The effects of external sourcing on performance: A longitudinal study of the Dutch manufacturing industry

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Abstract:

Outsourcing is often thought to affect firm performance in a positive way. However, the scarce academic research available in this area is inconclusive. Establishing this relationship in empirical work has generally been a difficult process because hard performance data were missing and most research could only rely on cross-sectional data. This paper overcomes both of these problems by conducting a panel data study over a 5-year period, from 1994 to 1998. In the context of the Dutch manufacturing industry the effects of external sourcing on ROS are demonstrated to be negative. However, external sourcing is moderately positively related to market share. Furthermore there are several important interaction effects. Although subsidiaries of MNCs outperform their local competitors, using external sourcing is even more negative for them than for their competitors. This points at a liability of foreignness problem in managing local supply networks. Firms that face profit fluctuations are best off by not outsourcing activities but firms that face volume fluctuations seem to benefit from external sourcing. This paper contributes to the sourcing debate by providing some new insights and using different data.

Keywords:

Sourcing, performance, liability of foreignness

INTRODUCTION

In recent years many firms have drastically lowered their degree of vertical integration and increased their reliance on external sources. This is true for both the manufacturing and services sectors (Murray & Kotabe, 1999). To argue for increased outsourcing managers often use popularized arguments like core competencies (Prahalad & Hamel, 1990). Among academics an often applied argument to explain decreased vertical integration is asset specificity, based on transaction cost economics (Williamson, 1985). In general firms have tended to move away from diversified strategies towards specialized production. This redirection has been accompanied by intensified mergers and acquisitions activity. While we are perhaps able to explain the move towards increased use of external sources it is far less clear whether outsourcing leads to the anticipated effects. Does 'focusing on your core' (Quinn & Hilmer, 1994) indeed lead to increased firm performance? Or alternatively, does it lead to deteriorated performance through hollowing out of corporations (Bettis, Bradley & Hamel, 1992)?

At a more advanced level it is also interesting to ask what kinds of firms are best or worst at managing outsourcing. For example it can be argued that multinational corporations (MNCs) are better at managing outsourcing because they have international sourcing networks that allow them to look for the best possible source everywhere in the world (Quinn & Hilmer, 1994). On the other hand foreign firms could also suffer from a liability of foreignness (Kostova & Zaheer, 1999): perhaps they lack the necessary understanding of their local environments through their shorter tenures or cultural and institutional differences. This issue is obviously particularly relevant for scholars of international business. Another interesting question is how uncertainty is related to the use of outside suppliers. Do firms use outsourcing as a means to combat their uncertain environments through more flexibility as has been argued to be the case in the relations between large German firms and their suppliers (Semlinger, 1993)? And what other conditions can be identified to help explain performance differentials caused by use of external suppliers?

LITERATURE OVERVIEW

Perhaps surprisingly the literature on the relation between outsourcing and performance is not well developed (Gilley & Rasheed, 2000). A considerable amount of studies attempt to explain the level and nature of sourcing relations (e.g. Poppo & Zenger, 1998; Walker & Weber, 1984). These studies confirm the main tenets of transaction cost economics in that asset specificity, uncertainty and frequency are important predictors of outsourcing (Walker & Weber, 1984). The theoretical basis for this had been provided earlier by Williamson (Williamson, 1981). The more recent study by Poppo and Zenger on IT outsourcing (Poppo & Zenger, 1998) also uses the resource-based view of the firm to develop similar predictions: when abundant qualities to perform a function are available internally, firms are less likely to outsource. Research in vertical integration (e.g. Hennart, 1988), a related topic, confirms the main hypotheses of TCE as well.

But the subsequent link from outsourcing to performance is less well developed empirically (Gilley & Rasheed, 2000; Masten, 1993). Masten (1993) also observes that strategic management scholars have failed to take into account relevant variables in their analyses of governance decisions. He shows that the performance impact of governance decisions, in terms of wrong make or buy decisions, is substantial. Leaving aside anecdotal evidence (Quinn & Hilmer, 1994) that usually suggests that outsourcing has positive effects on performance, there appear to be few studies that actually test the outsourcing-performance relation. Murray, Kotabe and Wildt (1995) find a positive relation between external sourcing and financial performance and a negative relation between external sourcing and market performance. This confirms an earlier finding by Kotabe and Omura (1989) who found a positive relation between internal sourcing and market performance. The research of Kotabe and associates on manufacturing firms seems to indicate that external sourcing generates benefits for the firm in the short run, in terms of higher ROS and ROI figures, but undermines their long term ability to be competitive in the market. For services

firms Murray and Kotabe (1999) find that internal sourcing is positively related to both financial market performance, ROS, ROI and ROE, and strategic market performance, market share and sales growth. Gilley and Rasheed (2000), with a sample size of 91, were not able to establish a significant direct relationship between outsourcing and performance.

If we consider the broader literature on vertical integration, there is more empirical work available. In a way vertical integration is what firms do when they do not outsource. However, vertical integration is a multi-dimensional phenomenon (Harrigan, 1986) of which the make-or-buy decision is only one dimension. Vertical integration for example also includes decisions on diversification of the firm in terms of the scope of its businesses (Harrigan, 1986). When we consider vertical integration there is evidence for performance effects in both directions. D'Aveni and Ravenscraft (1994) find that vertical integration, defined as the extent of intrafirm transfers between lines of business, has a moderately positive relation on performance. In an overview of studies on financial performance Capon, Farley and Hoenig (1990) used 15 studies to find that vertical integration was positively linked to performance in 69 relations and negatively linked in 35 relations. On that basis it seems safe to conclude that evidence on this topic is really not conclusive.

Apart from the fact that the literature on outsourcing and performance is not well developed, there are two methodological problems with most of the literature. They concern the nature of the data and the longevity of measurement periods. Earlier research on this topic mostly had to rely on perception data collected through surveys (Gilley & Rasheed, 2000; Murray et al., 1995a; Poppo & Zenger, 1998; Walker & Weber, 1984). A notable exception is the study by D'Aveni and Ravenscraft (1994), which, however, is mostly concerned with vertical integration and internal transfers between business units. Although surveys allow for more degrees of freedom in gathering data, responses are also known to be biased by several factors. Low response rates can cause concerns over the nature of the response. Respondents are often not willing

to provide exact measures of profitability of market share. Surveys are a very useful tool for sourcing research but it is important to also recognize their shortcomings. Using 'hard', secondary data can provide a fruitful complement to these earlier studies.

Another shortcoming of previous literature on sourcing is that most studies are cross-sectional in nature. Cross-sectional data often are more convenient to obtain, particularly with survey methods. However, they do not reveal whether observed patterns are consistent over time. This can be an important omission when one considers the possible effects of the business cycle on the level of external sourcing. If the economy does not perform well, firms are likely to downsize and perhaps outsource particular functions. Thus it would be better to use longitudinal data over a stretch of several years. With longitudinal data it can be established whether certain relations are consistent over time. A final point, which should concern us as IB scholars in particular is the lack of studies on outsourcing or vertical integration outside the United States. Perhaps earlier findings can be (partially) explained as artifacts of the U.S. environment. Thus it may be good to use data from another cultural and institutional setting to complement these U.S. based studies.

RESEARCH QUESTIONS

A first fundamental question is 'how can we measure outsourcing'? To measure the degree of external sourcing this paper relies on industrial purchasing over turnover. While the level of industrial purchasing certainly signifies to what extent a manufacturing firm relies on external suppliers in its production process, it is not necessarily a useful measure for outsourcing. As discussed by Gilley and Rasheed (2000) definitions of outsourcing in the literature are inconsistent. Some authors narrow down the use of outsourcing to those activities which a firm could internalize. In other definitions outsourcing is solely used for activities that were previously performed internally and are now being performed externally. And there

are authors that use outsourcing as an equivalent of external sourcing. While it is not our intention to solve this definition problem here, we believe external sourcing to be at least a reasonable approximation of outsourcing, particularly if one controls for the 3-digit industry level of external sourcing. Differences in the level of external sourcing between competitors in the same industry can be thought of as strategic choices as to the level of vertical integration or outsourcing. To investigate the direct relation between external sourcing and performance we use performance measures similar to Murray, Kotabe and Wildt (1995).

EXTERNAL SOURCING – PERFORMANCE

As discussed above the performance effects of outsourcing could either be positive or negative. Firms may benefit from internalizing production through scale or scope economies (D'Aveni & Ravenscraft, 1994). On the other hand they may also suffer from rising production costs and more generally the lack of price incentives associated with internal production (D'Aveni & Ravenscraft, 1994). Thus we hypothesize the main relation between external sourcing and performance to be either positive or negative. This is hypothesized for both financial performance, as measured by the firm's ROS figures, and market performance, as measured by its market share.

Hypothesis 1a: The degree of external sourcing is positively related to ROS of the firm

Hypothesis 1b: The degree of external sourcing is negatively related to ROS of the firm

Hypothesis 2a: The degree of external sourcing is positively related to market share of the firm

Hypothesis 2b: The degree of external sourcing is negatively related to market share of the firm

However, as suggested earlier, several variables act as moderators for this relationship. The literature has specifically defined a number of moderators, which we have included in our models. For reasons of space and to keep at bay the complexity of this paper, these moderators are only used on the relation between

external sourcing and ROS, which is generally thought to be the most interesting relation in strategy research.

ASSET SPECIFICITY

The prediction made by transaction cost economics that asset specificity is positively correlated to the level of outsourcing has been shown to be robust and general. However, Williamson (1985) does not explicitly address the consequences for firms that do not stick to that prediction. For example, suppose the required assets for production of a good are highly specific but the firm decides to outsource nonetheless. Will that decrease the firm's performance? The literature seems to agree that it will (Masten, 1993). Deviating from the norms of efficiency posed by transaction cost economics will lead to inferior performance. Thus, asset specificity is a negative moderator on the outsourcing-performance relation.

> Hypothesis 3: High asset specificity negatively moderates the relation between external sourcing and financial performance

UNCERTAINTY OR ENVIRONMENTAL DYNAMISM

The economic uncertainty a firm faces is an important variable to consider in outsourcing decisions. It has been argued that firms facing high uncertainty will tend to outsource risks (Quinn & Hilmer, 1994). Through carrying over production responsibilities and volume risks to suppliers, firm are thought to become more competitive. However, a supplier would normally be expected to add a risk margin to its cost price if there is much uncertainty so such gains may be negligible. Gilley and Rasheed (2000) find that uncertainty is actually a negative moderator for the outsourcing-performance relation. That is, if there is much uncertainty in their environment, firms are better off by not outsourcing many activities.

Hypothesis 4: High uncertainty negatively moderates the relation between external sourcing and performance

INNOVATION

In industries where innovation plays a particularly large part, it may be beneficial to internalize production activities (Murray et al., 1995). It is generally easier to develop product and process innovations internally. Furthermore if highly innovative products are being outsourced, this may lead to leaking of knowledge to competitors or to the supplier, encouraging potential entry in the industry by the supplier. Thus outsourcing is not a good solution for firms in highly R & D intensive environments.

Hypothesis 5: High R & D spending negatively moderates the relation between external sourcing and performance

FIRM NATIONALITY

It has often been argued that MNCs usually obtain a higher performance than local firms because they have particular inherent advantages (Dunning, 1993). Producing and selling in multiple countries allows MNCs to reap scale benefits. Global brand names help to introduce products on foreign markets more easily. Furthermore MNCs are able to develop production capabilities in one country and transfer those to other countries. However, when it comes to their local networks, MNCs are faced with a disadvantage (Kostova & Zaheer, 1999). Because they do not have a local supply base in a host country, they need to either use foreign sources or build up a supply network. Local firms have been around much longer and have more experience in constructing and improving a supply network. Thus MNCs face a 'liability of foreignness' problem (Kostova & Zaheer, 1999) in their sourcing network. While the overall performance

of subsidiaries of multinational firms is higher, their ability to leverage their network of outside suppliers to obtain higher performance is more limited.

Hypothesis 6: Being a foreign firm negatively moderates the relation between external sourcing and performance

INDUSTRY LEVEL OF EXTERNAL SOURCING

Industry characteristics usually play an important role in co-determining the performance of the firm. If the industry concentration is high, oligopoly rents can exist that increase firm performance. But what does a high level of outsourcing at the industry level imply for the relation between firm outsourcing and performance? If the industry has already gone through one or several waves of outsourcing, its level of external sourcing is high. Firms in industries with a high level of external sourcing will have noted this industry characteristic and will have adapted to it. Thus, they will have aligned their own sourcing strategy to that of competitors. With all this mimicking it will become much harder to use outsourcing as a source of competitive advantage over industry competitors.

Hypothesis 7: High external sourcing in the industry negatively moderates the relation between external sourcing and performance

The empirical setting for this paper is the Dutch manufacturing sector. Manufacturing firms in the Netherlands have increasingly relied on external sourcing in recent years. An analysis of sector interrelations using input-output tables of the Dutch economy between 1977 and 1992 revealed that there was a substantial increase in external sourcing (De Wit, Mol & Van Drunen, 1998). Firms in the Netherlands became ever more specialized over that period. In the early 1990s the ‘core business’

argument gained a lot of ground leading to further outsourcing of functions, particularly by manufacturing firms (De Wit et al., 1998).

METHODS

Statistics Netherlands (Centraal Bureau voor de Statistiek) collects official data from all Dutch firms and foreign subsidiaries with more than 20 employees on a yearly basis. Firms are legally obliged to provide answers to Statistics Netherlands. The data that are collected are quantitative in nature including items like turnover, industrial purchasing, profitability, markets share and exports. We were granted access to firm level data on a subset of 1,650 business units of manufacturing firms. These business units were selected from the largest 2,500 business units of firms based on whether they are involved in manufacturing and whether they had 5 or 6 years of data available for the 1993-1998 period. Using these data a number of firm level measures were created. The firm level data were then complemented by publicly available data at the 3-digit industry level, including detailed investment data and industry concentration. Finally a number of country-specific measures were added. The 1,650 firms are spread over 82 separate 3-digit level industries that are coded according to the NACE system, which is the European equivalent to the SIC in the United States. Manufacturing as it is defined here includes the NACE codes 15 through 37. The analysis conducted here was limited to the 5-year period between 1994 and 1998. We omitted 1993 because panel data studies require increasing amounts of computer memory with increasing years. Furthermore the period 1994-1998 suffices to cover any year-to-year changes, since it includes both a low in the Dutch economy (the years 1994 and 1995) as well as a high (1997 and 1998).

FIRM PERFORMANCE

Following earlier studies (Murray et al., 1995) two separate measures were created for each of the years. The first measure is return on sales, calculated as net profits over total sales of the business unit ('NETROS'). This measure reflects the financial performance of a business unit. The second measure is market share, calculated as this year's sales over the total sales in the 3-digit industry ('MARSHA'). This measure reflects the market performance of a business unit.

INDEPENDENT VARIABLES

The level of external sourcing ('EXTSOU') was calculated as industrial purchasing over total sales. This measure indicates to what extent a firm relies on external suppliers to produce its products. The nationality of the firm ('FOREIGN') is a dummy variable that can take on the value of 0 for a Dutch firm and 1 for a subsidiary of a foreign firm. Out of the 1,650 firms in the sample 530 are foreign subsidiaries. For asset specificity no firm level data are available in this database. However, there is a 3-digit industry level measure ('ASSPEC') that divides total investments by the industry over total turnover of the industry. We believe this provides a consistent and theoretically appropriate measure for the level of asset specific investments in a given year. Asset specificity is a strategic choice of firms but only to a limited extent (Nishiguchi, 1994). By far the larger part of the variance in asset specificity is not found at firm level but at the industry level. The kinds of specific investments firms in a particular industry need to make are fairly similar. Once one starts to compare between industries there will be much bigger differences. The product is a fairly reasonable predictor for asset specificity. The uncertainty a firm faces was calculated as the variance of the firm's respective ROS figures for all the years ('FIRMUNCE'). This is a fairly standardized measure for uncertainty. Furthermore an alternative measure was calculated, namely variance of the firm's sales figures for all the years ('SALEUNCE'). The industry level of sourcing ('INDSOU') was calculated as the average level of sourcing for all firms in the database. To measure

innovation a 3-digit industry level measure was employed that was calculated as total research and development costs in a given year over total turnover ('RNDINT'). Here a similar argument applies in that the variance of R & D spending within industries will be much smaller than the variance between industries.

CONTROL VARIABLES

To control for possible industry level effects, industry dummies were added. Since the sample consists of firms from 82 different industries, 82 dummies were added. Obviously industry effects play a substantial role in explaining firm performance (Rumelt, 1991). ROS measures can vary widely between industries, depending on how many investments are needed to produce a given turnover. ROI measures, which are not available in these data, are generally more stable across industries because shareholders and banks pose return levels on their investments that are equal across industries. The size of the firm is another obvious variable to control for in any study of firm performance as large larger firms have often been shown to be more profitable. To control for size of the firm the log of the sales of the firm in a given year was used ('LOGSALES'). Finally, 4 dummies were added for the years 1995, 1996, 1997 and 1998 ('YEAR 1995', 'YEAR 1996', 'YEAR 1997', 'YEAR 1998'). These dummies were added to assess whether patterns observed in subsequent years differed from patterns observed in 1994.

PANEL DATA ANALYSIS

To test the hypotheses, a panel data analysis was employed. Panel data is a good technique for studying data that are both longitudinal in nature, covering several years, and form a cross-section of observations (Greene, 2000). The use of panel, or pooled-cross-sectional data sets such as the one used in this study carries with it a number of methodological implications. While such samples capture both firm-level and inter-temporal dynamics, they also present some difficulties in estimation because same firm observations

across company years are not statistically independent (Maddala, 1977). Under such circumstances standard ordinary-least-squares (OLS) regression estimates are inefficient and may produce biased standard error estimates (Baltagi, 1995). Fortunately, random and fixed effects regression techniques based upon generalized-least-square (GLS) estimation are available which address these concerns (Maddala, 1977). In the context of this study, Hausmann & Lagrange multiplier tests (Greene, 2000) indicate that a random-effects estimation is most appropriate. We applied a random-effects estimation of the hypothesized relations using version 8 of SAS.

RESULTS

Before running the panel data analyses the bivariate correlations among variables were calculated. These are summarized in table 1.

Put table 1 around here

It can be observed that there are some pretty strong correlations among the variables. As expected the firm level of external sourcing and the industry level of external sourcing are strongly positively correlated. The size of the firm also correlates strongly and positively with market share of the firm. And there is a strong negative correlation between asset specificity and the industry level of external sourcing, in line with standard TCE predictions. The fact that most of this negative value is maintained when the asset specificity measure is correlated with firm level external sourcing seems to lend some support to the earlier argument that a 3-digit industry level measurement of asset specificity provides a good estimation for firm

level asset specificity. Finally it is found that foreign firms are more profitable, consistent with most of the IB literature.

Put table 2 around here

Subsequently various regression models were ran. For all models the Hausman test for random effects was significant, implying that a random effects model was more suitable for the analysis than a fixed effects model. Table 2 displays the results for the basic random effects estimate on market share. This model has a strong predictive power. The results indicate that there is a positive relationship between external sourcing and market share, thus confirming hypothesis 2a and refuting hypothesis 2b. However, the support found for this relation was rather weak. Because of space limitations in this paper no further regression were ran on market share.

Put table 3 around here

The base model used to assess the impact of external sourcing on firm profitability is shown in table 3. Firm size is positively related to return on sales in all models. In the base model there is a strong negative relation between external sourcing and return on sales of the firm. Thus hypothesis 1a is refuted and hypothesis 1b is accepted. External sourcing leads to lower profitability. The mode for hypothesis 3 shows the appropriate negative sign, but is not significant ($p = .1050$). Thus hypothesis 3, asset specificity is a

negative moderator for the external sourcing – profitability relation, has to be rejected. Hypothesis 4 gets accepted on the basis of the standard profit uncertainty measure. If profits are uncertain the external sourcing – profitability relation is negatively moderated. However, the alternative measure, sales uncertainty, suggests a positive relationship. This would call for a rejection of hypothesis 4. The negative sign of hypothesis 5 is correct but this model is insignificant. Firms in highly R & D intensive industries are more profitable, but their profitability is not related to the link between R & D and external sourcing. Hypothesis 5 gets rejected. As proposed in hypothesis 6, being a foreign firm negatively moderates the relation between external sourcing and performance. There is support for this hypothesis at the 5% level (actually at the 1.04% level). Finally hypothesis 7 provides an inconclusive answer. The industry level of external sourcing does not moderate the relation between external sourcing and financial performance. While there is the expected negative sign, this relation is not significant and the hypothesis has to be rejected. Moreover this is the only model where the direct relation between external sourcing and financial performance is insignificant. Throughout all the other models it had been significant at the 0.001 level. Econometric problems seem to be at the basis of these findings. The high correlation between external sourcing and industry level and the fact that both these terms as well as their interaction were included may have caused the regression to become unreliable. Clear support was found for a number of hypotheses. It appears that in this study external sourcing is positively related to market share. Given the weak link further analyses are needed to confirm this finding. The negative relation between external sourcing and ROS was established unequivocally. Thus support was found for some earlier studies on this topic. Furthermore two variables were found to be negative moderators of the relation between external sourcing and performance: being a foreign firm and profit uncertainty. Sales uncertainty on the other hand was found to be a positive moderator of this relation. The different dummies used for years were hardly significant to explain performance differences. Some of the industry dummies were significant to explain performance differences but there did not appear to be a very clear pattern among those industries.

DISCUSSION AND CONCLUSIONS

This paper started with the contention that the literature on the relation between outsourcing and performance is inconclusive. Furthermore two major methodological weaknesses in the existing literature base were pointed out. Both these weaknesses, the use of perception data and analyses of cross-sectional evidence only, were repaired in this study. The evidence presented here for a large sample of manufacturing firms in the Netherlands indicates a strongly negative relation between external sourcing and ROS, consistent with D'Aveni and Ravenscraft (1994) as well as Murray and Kotabe (1999). On the other hand a moderately positive relation was found between external sourcing and market share, which appears to contradict earlier literature. The patterns that were found appeared to be consistent over time. Thus, like previous literature, this study is not able to establish one particular direction for the outsourcing performance relation. However, some important interactions were discovered. The IB literature has generally assigned superior performance to subsidiaries of multinational corporations. A selection process occurs before firms internationalize which results in those firms with the strongest competence and product base moving abroad. As was pointed out recently by Kostova and Zaheer (1999) multinational corporations abroad face a liability of foreignness problem in areas where they need to communicate with local partners like governments. This study found evidence to support this argument for another group of local partners that firms need to communicate with: external suppliers. Subsidiaries of MNCs are less apt at managing their supply networks then their local competitors. Another interaction effect that confirmed previous studies, in particular Gilley and Rasheed (2000) is that for firms facing uncertainty about profits outsourcing undermines financial performance. Thus if profits fluctuate over time, manufacturing firms are better off by internalizing production activities. Industries that come to mind with such patterns include many high tech industries. For uncertainty of sales the opposite effect was found. It appears that in cyclical

environments, firms are better of by outsourcing parts of their production. Perhaps by offloading turnover risks to suppliers, firms are able to use their internal production capacity to the maximum. Another interesting finding was a relation that was not confirmed in this study. Asset specificity negatively moderates the external sourcing – financial performance relation but not significantly. This appears to be consistent with Masten's (1993) observation that the performance consequences of outsourcing to a firm are related to its adoption of good practices. Correlations showed that the asset specificity – internalization relation that has been found in previous studies (e.g. Walker & Weber, 1984) was maintained. Firms appear to follow this link and therefore asset specificity does not hold as a moderator. This paper, while showing interesting results, needs some further improvements and some limitations in the theory presentation, the present model and the method need yet to be overcome.

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Table 1: Bivariate correlations (1994)

	FOREIGN	EXTSOU	INDSOU	MARSHA	ASSPEC	SALEUNCE	RNDINT	FIRMUNCE	NETROS	LOGSALES
FOREIGN	1,000									
	(1650)									
EXTSOU	-,056*	1,000								
	(1643)	(1643)								
INDSOU	-,046	,502**	1,000							
	(1650)	(1643)	(1650)							
MARSHA	,139**	,025	,006	1,000						
	(1643)	(1643)	(1643)	(1643)						
ASSPEC	,048	-,283**	-,503**	-,063*	1,000					
	(1546)	(1539)	(1546)	(1539)	(1546)					
SALEUNCE	-,025	,078**	,013	-,027	-,040	1,000				
	(1650)	(1643)	(1650)	(1643)	(1546)	(1650)				
RNDINT	,181**	-,107**	-,128**	,010	,102**	-,010	1,000			
	(1139)	(1134)	(1139)	(1134)	(1088)	(1139)	(1139)			
FIRMUNCE	,019	-,025	-,062*	-,038	-,026	,220**	,047	1,000		
	(1650)	(1643)	(1650)	(1643)	(1546)	(1650)	(1139)	(1650)		
NETROS	,079**	-,189**	-,108**	,047	,123**	,013	,055	-,082**	1,000	
	(1643)	(1643)	(1643)	(1643)	(1539)	(1643)	(1134)	(1643)	(1643)	
LOGSALES	,207**	,219**	,213**	,474**	-,082**	-,129**	,175**	-,153**	,065**	1,000
	(1643)	(1643)	(1643)	(1643)	(1539)	(1643)	(1134)	(1643)	(1643)	(1643)

N between parentheses.

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table 2: Random-effects estimate of market share

	B	s.e.
Extsou	0.002522	0.00143†
Log sales	2.2452	0.0546***
Year 1995	-0.1413	0.2504
Year 1996	-0.2908	0.2504
Year 1997	-0.3987	0.2505
Year 1998	-0.5344	0.2507*
Intercept	-21.46	0.7174***
R^2	0.23	

Please note that unstandardized coefficients and standard errors of the 82 industry dummies have been omitted due to space constraints.
† p < .1; * p < .05; ** p < .01; *** p < 0.001

Table 3: Random-effects estimate of ROS (netros)

	B	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Extsou x rndint													-0.2096	0.0224
Rndint													3.8862	1.4266†
Extsou x asspec											-0.00639	0.00394		
Asspec											0.2341	0.2172		
Extsou x indsou									-0.0017	0.00117				
Indsou									0.2354	0.1009**				
Extsou x saleunce							3.839E-6	7.66E-7**						
Saleunce							-2.2 E-4	5.6E-5***						
Extsou x firmunc					-0.00041	0.00009***								
Firmunce					0.00281	0.00595								
Extsou x foreign			-0.0593	.0231*										
Foreign			4.1280	1.3662**										
Extsou	-0.1789	0.0115***	-0.1544	0.0140***	-0.1456	0.0134***	-0.1884	0.0118***	-0.0916	0.0608	-0.1502	0.0214***	-0.1536	0.0181***
Log sales	2.0367	0.2339***	1.9940	0.2435***	1.8300	0.2384***	2.1507	0.2390***	2.0527	0.2360***	2.0807	0.2472***	1.4970	0.2870***
Year 1995	0.3569	0.3432	0.3313	0.3416	0.3182	0.3416	0.3976	0.3416	0.1578	0.3570	0.3723	0.3596	0.5863	0.4516
Year 1996	0.2314	0.3429	0.2208	0.3412	0.2350	0.3412	0.2712	0.3412	0.0772	0.3503	0.3627	0.3594	0.6832	0.4508
Year 1997	0.5731	0.3443†	0.5580	0.3427	0.5556	0.3426	0.5911	0.3426	0.3367	0.3672	0.6947	0.3605†	0.8967	0.4526†
Year 1998	0.2682	0.3498	0.2518	0.3483	0.02466	0.3483	0.2967	0.3483	-0.0696	0.3912	0.5368	0.3729	0.5016	0.4601
Intercept	-1.947	2.6252	-3.046	2.7367	-0.8873	2.6935	-2.661	2.6779	-.13.76	5.6530**	-3.5949	2.9334	1.3705	3.1435
R^2	0.08		0.07		0.08		0.08		0.08		0.07		0.07	

Please note that unstandardized coefficients and standard errors of the 82 industry dummies have been omitted due to space constraints.
† p < .1; * p < .05; ** p < .01; *** p < 0.001