**THE EFFECT OF RECESSIONS ON FIRMS’**

**INSOURCING- AND OUTSOURCING DECISIONS**

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02. May 2012

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**ABSTRACT**

This paper analyzes the effects of a major economic crisis on firms’ boundary decisions. More specifically we use the economic theory of the firm to derive a number of hypotheses regarding the influence of decreasing demand and supply of risk willing capital on firms’ decisions to in-and outsource activities. We test these hypotheses using an original data set from a survey conducted among Norwegian firms. We find that in-and out sourcing decisions depend on whether activities were core to the firm and whether they are characterized by asset specificity. Further, we find that core activities are sensitive to both reductions in demand and reductions in access to credit, while non-core activities only are sensitive to demand reduction. In addition, we find a negative interaction effect between reduction in demand and reductions in access to credit for insourcing of core activities. We argue that the latter finding indicate that reductions in demand increases firms’ incentives to vertically integrate core activities, but that its ability to do so depends on their access to credit.

**INTRODUCTION**

The current economic crisis influences the business environment in ways that require many firms to adjust their kind and level of activities. In this paper we explore the influence of the economic crises on firm boundary decisions. More specifically we ask how two important characteristics of the current crisis, namely reduced demand and a lack of capital for investment influence firms decisions to out- or insource activities. We address these questions using the theory of economic organization (aka the economic theory of the firm), as this theory explicitly addresses the issues of firm existence and firm boundaries.

Within the economics branch of the theory of the firm there is a common understanding of transaction costs as the factor that explains both the existence and boundaries of firms. Much of the research has centered on identifying the different variables that cause costs of carrying out a particular transactions to be higher in markets relative to within firms (e.g. Williamson, 1975, 1985; Hart, 1995). Taking the transaction as the unit of analysis, changes in firm boundaries has been analyzed in terms of changes at either the firm level or in the relations between firms. Thus, the impact of an economic crisis on firm boundaries would have to be analyzed through its impact on either firm or intra firm activities. However, already Coase (1937) recognized that changes in the economic environment of firms (notably technological changes) might influence the boundaries of firms. Some later work has included more macro determinants of the boundaries of the firm, notably technology and the law (e.g., Milgrom and Roberts, 1990; Williamson, 1991). Still, only little research has been done with respect to understanding how radical changes in the business environments- such as a major economic crisis – influence the relative costs of carrying out transactions in markets versus within firms, although Williamson (1991) in passing mentions that an increase in the number and severity of ‘disturbances’ tend to push transactions away from the hybrid form of governance and towards the market and hierarchy modes of governance[[1]](#footnote-1). And yet the theory of economic organization emphasizes uncertainty (Coase, 1937, Williamson, 1996) as a necessary condition for the existence of firms, that is, phenomena which characterize the economic environment and which seems natural to associate with an economic crisis. The approach taken in this paper is to identify how an economic crisis indirectly influences firm decisions to out- or insource activities through its impact on the uncertainty that characterize the economic environment and through its impact on the demand that firms face and on their cost of risk willing capital.

**THEORY AND HYPOTHESES**

Much has been written on firms' decisions to out- or insource activities. In the international business literature in- and out sourcing have been studied as part of firms’ internationalization strategies. An often stressed variable in this literature is the ability of firms to control activities in order to avoid knowledge spill-over or imitation as well as to ensure that assets such as e.g. brand-name values are not eroded. Outsourcing has also been studied within various functional areas such as information systems, supply chain management, and in innovation and product development. Although most studies focus on transaction cost as an important explanatory variable, they also include more specific variables, which pertain to these functional areas, as reasons to in or outsource activities. For example, in supply chain management much emphasis is put on the relationship between in- and outsourcing and the strategic importance of such techniques as just-in-time, lean manufacturing and agile manufacturing.

We have made no distinctions between different types of activities or the extent to which they have an international dimension. Thus, we study in-and out sourcing of any type of business activity. In the following we define outsourcing as the act of moving hitherto firm-internal economic activities outside the boundaries of that firm and in-sourcing as the act of moving economic activities conducted across markets within the boundary of a firm. This is a very general definition that only leaves out boundary changes that follow from decisions to expand or reduce the scale of existing capacity.

We use the economic theory of the firm to derive hypothesis regarding the influence of the economic crisis on firms’ decisions to in or out source activities. The field of economic organization reveals different positions regarding the nature of firms and the coordination problems they solve. It is possible to discern at least three different perspectives, which may broadly be characterized as the “Coasian, (Coase, 1937)” the “Transaction Cost, (e.g. Williamson, 1975, 1985 1986, 1991; Klein et al., 1978; Klein) and the “Property Rights (e.g. Grossman and Hart, 1986; Hart and Moore, 1990; Hart, 1991, 1995) perspectives. These different positions hold different views on what is the core rationale for the existence of firms and what determine the efficient boundaries of firms and therefore also for how we may expect firms to react to economic crises. The many contributions to the theory of the firm share the –sometimes-implicit – assumption that if complete contingent markets had existed, price coordination would suffice and there would be no firms. The different contributions also have in common the notion that it is the combination of uncertainty and transaction costs that explains why complete contingent markets do not exist and why firms exist to fill the void of the price system. With the exception of the property right view, the different perspectives on the theory of the firm, perceive firm coordination as the substitution of price coordination with managerial discretion. In the following we use the Coasian and the Transaction Costs branches of the theory of the firm to develop testable hypotheses on the impact of the economic crisis on firms’ decisions to out- or insource activities. These two branches are best suited for an analysis of the impact of a crisis on firm boundaries as they allow for a much boarder view of uncertainty and what makes contracts incomplete compared to the Property Rights view.

 **The Coasian Perspective on the Firm**

In his seminal paper, Coase (1937) asked why firm exist. In answering this question he introduced the concept of transaction costs. According to Coase, transaction costs are ‘the costs of using the price mechanism’ where the ‘[m]ost obvious cost of “organizing” production through the price mechanism is that of discovering what the relevant prices are’ (Ibid, 1937: 21). Uncertainty (Coase, 1937: 21) plays an important role in making it difficult to “discover the relevant prices” as unforeseeable changes in demand and supply may change the relative value (opportunity cost) of different courses of actions. However, economic agents are forward-looking, and may anticipate that future changes will take place making it desirable to adaptation contractual relations. Uncertainty, of the kind that is implicit in Coase’s reasoning, does not explain why firms exist unless there are also costs of negotiation and concluding a separate contract for each exchange transaction that takes place on a market.

Coase argued that there are costs of using the market as well as of using managerial direction (authority) within firms. Firms would perform an activity internally if the costs associated with doing so where lower than the costs of using the market, and the overall outcome of this trade-off should therefore be an optimal division of labor between firms and markets, depending on each method of resource allocation (Slater, 2003).

The costs of using firm organization are of a different nature than the costs of using markets as they stem from the ‘increasing opportunity costs due to the failure of entrepreneurs to make the best use of the factor of production’ (Coase, 1937: 23). In an amendment to his original paper Coase (1991) makes an implicit distinction between core and non-core activities in that he observes that a full firm-type relationship ‘will not come about unless several such [incomplete] contracts are made with people and for things which cooperate with one another’(ibid:64). This amendment implies that firm organization is predominantly used when economic activities are characterized by strong degrees of interdependencies (Thompson, 1967). Thus, core activities would be those where parties to transactions realize that contingencies of different sorts may in an unpredictable manner disrupt the choice of action or the timing and sequencing of interdependent activities (Wernerfelt, 1997; Foss, 2010).

Uncertainty also plays an important part in determining the cost of firm internal organization of transactions. For example, Coase (1937) argued that the cost of using managerial direction increase ‘with an increase in the spatial distribution of transactions organized, in the dissimilarity of the transactions, and in the probability of changes in the relevant prices’ (ibid: 25). Managers, in other words, have limited capacity to ‘discover the relevant prices’ and this increases mistakes as more transactions and particular more dissimilar transactions are organized in a firm (cf. also Richardson, 1972 and Penrose, 1959). Finally, changes in relevant prices increase the costs of internal organizations. It is somewhat unclear how changes in relevant market prices influence the costs of internal organization. Price changes can be interpreted either as a change in the price level or as changes in relative prices. Changes in the price level that come about as a consequence of inflation or deflation do not change the opportunity cost of different uses of assets. Thus, there is no change in the best use of a particular labor service or input factor in production. If instead the economy experiences changes in relative prices due to e.g. shifts in demand or in the relative scarcity of input (or both) opportunity costs of the related assets. Relative price changes indicate that some goods, that are traded in markets, have become more/less valuable, the implication being that new uses of some labor services and input become efficient. It seems reasonable to assume that managers are most likely to make mistakes in situations where relative market prices change, since they must form new judgments on what are the best (non-priced) uses of the particular labor services and inputs over which they hold managerial discretion.

Coase’s framework is very general and it is difficult to specify and measure the costs associated with using both market and internal organization. To cope with these weaknesses, Williamson (1975, 1985) and others have extended Coase insights into a more specific theory of transaction costs that are easier to operationalize.

**The Transaction Cost Perspective**

Among the first attempts at defining a more precise cause of transaction costs was the work carried out by Williamson (1975, 1985), who laid the foundation for the ‘transaction costs branch’ of economic organization. According to Williamson, markets fail to produce the proper incentives for investments when economic agents face a combination of uncertainty and high asset specificity in their investments. The transaction cost perspective rests on two fundamental behavioral assumptions, namely the bounded rationality- and opportunistic behavior of economic actors (Williamson, 1985). Bounded rationality means that economic actors are intentionally rational, but due to imperfect information and limited cognitive capacity, they are not able to make perfectly rational choices. Therefore, the actors cannot predict the future even if they have access to all available information, and they can make mistakes. However, the actors are aware of their own limitations, and this will influence their actions and choices. Opportunism, on the other hand, is defined by Williamson as “self-interest with guile”, implying that economic actors are willing to cheat and break contracts if it is in their interest to do so.

According to Transaction cost theory, transactions differ with regard to; the degree of asset specificity; level of uncertainty; and frequency. The most efficient organization of a transaction is determined by these three characteristics. If a transaction requires specific assets, e.g. assets that have a lower value outside- than in the transaction, the firm will lose all quasi rents on its investment if the transaction would be terminated. The level of asset specificity is therefore positively related to the decision to vertically integrate. The second dimension, uncertainty, affects vertical integration decisions by altering the extent to which contracts will be incomplete. The kind of environmental uncertainty that causes contracts to be incomplete is not very clearly spelled out in the work of Williamson but he does argue that environment uncertainty makes sequential adaptation of the contractual relation economically efficient. Such adaptation may give rise to contractual disputes which ultimately will have to be settled by courts. However, bounded rationality apply not just to contractual partner, it also apply to courts. One important factor that makes vertical integration efficient is the fact that it is uncertain what is the outcome of dispute settlement by courts. The reason is that courts may be unaware of the exact reasons why either of the parties to a transaction may want changes to be made in contracts. Thus, courts may allow cancelation of contracts because they too are bounded rational and because they suffer from information impactedness. This is particular important when courts are dealing with disputes involving transaction- specific investments as it makes a hold-up of the firm that has made the transaction specific investment possible (e.g., Williamson, 1985; Masten, 1991; Vandenberghe and Siegers, 2000).

Within the boundary of a firm, the exercise of managerial discretion substitutes dispute resolution by courts. In fact, Williamson (1996: 27) describes a firm as ‘its own court of ultimate appeal’ and perceives the firm as a governance structure that is supported by a legal frame of employment law and corporate legislation (Masten, 1991). Similar to Coase (1937) Williamson also compare the cost of market transaction with the cost of internal organization. Williamson however, stresses the costs that arise from lack of proper incentives. Thus, firm governance is limited by rising agency costs and by ‘the impossibility of selective intervention’ (Williamson, 1985). The impossibility of selective intervention refers to the idea that managers cannot commit to intervene in decentralized decisions where the intervention is for the benefit to the entire organization (Williamson, 1985). Thus, managers intervene for private interests or on behalf of units that use their specific information and position to influence managers’ decisions (Foss et al., 2006).

Holding cost of internal organization constant across all type of transactions, the transaction cost perspective predicts that vertical integration increase with increased uncertainty, higher degrees of asset specificity and higher levels of frequency. Frequency relates positively to the decision to vertically integrate as the fixed costs of setting up a firm governance structure for the transaction is spread over more transactions.

 **Firm Boundaries and Recessions**

Two important ways in which crises impact firm boundaries is through changes in demand for firms’ products and services and through capital market imperfections that increases the cost of credit. In the following, we derive hypothesis regarding the impact of reduced demand and increases in cost of credit on firms’ decisions to change their boundaries by in-or outsource activities.

 *The Impact of Reductions in Demand on Firms’ Boundary Decisions.*

Reductions in demand will shifts firms’ demand curve inwards, and the standard economic response to such a problem is to adjust the supply curve accordingly. In real life, however, firms face two options. Either they can keep their (now inefficient) level of capacity and wait until the demand adjusts back to ‘normal levels’ or they can alter their capacity according to the new level of demand. The latter includes the option of outsourcing some of the activities to suppliers and let the supplier be a buffer for changes in demand.

We expect that the way in which firms make boundary changes, in response to changes in demand, differ depending on whether they are considering core or non-core activities and on the level of asset specificity in these activities.

If we start by looking at activities that are non-core to the firm in question and have low levels of asset specificity, the theoretical predictions about the effect of demand reductions on firms’ boundary decisions are pretty clear: firms will increase their outsourcing of such activities. We find two different explanations for this, one based on the transaction cost perspective and one based on the reasoning of Coase (1937). The transaction cost perspective clearly predicts that as transaction frequency is reduced (which is an outcome of the firm facing less demand) some vertically integrated transaction becomes too expensive to sustain within the boundary of a firm. In particular, those transactions, which also are characterized by low levels of asset specificity, may then fall below the cut-off line and be outsourced.

The Coasian perspective indicates that, with high levels of uncertainty, we should expect firms to vertically integrate those transactions that are characterized by high frequency. Thus, substituting many market transactions with managerial direction reduce cost of renegotiation these contracts (Coase, 1991; Foss, 2010). When firm grow and expand their core activities, the frequency of complementary non-core activities may increase, and it may become feasible to internalize these activities. However, if a negative shift in demand, caused by a recession, reduces the demand for the firms’ core activities, the frequency of the non-core activities will also be reduced. And, when the frequency is reduced, there are no longer any reasons to keep these non-core activities within the boundaries of the firm as other more specialized firms have an advantage in performing the activity. Therefore, these activities will be outsourced (Foss, 2011). Based on the above discussion, we therefore suggest the following hypothesis:

*H1: Reductions in demand are positively related to outsourcing of non-core activities.*

For transactions involving higher levels of asset specificity and/or high level of complementarity among transactions, the theoretical predictions regarding reductions in demand are less clear. If the reduction in demand increases uncertainty associated with the transaction, the transaction cost perspective indicates that firms’ incentives to vertically integrate will also increase (Williamson, 1985, 1991). Increased uncertainty may be either behavioral or environmental uncertainty, of which both can be affected by a recession. Behavioral uncertainty, which stems from the inclination of economic actors to act opportunistically, may increase with reductions in demand because the structure of markets may change as firms go bankrupt during recessions. Thus, firms that have high sunk cost investments may all of a sudden find themselves in a small number bargaining situation. This is a setting that increase proclivity of suppliers or buyers to act opportunistic and hold up the firm (Klein, Crawford, & Alchian, 1978).

Environmental uncertainty relates to the environmental context that the firms operate in, and this kind of uncertainty can be affected by recessions through firms not knowing when- and if the demand curve will readjust to pre-recession levels. Thus, firms may find themselves in a situation where it becomes economically efficient to make sequential adaptations of transactions to the changing market conditions. However, with incomplete contracts such adaptations may be carried out more effectively within firm boundaries. The transaction cost perspective predicts that increased uncertainty gives firms incentives to integrate vertically, but it is not given that the firms actually will do so.

Williamson (1986) argues that firms face two different solutions to situations with increased behavioral- or environmental uncertainty. Firstly, they can integrate vertically by increasing governance efforts related to the transaction, or secondly, they can start using market governance by sacrificing specificity in favor of more standardized goods or services. Which one of these responses firms will choose is difficult to predict, something that is further emphasized by the ambiguous findings in the literature related to the effect of uncertainty on firms’ boundary decisions. In a literature review, David and Han (2004) found that the empirical evidence regarding the effect of uncertainty on firms’ boundary decisions was inconsistent as there was almost as much evidence of uncertainty causing less integration as there was empirical evidence suggesting the opposite relationship predicted by TCE. Shelanski and Klein (1995) suggest that this inconsistency can be explained by “confusion” in the treatment of uncertainty as a factor that raises transaction costs. Several studies, they write, treat uncertainty as an independent variable without including measures of asset specificity. Doing so may give misleading results as uncertainty only affects transactions with a significant presence of relation specific investments (Williamson, 1985). Another possible explanation could be that firms’ in some situations prefer to sacrifice specificity and use market governance. However, even though the empirical evidence of whether or not firms actually integrate vertically as a response to increased uncertainty is somewhat ambiguous, it seems clear that the reductions in demand will positively influence firms’ incentives to take actions regarding the governance of its core-activities, either in the form of increased vertical integration or by sacrificing specificity and increase their outsourcing. Thus, it follows that recessions are positively related to both out- and insourcing decisions, which makes us to suggest the following hypotheses:

*H2: Reductions in demand is positively related to outsourcing of core activities.*

*H3: Reductions in demand is positively related to insourcing of core activities.*

 *The effect of shortage of risk willing capital on firm boundaries.*

The other major characteristic of an economic crisis is the shortage of risk willing capital. The shortage of capital is in fact a decrease in the supply of capital for financing transaction (credits) and investments leading to higher costs of carrying out transactions and investments.

Again, we expect that the effect on firm boundary choice (of reduced supply of capital) will differ depending on which activities we are considering. Starting with non-core activities, we expect that an increase in cost of short-term credit increase the cost of carrying out those transactions where such credits are important. As the average total cost of a transaction increase we should expect fewer transactions to be carried out. However, this effect we expect does not differ depending on the transaction being carried out within a firm or across a market. Thus, there is no theoretical reason why problems of accessing credit should affect the decision to out-source non-core activities. Therefore, we suggest the following hypotheses:

*H4: Reductions in access to credit is not related to the outsourcing of non-core activities.*

We will, on the other hand, expect that the in- and outsourcing decisions related to transactions characterized by high levels of asset specificity and core activities are affected by a shortage of risk willing capital. The argument is as follows: The cost of external finance increase with increasing riskiness of investments. As transactions involving specific assets are considered to be more risky than general type investments and perhaps even more so during an economic crisis, the implication is that such transactions would become relatively more costly compared to transactions involving general type investments. The transaction costs perspective a priori assumes that that transaction specific investments are efficient compared to general type of transactions, leaving the issue of the costs of financing transaction-specific assets relative to general-type assets out of the analysis. However, changes in relative cost of financing general and transaction specific investments may turn the latter in to inefficient investments thus, making more transactions market based. Now, while these argument seems to effect only those firms that are about to make new investments they may in fact also have an impact on firms that have already invested in transaction specific assets as these investments may also become inefficient with rising cost of re-financing the investment. Thus, some firms may decide to write-off the loss from the sunk cost investment and invest in the general type asset. This makes us suggest the following hypotheses:

*H5a: Reductions in access to credit is positively related outsourcing of core activities*

Coase (1937, 1991) only indirectly touches on investments as a variable that influences firm boundaries. According to Coase (1937), the cost of organizing transactions within the boundary of a firm increase with increasing managerial mistakes. Making the wrong (inefficient) investment is one of the possible mistakes that managers can make. When cost of external credit increase it increases the cost of managerial mistakes more in firms that rely on external finance than in firms that rely on internal finance of investments. This implies that reductions in access to credit are positively related to outsourcing of core activities for firms that rely on external finance. Thus, we suggest the following hypothesis:

*H5b: There is a positive interaction effect between reduction in access to credit and firms’ dependence of external finance on insourcing of core activities*

As with reductions in demand, there are theoretical arguments implying that reductions in access to credit also may work in the opposite direction by being positively related to insourcing of core activities. The ability of managers to assess the efficiency of an investment may be based on firm specific experience. Thus, managers may have more accurate perception of their firms’ investments projects compared to market agents (such as bankers) (Williamson, 1975). Thus, we should expect managers, who have internal capital available, to invest more in their firms’ core activities than those firms that must use external finance. A crisis exaggerates these differences. Foss (2010) draws on Coase (1937, 1991) for explaining why this can happen. Firms’ choices of governance structure depend on whether or not they can make more efficient investments and allocate resources at lower costs than using the market. When recessions hit and market failures increase, external investors and creditors may have less accurate predictions of the value of a resource than the firm-internal manager does. In particular, managers may have informational advantages stemming from their firm specific experience with the core-activities of the firm (experience that is unique to the core activities of the particular firm). Therefore, managers will be more willing to invest in core activities compared to market agents (such as bankers) as they have an information advantage. With an economic crisis the importance of this advantage increase as cost of making mistaken investments increase with higher cost of capital. If managers have access to internal capital, we should therefore expect to see an increase in core activities being internalized.

Another reason why reduced access to credit may increase vertical integration can be derived from the transaction cost perspective. Makismovic (1995) found that highly leveraged firms are more likely to default their obligations. Such firms are more likely to go bankrupt, and therefore more likely to act opportunistically as debt reduces both profits received by their owners from fulfilling their obligations and the costs associated with not fulfilling them. High leverage is therefore expected to decrease firms’ ability to enter credible contracts, and increasing the likelihood (at least the perceived likelihood) that the highly leveraged firm will act opportunistically. Firms that experience problems accessing credit may be forced to integrate vertically rather than sacrificing specificity as they will have problems entering credible contracts with new partners. This logic is further strengthened by Kale and Shahrur (2005) who found that firms use low debt levels as a commitment mechanism to make partners undertake relation specific investments. However, the above reasoning will only hold for firms with internal access to finance. Based on the above discussion, we therefore suggest the following hypothesis:

*H6: Reductions in access to credit is positively related to insourcing of core activities (for firms with access to internal finance)*

*H6a: Reductions in access to credit is positively related to insourcing of core activities*

*H6b: There is a negative interaction effect between reduction in access to credit and firms’ dependence on external finance on insourcing of core activities*

 *Integrated effects of reductions in demand- and access to credit.*

The last point of interest is the interaction effects between reductions in demand- and access to credit on firms’ in- and outsourcing decisions. Building on the above argumentation, the effect of reductions in demand is somewhat ambiguous as firms can respond to such a problem either by integrating vertically or by sacrificing specificity and outsource an activity to the market. If a firm decides to respond to reductions in demand by insourcing an activity, it needs to finance the vertical integration either internally or externally. If the firm experience reductions in access to credit in addition to reductions in demand, it may hinder its ability to vertically integrate. So while the incentives to vertically integrate is increased due to the increased uncertainty accompanied by reductions in demand, the ability to do so depends on the firms access to capital that can finance the integration. Following this logic, reductions in access to credit should negatively moderate the effect of reduced demand on insourcing of core activities. Based on the above argumentation, we therefore suggest the following hypothesis:

*H7: There is a negative interaction effect between reductions in demand and –access to credit on insourcing of core activities*

**DATA AND METHODS**

**Sample**

We use data from an extensive questionnaire about the effects of the recent financial crisis and the subsequent recession on Norwegian firms. Questions were constructed based on a literature review and went through a number of revision rounds before a complete draft was tested on 12 CEOs from firms of different sizes and from different industries. The final questionnaire consisted of 39 questions divided into three sections. The first section focused on issues regarding the pre-crisis period, the second on how firms were affected by the recession and how they responded to it, while the third section focused on firms’ expectations for the future. The survey was distributed to the CEO of 5000 Norwegian firms in November 2010, with two reminders being sent out in December 2010. The data collection was completed at the end of January 2011.

We found it necessary to exclude a number of firms and industries from the sample in order to make the empirical setting as representative as possible of the population of Norwegian firms. Cut off limits were set on the basis of 2007 data, the year before the crisis, and included the following. First, we removed firms with an annual turnover smaller than NOK 10 million (approximately $ 1.7 million) to avoid very small firms to dominate the sample, and to exclude holding and real estate firms with no day-to-day operations. Second, to secure that the firms at least had a few employees we removed firms with labor and social expenses lower than NOK 3 million (approximately $ 0.5 million). Setting a limit on number of employees would be preferable, but unfortunately not possible as the employee variable in the dataset was rather incomplete. Third, we removed firms with legal forms other than AS, ASA, ANS and DA[[2]](#footnote-2), and fourth, all state owned firms were removed as these are little likely to be motivated by profits. Fifth, we removed a total of 13 two-digit NACE-industries that were believed to disturb the generality of the sample. Industries from the finance and insurance sector were removed as their financial reporting tends to differ from that of other firms, while the agriculture, health and culture sectors were removed as their close connections to the public sector make them less likely to experience normal market forces or to be motivated by profits. This left us with a total sample frame of 17.312 firms from which 5000 firms where randomly selected to receive the questionnaire. We received a total of 1248 usable responses, yielding a response rate of 25 % which is considerably higher than response rates obtained in recent surveys of senior managers (e.g. Frels, Shervani and Srivastava, 2003).

**Source of Variation**

The financial crisis of 2008 and the recession that followed was the biggest economic crisis in Norway since the 1930s. GDP growth dropped from 2.7 % in 2007, to 1.8% in 2008 and -1.5% in 2009, growth in gross capital investments dropped from 16.1 percent in 2007 to -7 percent in 2009, while the number of yearly bankruptcies increased by 106 percent between 2007-2009 (StatisticsNorway, 2010). The effect on firm performance was also substantial. Mean operating profits for our population of Norwegian firms dropped from 8.84 percent in 2007 to 5.67 percent in 2009, while the standard deviation of operating profits increased from 0.105 to 0.306 in the same period. Meyer (1995:151) states that “good natural experiments are studies in which there is a transparent exogenous source of variation in the explanatory variables that determine the treatment assignment”. The financial crisis of 2008 did not originate in Norway, something that increases the exogenous dimension of the shock. In this paper, the financial crisis of 2008 and the recession that followed are therefore used as a natural experiment on the population of Norwegian firms.

**Variables and Measurement Development**

We had three dependent variables measuring actions related changes in firm boundaries, namely outsourcing of core activities (OUT\_CORE), outsourcing of non-core activities (OUT\_NCORE) and insourcing of core activities (IN\_CORE). All three were binary, and were constructed based on the following questions in the questionnaire: “Have the crisis made your firm change which activities that are performed within the firm (insourcing and outsourcing? If yes, please specify”. Then the firms could choose between the categories “Outsourced production activities”, “Outsourced administrative/ support activities”, “Insourced production activities (that used to be bought in the market)” and “insourced administrative/ support activities (that used to be bought in the market)”. To each of these four questions, respondents could choose between the three categories “Yes, within the firms core activities”, “Yes, outside the firm’s core activities” and “No”. The firms that answered yes to one or both of the two questions regarding outsourcing where given the value for the two variables OUT\_CORE and OUT\_NCORE respectively, while the others were given the value zero. Similarly, firms that answered, “yes, within core activities” to one or two of the questions regarding insourcing were given the value 1 for the variable IN\_CORE. Frequency tables for the three dependent variables are presented in table 1 below.



We had two independent variables of which both where based on questions from on the questionnaire. Access to credit (CRED\_PROB) was constructed based on a question where the respondents were asked to rate how their access to credit where affected by the crisis on a scale from -3 (reduced) to + 3 (increased) with 0 indicating no change. We recoded the scales to a 1-7 scale for the purpose of analysis, which means that the neutral value is 4 instead of 0 in our subsequent analyses. The scale was then reversed so the higher value of the variable, the more reductions in access to credit the firm experienced. Demand for products and services (DEMAND\_PROB) was constructed by summing up two items from the survey. The items where based on seven point scales where the CEOs where asked to evaluate how the crisis had affected the demand for the firms products and services and how it had affected their capacity utilization. The two scales ranged from -3 (reduced) to +3 (increased) with 0 indicating no change. We recoded the scales to a 1-7 scale in a similar way as for the CRED\_PROB variable, so that the neutral value is 4 instead of 0. The two items was then summed up and reversed so that the higher value of the variable, the more reductions in demand a firm experienced.

As control variables, we included seven pre-recession firm- and industry characteristics. Firm profits and –leverage are measured as operating profits and debt-to-total assets in 2007. All these measured were adjusted for each firm’s two-digit NACE industry. Firm size is measured as the natural logarithm of firms’ total sales, while industry profits, -sales growth and – leverage are measured using aggregates of operating profits, sales growth and debt-to-equity ratio of two-digit NACE industries in 2007. Also, we included two controls on the firms’ selfreported vertical bargaining power, customer power and supplier power. These were each based on a seven point likert scale items where the firms were asked to evaluate the degree to which their customers- and providers could influence terms and conditions such as prices, delivery, terms of payment etc.

The means, standard deviations and correlations of all independent variables are shown in table 2 below.



**Statistical Approach**

Our dependent variable is dichotomous, a firm either insource/outsource core/non-core activities, so we use logistic regressions. The general model is the following:

(1) Logit Y = α + β1 Firm profits + β2 Firm leverage + β3 Industry profits + β4 Industry leverage + β5 Firm size + β6 Downstream Bargaining power + β7 Upstream bargaining power + β8 Reductions in demand + β9 Reductions in access to credit + ε

Logit Y is the natural logarithm of the odds that a firm actually has insourced/outsourced activities:

(2) ln [p(Y = 1) / (1 − p(Y = 1)]

**Data Concerns**

A number of potential biases are present when using survey data. First, we may have respondent biases, e.g. that the firms that answered the survey are different from the firms that did not answer it. To investigate if this was the case, we used register data to check if the firms that responded differ from the sample of 5000 firms that received the questionnaire. Differences were checked on a number of variables, including size, pre-crisis growth, pre-crisis debt ratio, pre-crisis profitability, pre-crisis total assets, geography, industry, ownership, age and legal form. We found no indications of any respondent biases. Second, as our survey data is retrospective, an obvious concern is biases associated with the accuracy of the memory of the respondents. Unfortunately, there is no way we can check for such biases but as the questionnaire was sent out relatively close up to the recession, we have, hopefully, minimized this problem. Further, it seems little likely that memory biases are distributed across firms in any systematic way, which implies that potential biases will appear in our data as random sources of error. Also, outsourcing/insourcing activities are decisions so considerable for a firm that the likelihood of the CEOs to remember that they have done so should be very high. Third, as there was only one respondent in each firm, the CEO, our data is also vulnerable to single respondent biases. This is problematic if there are any systematic biases of CEOs’ responses, such as self-serving bias where poor performance is blamed on the recession. Fourth, as the survey was distributed only to surviving firms and not to the firms that disappeared during the recession, our data is also vulnerable to survivor biases.

**RESULTS**

To discover how to reductions in demand and reductions in access to credit caused by the recession affects firms out- and insourcing decision, we conducted a series of logistic regressions of which results are presented in table 3.



We ran four different models with each of the three dependent variables. First we use outsourcing of non-core activities as the dependent variable. Model 1a consists of the five control variables and a constant. The results show that the model is insignificant with a Chisquare value of 8.464 and a pseudo R2 of only 0.023. None of the seven control variables are statistically significant on a 5% level, while industry profit is statistically significant on a 10% level.

Model 1b adds the two independent variables, reductions in access to demand and reductions in access to credit. From the results we find that the model is significant on a 5% level with a Chi-square value of 17.699 and a pseudo R2 of 0,047. H1 predicted that reductions in demand would be positively related to outsourcing of non-core activities, which imply that the coefficient of the reductions in demand variable should be positive. From the results we see that the coefficient is positive and significant on a 0.05 level, which makes us conclude that H1 is supported. H4 predicted that problems accessing credit should have no effect on the outsourcing of non-core activities. From the results we see that the reductions in access to credit-variable is insignificant, which is in support of H4.

Next, we used outsourcing of core activities as the dependent variable. Model 2a consists of the five control variables and a constant, and is significant on a 5% level with a Chi-square value of 13.753 and a pseudo R2 of 0.047. Industry profit is statistically significant on a 5% level, while none of the other controls are significant.

Model 2b adds the two independent variables, reductions in demand and reductions in access to credit to the equation. From the results we find that the model is significant on a 1% level with a Chi-square value of 34.991 and a pseudo R2 of 0,097. H2 and H5a predicted that reductions in demand and reductions in access to credit would be positively related to outsourcing of core activities. From the results we see that the two coefficients are positive and significant on a 0.05 level, which makes us conclude that H2 and H5a is supported.

Model 2c adds an interaction term between reductions in access to credit and firm leverage 2007. From the results we find that this step did not significantly improve the model. The interaction effect is positively signed as predicted, but the term is also not statistically significant so H5b is not supported.

Finally, we use insourcing of core activities as the dependent variable. Similar to the above, Model 3a consists of the five control variables and a constant, and is significant on a 5% level with a Chi-square value of 15.437 and a pseudo R2 of 0.049. Upstream bargaining power is here found to be positively related to the insourcing of core activities and statistically significant on a 5% level. None of the other controls are statistically significant on a 5% level, while industry profit and firm profit is statistically significant on a 10% level.

Model 3b adds the two independent variables, reductions in demand and reductions in access to credit to the equation. From the results we find that the model is statistically significant on a 1% level with a Chi-square value of 30.100 and a pseudo R2 of 0,095. H3 and H6a predicted that reductions in demand and reductions in access to credit would be positively related to outsourcing of core activities, respectively. From the results we see that the two coefficients are indeed positive and significant on a 0.05 level, which makes us conclude that H3 and H6a is supported.

Model 3c adds an interaction term between reductions in access to credit and firm leverage 2007. From the results we find that this step did not significantly improve the model. The interaction effect is negatively signed as predicted, but the term is also not statistically significant so H6b is not supported.

Model 3d adds an interaction between the two independent variables to the equation. From the results we see that the model is statistically significant on a 1% level with a Chi-square value of 34.376 and a pseudo R2 of 0,108. H7 predicted that there would be a significant interaction between reductions in demand and reductions in access to credit in the case of insourcing of core activities. From the results we see that the interaction term is negative and statistically significant on a 5% level, and that its inclusion in the model added explanatory power to model by increasing the pseudo R2 from 0.095 to 0.108. These findings indicate that H7 is supported. Further, the two main effects are also statistically significant on a 1% level, indicating that both of the variables have a statistically significant effect on the probability that a firm will insource core activities when the other has the value of zero.

**DISCUSSION AND CONCLUSION**

We used a dataset combining primary survey data with secondary financial data for a sample of 1248 Norwegian firms to investigate how reductions in demand and -in access to credit affect in- and outsourcing of core/non-core activities. To test the seven hypotheses developed in the theory section, we applied a series of logistic regressions.

Our first set of hypotheses was related to how reductions in demand affect out- and insourcing. First, we tested how it affected outsourcing of non-core activities, and found a positive and significant relationship. This was as expected. Foss (2010) suggested two reasons for why firms keep non-core activities within the boundaries of the firm, namely that they either has high complementarity with other more specialized assets or that they have a very high frequency. The negative shift in demand reduces the demand for firms’ core activities, which again reduce the complementary effects and/or frequency of the non-core activities. Our results are in congruence with the theoretical arguments, but unfortunately they do not allow us to make a clear distinction between which of the two mechanisms that are at work. Second, we tested how reductions in demand affected outsourcing and insourcing of core activities, and found positive and significant relationships regarding both. The theoretical reasoning behind these two hypotheses was that reductions in demand increase uncertainty (behavioral, environmental or both), and that this again affects firms’ incentives to take actions regarding which activities they perform within their boundaries. Our findings of reductions in demand being positively related to both in- and outsourcing are in congruence with predictions of Williamson’s (1986) proposition that firms can respond to uncertainty by either integrating vertically or by sacrificing specificity in favor of more standardized goods and services. From our results it thus seems clear that both options are chosen.

Our second set of hypotheses tested how reductions in access to credit affect in- and outsourcing. We found no significant relationship between reductions in access to credit and outsourcing of non-core activities, which was just as expected. Regarding core activities, we hypothesized that reductions in access to credit should be positively related to outsourcing for firms that rely on external finance, and positively related to insourcing for firms that rely on internal finance. We applied a two-step method to test these hypotheses where we first tested whether the relationship between reductions in access to credit and in/outsourcing were positive and statistically significant, and then tested for interaction effects between reductions in access to credit and pre-recession level of debt. The results were mixed. Reductions in access to credit were positive and significantly related to both in- and outsourcing, but there were not any statistically significant interaction effect between reductions in access to credit and debt level on neither in- or outsourcing. We also tried other proxies for reliance on external debt, with similar results. This may indicate that there are other characteristics than reliance on external finance that moderate the relationship between reductions in access to credit and in/outsource. Another reason for why we did not find the hypothesized interaction effect could simply be that pre-recession debt-levels are imperfect proxies for whether or not firms rely on external finance. The theoretical reason for believing that reliance on internal/external finance moderates the decision to in/outsource core activities is related to the relative costs of the two financing sources at the time the firms’ are making the decision, e.g. in the recession years of 2008-2009. Using debt-levels from 1-2 years before this may therefore be problematic. An alternative (which we also tried) is to use debt-levels from 2008, but this introduces other problems as the in-recession level of debt may already been affected by the recession and thereby being more difficult to interpret. A preferably alternative would have been to combine pre-recession debt-levels with survey questions related to if firms changed their sources of finance during the recession, but unfortunately such questions were not included in the survey. However, the finding of reductions in access to credit being positively related to both in- and outsourcing of core activities (and not to noncore activities) is still interesting as it highlight how financial problems makes firms take actions regarding its boundaries.

Our last interest was in the interaction effect of reductions in demand- and access to credit on insourcing on core activities. Here we hypothesized that reductions in demand would increase firms’ incentives to vertically integrate core activities, but that the relationship would be moderated by reductions in access to credit. So, if a firm experience reductions in access to credit in addition to reductions in demand, this should hinder its ability to vertically integrate. Following this logic, we hypothesized (and found) that reductions in access to credit negatively moderates the effect of reduced demand on insourcing of core activities. This is an interesting finding as it shed lights on somewhat ambiguous theoretical predictions of whether firms respond to reduced demand by integrating vertically or by sacrificing specificity and outsource an activity to the market. According to our findings, firms’ access to credit may be a factor that determines which one of the two options that are chosen. So while the incentives to vertically integrate is increased due to the increased uncertainty accompanied by reductions in demand, the ability to do so depends on the firms access to capital to finance the integration. Also, this result may provide an explanation for why we did not find significant interaction effects between pre-recession reliance on external finance and reductions in demand. Our “access to credit” variable is a more direct measure of reduced access to external finance than pre-recession levels of debt, as it directly captures problems accessing capital for investments firms want to pursue.

The findings outlined above have several theoretical implications. First, as advocated by Foss (2011) it emphasizes that more focus should be given towards studying how radical changes on macro levels, such as recessions, affect firms’ boundary decisions. Second, several of the above findings highlight the importance of debt and access to finance when studying changes in firm boundaries. In addition, the negative interaction effect between demand- and credit problems on the insourcing of core activities highlight that financing issues may influence firms’ boundary decisions under periods of increased uncertainty. Future research should, however, go more in detail on the mechanisms on play regarding how demand- and credit problems affect firms’ in- and outsourcing, and also look further into the role of access to finance as a moderator of demand problems on firms’ boundary decisions. The latter should be studied in more detail both in “normal times” and in times of severe recessions to investigate how the relationships might change depending on the stability of the business environment.

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1. Of course, “disturbances” are in general important to causing “hold-up” (Williamson, 1996). [↑](#footnote-ref-1)
2. AS = Limited liability firms, ASA = publicly listed firms, ANS and DA = partnerships [↑](#footnote-ref-2)