasks. This identification problem is much related to the problem obtained in the empirical implementation of the Roy-model in which individuals choose among different occupations (see Heckman and Sedlacek (1985) and Heckman and Honoré (1990) for a discussion on the Roy model). The problem is a little different here, since individuals who perform a particular transaction task are still able to do other tasks as well.

However, it is likely that particular tasks take time and therefore these recourses cannot be used for other tasks anymore. Hence individuals only choose to perform a particular task if and only if the time consumed for this task is outweighed by the extra pay.[5] A complete empirical investigation of choice of jobs on the labor market goes beyond the scope of this paper.

Are transaction tasks rewarded differently?

Up till now we were quite cautious using wage data to make any comment on the rewards for individuals performing particular transaction tasks. Even though we are still as cautious as before, it would be somewhat of a puzzle if individuals would on average earn different wages when performing the same transaction tasks, but working in different industries.[6] In particular this would imply that the labor market is not efficient since we would expect individuals to work for the industry that offers and pays the highest paycheck. Besides this, if individuals would earn the same wages irrespective of the type of firm they are working in, then our estimates using wages would at least be able to measure total resources spent in transactions.

Table 4: Differences in hourly wages (in €) between the manufacturing industry and the trade sector

	Manufacturing		Trade sector		T-value
	Mean	Standard deviation	Mean	Standard deviation	
Pure trade	14.57	0.41	10.60	0.17	8.90
Complementary trade	9.87	0.60	8.40	0.38	2.06
Ideas and information	18.35	1.25	18.35	1.41	1.16
Monitoring	11.96	1.19	12.30	3.17	-0.10
Transport	11.29	0.77	9.99	0.59	1.34

We examine the possibility that employers in different industries pay different wages for individuals that perform the same tasks (and hence the same jobs) by comparing the average hourly wages between different industries. Since we compare individuals who perform the

[5] Or equivalently, tasks are applied such that total pay is maximized given total working hours.
[6] The issue of the possible existence of inter-industry wage differentials has raised a lot of attention in the economic literature. See Krueger and Summers (1988) for an early discussion.

same tasks, the hazard of selection bias is reduced to some extent. We look at two different industries: one industry that is much involved in production, the manufacturing industry, and one industry that is highly involved in trade, the trading industry. Table 4 lists the average wages and the standard deviations of these averages among the different transaction tasks for both industries. We find that the earnings are higher in the manufacturing industry for all trading activities. One exception is the activity of monitoring. In addition, the difference is statistically significant only for pure trade and complementary trade workers. This is quite remarkable since this implies that workers in trade may do better if they move from the trading sector, in which there is huge demand for transaction jobs, towards the manufacturing sector. This may indicate that the labor market is not fully efficient and hence the total earnings of workers are not a good measure for the total resources put into trade. Hence, it would be wise to focus on employment and not on earnings in approximating the transaction sector.[7]

International trade: higher transaction costs?

A question of some importance is whether international trade makes it necessary to employ more resources than those employed in domestic trade. It stands to reason that long distance trade is a much riskier transaction than the transactions that are carried out on a daily basis within the Dutch borders. Historical anecdotes and case studies show that this is indeed the case, but is that still the case for the present? Table 5 offers a glimpse by comparing the employment of transaction tasks for the manufacturing sector, as more detailed information on the export activities of this sector are registered. Firms that rely for more than 50 percent of their turnover on exports are marked 'international trade firms'.

What Table 5 makes clear is that the pure trade and transport tasks are (in absolute terms) important elements of internationally oriented manufacturing firms, but if we compare the employment of 'traders' to that of nationally oriented manufacturing firms it appears that 'international trade firms' employ far more employees who monitor trade, whereas the pure trade and transport jobs are relatively less important for those firms. This finding does seem to make sense as in the case of international trade contracts become far more difficult to

[7] A caveat has to be mentioned here as we only focus on the difference in means, while it may be the case that the characteristics of workers differ between the two sectors. For example, the number of male workers in manufacturing is known to be much higher than in the trade industry and since the Netherlands is one of the countries with the highest difference in compensation between men and women, this may be an important driving force behind our results (OECD, 2002). However, a complete analysis is beyond the scope of this paper.

formulate and enforce as the 'world gets bigger' (Dixit, 2003). Beyond a certain distance contracts cannot be self-enforcing and enforcement costs have to be made and in our case this boils down to monitoring activities.

Table 5: The Dutch *international* transaction sector in manufacturing, 1997

	Employment in persons			In millions of €		
Definitions of transaction tasks	x 1000	% of total	% of total transaction in manufacturing	Millions €	% of total	% of total transaction in manufacturing
1. Pure trade	29.4	3.2	31.6	1203	2.9	33.0
2. Complementary trade	7.8	0.9	41.3	121	0.4	46.9
3. Ideas and information	5.6	0.6	36.1	354	1.2	48.2
4. Monitoring	4.8	0.5	67.5	81	0.4	73.6
5. Transport and distribution	13.7	1.5	36.7	571	1.5	35.0

Source: Own calculations based on SES, Statistics Netherlands (1997)

Is transacting a human capital intensive task?

A final observation on the size and structure of the transaction sector concerns the education level of workers performing particular trade tasks. Table 6 offers an overview of the education levels of workers that perform particular trade tasks.

Table 6: Level of education of transaction jobs, 1997 (in persons)

	General	Transaction jobs/activities				
	Distribution work force	Pure trade	Complementary trade	Trade in ideas / information	Monitoring trade	Transport , distribution
Aggregate		12.8	5.5	2.9	2.2	5.5
Disaggregated by level of education						
No primary school	0.4	-	0.2	-	-	1.0
Primary school	7.7	5.3	10.2	0.6	5.5	19.4
Lower secondary	23.1	23.4	38.7	5.2	29.6	45.6
Upper secondary	45.1	56.1	43.6	34.4	53.3	31.0
Bachelors degree	16.5	12.0	6.2	28.6	7.3	2.8
Masters degree	6.4	2.9	1.0	29.4	1.6	0.3
Ph.D.	0.8	0.1	-	-	-	-

Source: SES, Statistics Netherlands (1997).

We find large shares of highly educated workers who perform tasks in ideas and information, while there is hardly any worker with at least a bachelor's degree who performs a trade task in complementary trade or trade in transport and distribution. Of course, when one looks at the job descriptions (e.g. cash registration, providing tickets or warehousing) as set out in the appendix to this paper one can understand why these tasks do not require formal training at an academic level.

3. Assessing the Impact of Particular Covariates of Transaction Tasks

To assess the impact of particular characteristics of the typical transaction worker somewhat further, this section is devoted to estimate probit models of the choice of particular transaction *activities* or *tasks*. The central question around which this section revolves is: what characterizes the typical transaction worker? In Table 7 we report the results of this particular exercise.

The first column of the table summarizes the probit estimates for the choice of (at least) one of the transaction activities.[8] Besides the explanatory variables that are summarized in the table, we also take account of industry and regional characteristics but for matters of brevity we suppressed them in the table.[9] We find that women are in general more likely to perform one of the tasks related with transactions. With respect to the level of education we find the likelihood to perform one of the transaction tasks to follow an inverted U-shape: compared to those without an education the probability of fulfilling a transaction job is at first roughly increasing with education, but after the secondary education level the probability to perform a transaction task is reversed and especially those with a higher education are less likely to end up in a transaction job. Looking at the ethnic origin of individuals, we find that Dutch individuals have the highest likelihood to be traders, while those workers who are from an Islamic origin have the lowest likelihood.

Of course, these probit estimation results for the total trading sector cover up huge differences across job types and this problem can be resolved by looking at the choices for the underlying job types. We therefore estimated the likelihood that a particular person is performing a *particular* transaction task. For this separate estimation exercise, it is important to notice that

[8] This implies that the dependent variable equals one if the individual performs at least one of the five tasks of trade.

individuals can be in more than one transaction task and hence the sum of the estimated probabilities from these probit estimates and the probability of the estimates derived in the first column of Table 7 do not have to be equal. When individuals could only perform one of the trading tasks, our analysis would not be valid because it would not take this restriction into account. Instead, we would have to estimate this by multinomial logit or probit (see Greene, 2000 for a discussion). The results of the separate probits for different trade tasks are summarized in the second to the sixth column of Table 7.[10]

One noteworthy finding of this exercise is that women tend to be concentrated in the activities of pure trade and complementary trade, while there are hardly any women working in monitoring and transport and distribution. More remarkable findings are to be found in the effects exerted by education and ethnicity. With respect to the level of education we find that the higher educated are not as averse to transaction jobs as we would have to conclude from the first column. Workers with a higher education have a relatively high probability of performing the pure trade task and the task of trading in ideas and information. However, the reverse applies for the probability of performing the other transaction tasks. When we turn to the ethnicity of the typical transaction workers we see that migrants are less likely to participate in any of the different transaction activities. However, there is one exception, which is Surinam workers are more likely to participate in monitoring.

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[9] Results of all of the covariates are available upon request.

[10] We hasten to add that the estimation results in Table 7 are consistent, but the estimation method is not fully efficient, since we do not take account of the possible dependence between the error terms of the different probit regressions. In order to do this, we could estimate a multivariate probit model using five different alternatives (Greene, 2000). However, there are only 264 out of the 150,000 observations with more than 1 trade task. This implies that though it is possible to estimate the multivariate probit model, it is not likely to result in much more efficient estimates. In addition, the estimated correlation structure will result in rather high standard errors because of the few observations that have more than one trade task. We investigated this premise with a few regressors and we found this to be the case. Due to the computational problems that such an exercise would bring if we would include more regressors, we did not investigate this further.The computational burden is due to the 5-dimensional integral of the normal distribution that needs to be calculated for any of the individuals. Though there are techniques to calculate this using simulation (see for example Keane, 1998), using almost 150,000 individuals and the regressors we used in table 7, would still result in a computational burden that is beyond the scope of the computational power of nowadays computers.

Table 7: Probit estimates of the various transaction tasks

	Total	Pure Trade	Complementary trade	Trade in ideas and information	Monitoring	Transport and distribution
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.599	-2.636	-1.854	-2.478	-2.624	-0.984
	(0.076)	(0.159)	(0.134)	(0.348)	(0.184)	(0.101)
Female	0.122	0.297	0.637	-0.041	-0.657	-0.844
	(0.019)	(0.011)	(0.014)	(0.018)	(0.028)	(0.018)
Age group (base: 15-24 years)						
25-40 years	-0.196	-0.060	-0.352	0.298	0.101	-0.171
	(0.011)	(0.013)	(0.015)	(0.030)	(0.035)	(0.017)
41-55- years	-0.182	-0.051	-0.344	0.402	0.309	-0.269
	(0.012)	(0.014)	(0.017)	(0.032)	(0.034)	(0.019)
56 and older	-0.079	-0.016	-0.245	0.453	0.490	-0.234
	(0.022)	(0.028)	(0.036)	(0.048)	(0.049)	(0.036)
Education (base: no primary education)						
Primary school	0.145	0.516	0.297	0.143	-0.030	-0.091
	(0.066)	(0.151)	(0.118)	(0.341)	(0.138)	(0.076)
Lower secondary	0.153	0.669	0.378	0.494	0.116	-0.332
	(0.065)	(0.150)	(0.117)	(0.336)	(0.136)	(0.076)
Upper secondary	-0.017	0.896	0.078	0.851	-0.057	-0.802
	(0.065)	(0.150)	(0.117)	(0.335)	(0.136)	(0.076)
Higher vocational	-0.204	0.852	-0.300	1.238	-0.797	-1.432
	(0.066)	(0.151)	(0.119)	(0.335)	(0.141)	(0.082)
College – university	-0.122	0.717	-0.555	1.529	-1.108	-1.766
	(0.068)	(0.152)	(0.127)	(0.336)	(0.154)	(0.105)
Ph.D.	-0.397	0.337	-0.606	1.332	-1.164	-1.698
	(0.089)	(0.184)	(0.201)	(0.342)	(0.242)	(0.234)
Ethnic origin (base: Dutch)						
Other European (incl.	-0.129	-0.138	-0.033	-0.138	0.087	-0.058
US born citizens)	(0.028)	(0.037)	(0.045)	(0.060)	(0.068)	(0.050)
Turkish	-0.409	-0.601	-0.120	0.014	-0.338	-0.139
	(0.048)	(0.083)	(0.075)	(0.119)	(0.137)	(0.063)
Moroccan	-0.277	-0.515	-0.043	-0.525	0.045	-0.051
	(0.058)	(0.099)	(0.085)	(0.257)	(0.120)	(0.078)
Indonesian	-0.238	-0.125	-0.098	-0.034	-0.157	-0.524
	(0.046)	(0.059)	(0.076)	(0.082)	(0.113)	(0.110)
Surinam	-0.173	-0.370	0.024	-0.101	0.236	-0.036
	(0.034)	(0.051)	(0.049)	(0.074)	(0.066)	(0.055)
Other	-0.159	-0.296	0.059	0.008	-0.030	0.009
	(0.046)	(0.052)	(0.051)	(0.074)	(0.088)	(0.057)
Field of education (base: other)						
Economics/Business	0.276	0.253	0.120	0.302	-0.172	-0.032
	(0.010)	(0.012)	(0.017)	(0.020)	(0.034)	(0.021)
Law and public admin.	0.820	-0.016	0.566	1.049	0.130	0.346
	(0.034)	(0.049)	(0.056)	(0.039)	(0.107)	(0.079)
Social/cultural studies	-0.025	-0.249	-0.098	0.223	0.054	0.189
	(0.023)	(0.033)	(0.041)	(0.032)	(0.070)	(0.058)
Transport	0.406	-0.274	-0.027	0.024	-0.146	0.693
	(0.028)	(0.043)	(0.058)	(0.070)	(0.080)	(0.031)
Pseudo R^2	0.17	0.21	0.21	0.23	0.18	0.27

Note: N = 136,827 and standard errors are in brackets. Two additional control variables that are not shown here for matters of brevity are the various sectors of industry (base: agriculture) and regional dummies (base: Groningen) (of place of work). The fields of education categories are in line with the standard education categories (SOI 1998 of Statistics Netherlands): Economics: 60-62 plus 0143,053,0163,0173; Law: 65-66; Social-cultural: 70-71; and Transport: 40-44.

The fact that immigrants do not end up in transaction jobs as much as the Dutch natives is quite remarkable since it is in contrast with the history of Dutch immigration of a distant past.[11] The history of the Netherlands is littered with examples of how entrepreneurs have enriched the business networks of cities like Amsterdam, Leiden and Dordrecht. Lesger and Noordegraaf (1995) provide evidence of this. And, of course, one could make the claim –as North (1991) does – that Amsterdam was the center where financial innovativeness and institutions were combined to create "the predecessor of the efficient modern set of markets that make possible the growth of exchange and commerce." (p.33) The Dutch republic offered fertile grounds for financial innovations such as the Amsterdam Bank, essentially the first central bank, admired by keen observers like Sir William Temple and an adventurer like John Law. Trade and finance was not a pure Dutch invention as immigrants from different cultural backgrounds came to Amsterdam. Trade on the so-called Levant during the eighteenth century was dominated by Greeks, Armenians and Leventine Jews who had settled in the Dutch Republic. Only 13 percent of the trade with England was carried out by Dutch merchants, while the English, Hugenots and Jews had – with respectively 30, 28 and 21 percent - a much larger share in total trade (Jonker and Sluyterman, 2000).[12] But even after the Golden Age, the immigrants who entered the Netherlands were distinctly different from the native Dutch. Van Eijl and Lucassen (2001: 171) show that up and till the census of 1909, immigrants (especially Germans) had a job or a business in the trade sector. Furthermore, their position in the hierarchy of firms compared to native Dutch men was high: relatively many owners, directors and managers were present at that time inside Dutch organizations and relatively few employees. However, from the 1920 census onwards their position is hardly different from Dutch men and women.

As a final point, we have looked at the *type of education* as it would be of some interest to see whether typical 'transaction' studies in the educational system lead individuals to follow a career in the transaction sector. We find from the first column of Table 7 that those who are educated in economics, law and transportation have a higher probability to perform

[11] One may argue that this is not the complete picture since it does not include the self-employed, who are likely to perform transaction tasks as well. Looking at the Dutch Labor Force Survey of 1999, we find that 11.8 percent of the Dutch population were self-employed. This number was only 8.5 among the Turkish population in Holland and as low as 3.5 and 4.1 among the Moroccan population and Surinam population in Holland. Hence, we can argue that even if we would include self-employment into the analysis this conclusion would not change.

[12] Hugenots were mainly European Calvinists who fled away from their home country (Belgium, France) to Calvinistic Holland.

one of the trade tasks. Interestingly, we find this probability to be higher for law and transportation than for economics. This may not be that surprising when we take into account that many of our trading tasks are not captured in the discipline of economics as it is being taught in the Netherlands. We also find this from columns 2 to 6 of table 7 when we look at the more detailed categorization of the trading tasks. We find that those who studied in the field of economics have a higher probability to perform tasks in pure trading, while those who studied in law have a very high probability to perform a task in trade in ideas and information. Not surprisingly, individuals with formal education in transportation have a high probability to perform a task in that field.

4. Did the Transaction Sector Grow over Time?

In gaining the status of a trading nation the Dutch had to invest in long distance trading relationships, in transport and logistics technology, in banking and insurance and in accompanying institutions like laws, courts and social norms (cf. WRR, 2003). Although the knowledge and infrastructure that supports trading in goods and services may be of a softer kind than necessary to maintain a foothold in manufacturing, it can perhaps make specialized trade, investments and production irreversible. If so, we would expect the Netherlands of, say, the early twentieth century or even the early nineteenth century to be quite similar in structure to the modern-day Dutch economy. At first sight this seems to be the case, as the value added generated in the trade sector has always been high. Even at the start of the twentieth century when the Netherlands apparently had lost most of the glory of its Golden Age image, the value added per worker in the Dutch trade sector was still 20 percent higher than that of the British trade sector, which was at that time one of the world leaders (Burger and Smits, 1996). And inspecting this remarkable comparative productivity figure somewhat closer, it does not appear to be the result of high trade margins. On the contrary, Dutch trade margins are rather low compared to the UK and the turnover per worker was substantially higher in the Netherlands than in other countries. Burger and Smits (1996: 149) point out that the strong development of the volume of foreign trade is the prime candidate for explaining this Dutch characteristic. However, dominance of international trade is not a specific Dutch character trait as most small open economies in Europe have a high net export performance. But what makes the Netherlands such a remarkable case is that it has such a long track record in international trade and the puzzle is, of course, what lies behind this knack for trading.

There are a number of population censuses carried out at regular intervals that can be used to obtain an impression of the size of the transaction sector in the past. In Table 8 we present figures on employment in trade related sectors of the Dutch economy and of employment in transport and distribution over the past two centuries. What is immediately clear is that this primitively assembled 'transaction sector' made up 13 percent of the working population in 1807. And because of the continuous shift in economic activity, the transaction sector has in 1998 reached the volume of 39 percent of the working population. In other words, over almost two centuries the percentage of people involved in bringing about trade has tripled.

Table 8: Structure of transaction related employment in The Netherlands, 1807-1998

Year	Trade related sectors*			Transport, storage and communication sectors		
	Male	Female	Total	Male	Female	Total
1807	-	-	9	-	-	4
1849	9	7	9	8	0	6
1859	9	6	9	8	0	6
1889	10	8	10	8	1	6
1899	12	9	11	8	0	6
1909	13	10	12	9	1	7
1920	14	20	16	10	2	8
1930	16	24	18	10	1	8
1960	18	34	21	8	2	7
1983	24	36	28	8	4	7
1990	25	35	29	8	4	7
1998	32	34	33	8	4	6

* Trade related sectors are retail and wholesale trade, restaurants, banking, insurance and business services.
Source: Statistics Netherlands (2001b).

Now, it is tempting to embrace such a spectacular rise in trade. And this conclusion also seems to be in accordance with the Wallis and North (1986) calculations. If the structural transformation of economies progresses with this speed, the economy would in the long run be nothing more than one gigantic service sector tending to trade and transport. This is, of course, a twisted prediction, as it does not take account of the production *and* transaction activities that go on inside the walls of the firm in different sectors. To rephrase this, the tacit assumption concerning employment figures is generally that those employees working in industry are industrial workers and those working in trade sectors, like the retail and

wholesale trade, are retailers or wholesalers, and so on. This kind of circularity does not help us much in sketching a picture of the present state of transaction work and its evolution. In order to see how things *could have evolved* if the 'transaction technology' of 1997 would have been a constant element, we drew up Table 9.

Table 9: Counterfactual structure of transaction sector in The Netherlands, 1807-1998

Year	Percentage involved in trade activities					
	Pure trade	Complementary trade	Trade in ideas and information	Monitoring	Transport and distribution	Total trade
	(1)	(2)	(3)	(4)	(5)	(1)-(5)
1807	8.4	3.0	1.0	0.9	5.4	18.7
1849	8.6	2.9	1.0	0.9	5.9	19.2
1859	8.5	2.9	1.0	0.9	5.9	19.1
1889	8.8	3.1	1.1	1.0	5.7	19.6
1899	9.3	3.2	1.1	1.0	5.7	20.4
1909	9.7	3.4	1.2	1.0	6.0	21.2
1920	10.2	3.6	1.4	1.0	6.3	22.4
1930	11.1	3.9	1.4	1.0	6.2	23.7
1960	11.7	4.1	1.6	1.2	6.0	24.6
1983	11.8	4.7	2.0	1.8	5.7	26.0
1990	12.0	4.9	2.0	1.9	5.5	26.3
1998	11.9	5.0	2.2	2.1	5.4	26.6

Source: Statistics Netherlands (2001b) and our calculations based on weights derived from the SES (1997). The total transaction input weights per sector are for: agriculture and fisheries: 0.104; manufacturing: 0.189; energy and water: 0.124; building: 0.107; trade sector: 0.597; restaurants/hotels/cafes: 0.575; transport sector: 0.458; finance: 0.354; business services: 0.248; public management: 0.254; education: 0.052; health and welfare: 0.077; environmental services: 0.351. More detailed transaction task weights are not listed here for matters of brevity but these can be received upon request.

We calculated the fraction of trade employment in every sector of the economy and applied these weights to each and every sector from 1807 to 1998. The end result of this exercise is Table 9, where all the different transaction task categories of Table 2 are calculated. The main conclusion from this table is that apparently the "propensity in human nature" to truck and barter of the Dutch working population has not changed that much over almost two centuries when taking account of the transaction employment shares of the traditional sector definitions. Elements of transaction that show big changes are the trade in ideas and the monitoring task. The share of people who tend to the task of transport and distribution has hardly changed.

Of course, the constancy of transaction technology is a heroic assumption and our calculation serves more the role of a bold and thought-provoking counterfactual than that it is backed up by hard facts of the distant past. However, there are sound reasons why this picture may be more reliable than one might think at first glance as processes of vertical integration or disintegration that have frequently occurred in many businesses need not distort our estimates of the transaction sector heavily. E.g., when a firm vertically integrates with an intermediary it internalizes the economies of scope or scale within the firm, and as long as the same tasks are performed (but this time inside the walls of the firm) our macroeconomic estimate of the transaction sector would not pick up this change of industrial organization. In that respect this macroeconomic accounting exercise makes it all the more suitable for historical comparisons, although one is bound to miss out on the nitty-gritty of industrial organization and governance structures. More integrated governance modes in business and government are associated with a higher degree of asset specificity[13], greater uncertainty, more complex transactions or more frequent exchange. To say that the governance structure in two centuries time did not change would be somewhat of a 'gotspe'. But anyone can see that changes in these elements of transaction costs could just as well cancel out at the macroeconomic level. Sure one can make a persuasive case that transacting was far more difficult in the nineteenth century as the system of rule-based governance was not as widely developed as it is today, gathering information was probably more time intensive and the absence of well-defined standards in the quality of goods and contracting made trading an element of business that made middlemen a profitable profession. But what about transaction complexity? A case can be made that the speed of creative destruction in modern day economies is far higher than it was in, say, the early twentieth century (see, e.g., Caballero and Jaffe, 1993), and as a consequence, the need to trade or to market new products is a more elaborate or time consuming task than it was in the era of the telegraph and the steam engine. And when one thinks closely of the element of transactional uncertainty, i.e. the unanticipated changes in circumstances surrounding an exchange, the overall assessment is not clear. Technological and behavioral uncertainty would seem to be just as unpredictable as ever.

However, 'outside' statistical sources give some support to the fact that the transaction sector around 1800 was relatively large. Historical evidence presented by Van Zanden (2002b) suggests on the basis of the *Informacie* – a detailed inquiry of the economic and

[13] Asset specificity is perhaps the most important element in transactions as it can give rise to a holdup situation It is a very broad concept as it can cover a variety of assets in practice. For example, Williamson (1996) identifies six types of asset

financial state of almost all villages and cities of Holland in the period 1510/14 - that the Dutch economy has been a modern economy with a high level of industry and trade very early on. To give an impression of one of Van Zanden's extraordinary findings: in 1514 around 22 percent of the labor force in Holland was involved in the service sector, and more so in cities where it represented around 30 percent of the labor force (e.g., in a trade city like Dordrecht 47 percent of the labor force was involved in trade, transport and other service sectors in the year 1555). The function of cities is however another aspect of the transaction sector that we would like to deal with in more detail in the next section.

5. The Importance of Cities

The importance of cities for trade has been emphasized by numerous authors in the history of economic thought, and perhaps Sombart is the most explicit about how the technology of trade is reflected in the geographical distribution of trading places. The system of 'fairs', was the standard format for organizing trade in pre-modern economies (Sombart, 1924). However, the practice of salesmen to move from market to market in order to provide regions and cities with surplus goods became less and less common when trading volumes reached certain threshold sizes which made specialization possible. The fairs made way for cities that functioned as staple markets, the focal point of early modern trade. Sombart made a distinction between local, provincial and national marketplaces like Amsterdam, Paris, London and Hamburg. These cities were in fact the focal points of international trade, where prices and quantities of traded goods were coordinated. Amsterdam was during the Golden Age at the zenith of its power and with it Holland became as Israel remarks in his description of the Dutch Republic: "a fully fledged world entrepôt, not just linking, but dominating, the markets of all continents." (1989: 13)[14]

It would be of some interest to see whether the geography of trade is still as highly concentrated as it was in the days of the Golden Age. In questions of production and innovation there seems to be persuasive evidence of geographical clustering of businesses (Ades and Glaeser, 1994; and Ellison and Glaeser, 1997). And given the fact that transaction and transformation tasks are generally jointly determined one would expect transaction tasks

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specificity, to wit: (1) site; (2) physical asset; (3) human asset; (4) dedicated asset; (5) brand name capital; and (6) temporal specificity.

[14] Or to consult another 'reliable' source: as early as 1728 Daniel Defoe described the Dutch as "the Carryers of the World, the middle Persons in Trade, the Factors and Brokers of Europe: ... they buy to sell again, take in to send out: and the Greatest Part of their vast Commerce consists in being supply'd from all Parts of the World, that they may supply all the World again."

also to show signs of clustering. However, an open question in transaction cost theory is whether transaction workers are tied to specific agglomerations. E.g., in day-to-day business multinational corporations play a dominant role in trade and it lies within their power to shift certain functions within their company across the globe (think of the treasury department of Ahold that was shifted to Switzerland), led by relative factor price movements (including taxes). And the very essence of a trading company is that it offers specialized knowledge or scale economies in transaction services, hence the possibilities for separating transaction and transformation tasks are present and real. Furthermore, with the onset of the Internet age many believe that such centrifugal (geographical) forces are no longer valid in trade. Leamer and Stolper (2001) make the case that it is certainly not as one-sided as Information Technology gurus claim it to be. Certainly there are deagglomeration forces brought on by the character and possibilities of ICT, but as Leamer and Stolper show there are possibly stronger tendencies toward agglomeration. Modern-day economies are more and more dependent on the transmission of complex messages, which require understanding and trust that historically have come from face-to-face contacts. The Internet may perhaps alleviate long distance 'conversations' but it certainly will not replace visible 'handshakes' that conclude transactions.

In today's economies, the importance of trade cities is exemplified by city states such as Hong Kong (Feenstra and Hanson, 2000, Ellis, 1998) and Singapore (Mahadevan, 2000) and perhaps the same can be stated for the Dutch economy. To get acquainted with the Dutch 'state of trade', one need only take a look at how trade employment is distributed across Dutch regions and cities as presented in Table 10. In order to compare the nature of employment the aggregate distribution of employment is presented in the second column of Table 10. There are two noteworthy observations to be made with respect to this table.

Holland – a province of traders

First of all, the concentration of trading activities in the regions North and South Holland (basically the west coast of Holland including Amsterdam, The Hague and Rotterdam) in absolute as well as relative terms (compared to the aggregate employment summed up in the first column of Table 10) is noteworthy. The only exceptions to this rule are the province of Utrecht where trade in ideas and information is an important activity, and the province of North Brabant where pure trade and transport activities are of substantial size. Of course, part of the dominance of these regions may be explained by the presence of large agglomerations. To take a closer look at this possibility we have repeated the accounting for seven largest

cities of the Netherlands in Table 10. And by focusing on the individual cities, we arrive at our second observation: the lost glory of shipping and transportation in the cities of Rotterdam and Amsterdam as reflected in the occupational data.[15]

Table 10: Geographic distribution of transaction jobs by place of work, 1997

		Transaction jobs/activities				
		Percentages				
	Aggregate employment	Pure trade	Complementary	Trade in ideas and information	Monitoring	Transport, distribution
Aggregate level		12.8	5.5	2.9	2.2	5.5
Disaggregated by province/region						
Groningen	2.5	2.0	0.2	1.6	1.7	2.0
Friesland	2.8	2.8	3.1	1.8	2.1	2.7
Drenthe	2.3	3.2	2.7	1.1	1.7	2.4
Overijssel	5.9	5.6	5.0	3.3	3.5	5.6
Flevoland	0.8	0.9	0.7	0.4	0.5	0.8
Gelderland	10.3	10.1	9.4	7.0	6.5	10.8
Utrecht	9.0	9.3	9.7	16.7	5.4	7.4
North Holland	18.7	22.1	24.0	24.9	12.7	16.2
South Holland	25.7	22.4	21.6	28.5	52.8	28.8
Zeeland	1.6	1.4	1.9	0.5	0.8	1.8
North Brabant	13.6	14.2	13.5	9.9	6.9	14.9
Limburg	6.8	6.0	6.4	4.4	5.4	6.7
Disaggregated by city[a]						
Amsterdam	7.4	8.5	10.5	17.4	9.5	3.6
Rotterdam	4.5	3.5	4.0	5.4	6.0	3.7
The Hague	4.3	3.7	3.9	6.4	4.2	9.7
Utrecht	3.8	3.0	3.7	13.4	3.3	2.1
Eindhoven	2.0	1.5	1.3	2.1	2.1	0.9
Tilburg	1.5	1.3	1.1	1.7	0.9	1.3
Groningen	1.3	0.9	0.9	1.1	1.6	0.5

Source: Our calculations based on Statistics Netherlands (SES, 1997).
(a) For the figures of the various cities we have excluded the public administration sector as this sector distorts the figures of The Hague too much and blurs a comparison across cities. The SES only registers the head offices of the employer and in that case most civil servants who are working outside The Hague but whose 'head office' (ministry or agency) is situated in The Hague will be erroneously allotted to The Hague.

[15] We deleted the public administration sector to obtain the second part of table 10. This is done due to the fact that the SES only registers the head offices of the employer, and in that case most civil servants whose prime employer, c.q. ministry, is situated in The Hague will be erroneously allotted to The Hague. If we did not delete this sector, The Hague would have been the largest city in terms of employment.

The lost glory of shipping and trade

The fact that a seaports do not give rise to an excessive transaction sector, in particular with respect to tasks surrounding transport and distribution, may at first sight appear puzzling. However, recent insights from economic geography provide a provisional answer to this puzzle. Fujita *et al.* (1999, ch. 13) make clear that the functions of cities may change dramatically as the physical distance from consumers shifts. In their words, any transportation hub or branching point in geographical network offers a local maximum for the market access. It is therefore very likely that cities emerge at such branching points. The initial geographic location is a trigger for cities to arise, but the link with its initial function (sea ports, entrepôts) is not a strong one and, as time passes by, one can arrive at the paradoxical situation that all major cities started as major ports or transportation hubs, but have long since then ceased to be major ports.

The case of the Netherlands offers two outstanding examples as Amsterdam and Rotterdam are two large ports: Amsterdam was once the center of world trade, a sea port, and right now located near one of the largest airports of Europe: Schiphol Airport.[16] Rotterdam is today the biggest seaport in the European Union. Together with East Asian ports, like Singapore and Hong Kong, Rotterdam dominates world cargo transport. If Rotterdam is the European center of (physical) transportation one would, first of all, expect a disproportionate amount of employees working in the transport business and as transport services are generally accompanied by trading activities one would also see relatively more people working in pure trade tasks or monitoring trade as much of the traded goods that move through Rotterdam are traded internationally. The employment distribution in the city of Rotterdam (see Table 10) is, however, far from what one would expect from a sea port city, as the number of people employed in traditional trade and transport jobs is relatively small. Only the more novel type of trade – trade in information and ideas – is found to be practiced with some fervor in Rotterdam (5.3 percent of the workers are involved in trade in ideas and information). To a certain extent the loss of transportation jobs is understandable as transport itself has become quite capital intensive (cf. the structure of container terminals) and with relatively few hands transportation and warehousing can be carried out. The fact that Rotterdam plays a dominant role in global distribution networks can perhaps even be seen as an admirable feat, taking into

[16] But also on a global scale Schiphol plays a significant role with a number 11 world ranking in 2002 in passenger travel and no. 15 in air freight.

consideration the low level of transaction resources (as measured by transaction workers) the city of Rotterdam employs.

Whereas the city of Rotterdam does not attract much transaction workers, the situation is quite the reverse in the city of Amsterdam. Amsterdam is truly the Dutch capital of traders when attention is restricted to the pure trading jobs, the complementary trade jobs and trade in ideas. Practically all the head offices of major banks are situated in Amsterdam, 'idea traders' such as law firms, consultancy firms, accountants, and advertisement agencies pick Amsterdam as their domicile. Oosterhaven *et al.* (2001) show with the help of bilateral trade relations between sectors that the greater Amsterdam region is characterized by high intraregional trade flows among the construction and installation sector, the business service sector and the trade (wholesale and retail) sector.[17] Again, just like in the case of Rotterdam transport and distribution are no longer dominant elements of the Amsterdam *employment* statistics, although the air transport sector is an important element of the Amsterdam economy. But apparently, just like in the case of Rotterdam, air transport is a quite capital intensive industry which hardly attracts transaction jobs.

6. Conclusions and Discussion

Accounting for transactions turns out to be a difficult yet adventurous exercise. Theory runs far ahead of the empirical research and this becomes quite apparent when one tries to reconstruct traditional national accounts of work and industry through the lens of the contract (Williamson, 2002). In the present study we tried to fill the gap by presenting thought-provoking figures to show that trade is not a free lunch. By measuring the number of workers who offer their services in the transaction sector one catches a glimpse of how much 'greasing the wheels of trade' costs.

Size of transaction sector

According to our definition of transaction workers 25 percent of the Dutch labor force is involved in the "propensity to truck and barter" and if one includes the transport and distribution tasks as part of the transaction sector one even ends up with 29 percent of the labor force. The Dutch transaction sector is therefore a sizeable one, certainly if one takes into account that we restricted our attention to transactions that are carried out outside the walls of

[17] The fact that banking and insurance does not show up in their bilateral trade flows may be a statistical artefact as Oosterhaven et al. (2001) claim as these sectors are dominated by a few large companies and internal transactions to these firms do not show up in their input-output tables.

the firm, whereas a considerable amount of transacting goes on inside the firm. However, at this point one should be careful in drawing conclusions on the efficiency of transactions as measured by size of a transactions sector, as a sizeable transactions sector could mean that we are either dealing with a small and highly efficient transaction sector that generates high output, or a large inefficient transactions sector that generates low output. Both conclusions are clearly not warranted without further micro-evidence.

Character of transaction worker

With respect to the characteristics of the typical transaction worker one has to arrive at the conclusion that transacting is not particularly a 'rocket science' if one takes a look at the level of formal schooling that is embodied in the average transaction worker or the skill level of the various transaction professions. The only exception to this rule is the task of trading in ideas and information: the average transaction worker in this 'sector' is far higher educated than the average Dutch worker. Furthermore, there seems to be a split in the sex composition of transaction workers: women are on average more likely to choose pure transaction jobs, and jobs that cover complementary trade and trade in ideas, whereas men are more likely to choose monitoring and transport jobs. Ethnicity has lost its importance for the choice of a transaction job, an observation that is in line with the post-World War II trend of immigrant workers moving away from jobs in trade related sectors. The ethnic groups that we have studied have generally been employed in low-skilled manufacturing jobs.

Remaining puzzles

Historical labor force data arranged according to standard industry classifications suggest that over the last two centuries the transaction sector has tripled. Our conjecture is that the transaction sector has always been sizeable but that the standard sector classifications hide the transaction tasks and jobs that are carried out within each and every industry, just like production tasks are carried out inside traditional trade sectors.

Furthermore much of what is traded has been done within the walls of the cities that owed their livelihood to their status as sea ports or transportation hubs. The Netherlands with its dense network of rivers, canals and openness to sea was perfectly fitted to become a gateway for the European mainland and Germany in particular. The contribution to the Dutch success in trade seems to be still the result of the work of cities and not of nations. As mentioned before, these puzzles are hard to solve by aggregate data and at this stage we suggest two research strategies that are complementary to our approach and that can in

principle shed more light on the puzzles that we raised: (1) more attention for unraveling the 'tricks of the trade' and (2) closely related but nevertheless a separate issue: the birth and design of institutions that make trade possible by lowering transaction costs.

The microstructure of transactions

The present national account of the transaction sector is in need of a microstructure as we cannot deduce anything about the efficiency of transacting. The empirical nature of evidence that is produced in transaction cost economics is highly qualitative (see Boerner and Macher, 2002) and focuses on the organizational modes that can minimize transaction costs. One of the problems that surrounds the present state of evidence is that it makes international or sector comparisons or comparisons across research findings in general very difficult as concepts are not clearly defined and perhaps never will be clearly defined as such theoretical concepts as assets specificity and transaction complexity are too broad to be standardized in statistical definitions. However, if progress is to be attained about which institution or which group of people have a comparative advantage in bringing about trade then statistical comparisons have to be made and as a consequence, definitional choices have to be made. One of the points still to be discovered is if some individual actors in transaction procedures have a knack for trading and perhaps the same Smithian "propensity in human nature" could be found to apply to (ethnic) groups, regions, cities or even states.

Interaction with institutions

Success and failure in solving the problems of exchange are inherently tied to institutions that have been designed to minimize the associated transaction costs. One of the puzzles of small open economies like Holland, but one can also think of Switzerland, Sweden, Belgium or city states like Singapore and Hong Kong succeeded in generating such large trading volumes. Our counterfactual about the relative large size of the transaction sector through two centuries of economic growth and trade may be a reflection of these (international) trade flows. What really lies behind the capabilities to trade is, however, less clear and a close inspection of institutional design in these small open economies is of some interest as it provides a hint about how transaction costs are lowered. A transaction costs perspective on the dominance of trade in small open economies is given by Katzenstein (1985). He makes the case for seven small European economies (of which one was the Netherlands) that the success of their international trade policies is explained by a system he calls 'democratic corporatism', which he defines as "voluntary, cooperative regulation of conflicts over economic and social issues

through highly structured and interpenetrating, political relationships between business, trade unions, and the state." What every state binds is their ability to adapt to rapidly changing global circumstances and the willingness to share the costs of such adaptation using some form of 'social insurance'. The smallness and the homogeneity of these countries plays an important role in the evolution of this system. Dixit (1996: 110-112) clearly sees this system as a way to cope with transaction costs. In this context a relevant question would be whether the globalization of business and everyday life makes this institution an outdated one. The expansion of the European Union and the fact that more and more economies are becoming more like the US - i.e. less homogenous and more prone to influences of special interest groups - will make the 'democratic corporatist' model less practicable and transaction costs will become a bigger burden for small open economies like the Netherlands and Sweden.

…and a culture of commerce

A very special institution is the culture of nation or the informal rules of the game. One of the amazing 'facts' is that the Dutch of today are more than any other nation in the world the least protectionist and according to Mayda and Rodrik (2001) this attitude in matters of trade is closely related to a high degree of cosmopolitanism or a weak sense of nationalism or patriotism. Although of course an attitude towards trade is not a sufficient condition to be successful in trade it does point out a character trait that numerous historians have stressed as being an important element of a plausible story of the wealth of a nation.

Appendix: Definitions of transaction tasks/jobs

In the statistics of most statistical agencies getting a grip on the nature of trade and trading activities is quite difficult as the sector classification dominates national accounting. To obtain a better insight into the nature of trade we have tried to distill trading activities by looking at the labor force survey of the CBS and use the Standard Classification of Occupations (see CBS, 2001a). The CBS classifies 128 different job tasks and the tasks which come closest to pure trade are defined by us as all persons who are involved in one of the tasks in their day-to-day activities. The following five definitions have been used throughout this exercise. The SCO distinguishes not only predefined occupations, it also distinguishes between job tasks, which is essentially the smallest measurement unit at which one can focus. A task is the set of activities that an individual performs or is supposed to perform with concern to his or her job. In order to go beyond predefined jobs we can distill the elements of trading and entrepreneurship which is part and parcel of every firm, but which differs from one sector of the economy to the other. An entrepreneur is a general category as this person not only coordinates the internal organization of a firm and organizes the financial means to cover investments, he or she also has to develop the external organization of the firm's product or service. In other words, this particular task covers the buying and selling or marketing of the product. The latter task can be well defined as a trading or transaction task and the trader is therefore a subset or specialization of the entrepreneur as he or she specializes with respect to bringing about trade.

Definition 1: Pure trade

Job task number 033: *wholesale trading*. This activity covers the buying and selling in bulk of goods, assets, services and other trade wares or providing of brokerage services which supports the aforementioned transactions. Acquisition of assignments or making of value assessments based on experience with prices in a particular business sector.

Job task number 034: *buying*. Buying, renting or leasing of raw materials, products or services, of which price, quality and delivery conditions fit the production and sales policy of an organization. To carry out market research and deal with offers, quotations.

Job task number 035: *selling: commission based representation.* Selling, renting or leasing of goods or services. In order to sell one has to visit customers in their house or firm. Informing and giving of advice concerning the possibilities of mixtures, the use and applications of goods and services.

Job task number 036 *selling (excluding representation)* Selling, renting or leasing of goods and services, by telephone or in face-to-face communication. Informing and giving of advice concerning the possibilities of mixtures, the use and applications of goods and services. Also the acquisition, the making of official offers en the sales of advertisements belong to this task.

No trade is of course complete without with accounting and warehousing of goods so we have defined these complementary activities as:

Definition 2: Complementary trade

This task covers all those activities that have to do with the reception of customers or clients by means of standard procedures (job task number 032); the settlement of accounts at a cash register or providing of tickets or receipts (job task number 037); and the warehousing, accounting and storage of goods and to inspect incoming and outgoing goods on quality and quantity (job task number 038).

Definition 3: Trade in ideas and information

An additional classification can be defined by taking a look at the trade in ideas and information. This covers the activities which apply to the giving of legal advice concerning business and family affairs (job task number 009); giving of business or organization advice (job task number 010); the provision of marketing or economic advice (job task number 011); the provision of technical advice, concerning raw material use, production techniques or environmental affairs (job task number 012); the provision of social, psychological or pedagogical advice (job task number 013); and communication, the task of informing people, orally, by means of lectures or talking to the press, or in writing, by means of press releases, brochures or articles (job task number 014).

Definition 4: Monitoring

This category covers the activities of inspecting, which boils down to monitoring of regulations and laws (job task number 008); the securing and monitoring of private property (goods, buildings, land), the monitoring and registration of lading or freight papers (job task number 049).

Definition 5: Transport and distribution

Finally, we have to define the task concerning transport and distribution. These activities are the loading and unloading of goods in trains, airplanes, ships, lorries. During the loading the quantity of goods is checked (job task number 039); physically delivering of goods or materials (job task number 040), the transporting of goods or materials, manually (job task number 041); to steer or navigate an (freight) airplane (job task number 043); to navigate a ship (job task number 044); to steer a train (job task number 045); to steer a lorry (job task number 046); to steer a van or car (job task number 048) in order to transport goods and/or persons.

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