

Transaction costs, industry experience and make-or-buy decisions in the population of early U.S. auto firms

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Abstract

We study the determinants of make-or-buy decisions for engines made by every recorded U.S. auto firm during 1917–1933. Most make-or-buy studies testing predictions of transaction cost economics exclude smaller firms, even though their make-or-buy behavior might be different from large firms' due to capital constraints or other factors. We find that transaction cost effects on make-or-buy choices were nevertheless important at the population level. We also find that firm experience in the industry, as well as pre-entry experience, significantly affected make-buy choices. These experience effects may reflect the interaction of mechanisms emphasized in evolutionary and transaction cost theories.

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Many empirical studies of make-or-buy decisions testing transaction cost economics (TCE) have found support for the theory's main hypotheses. Transactions characterized by asset specificity, for example, tend to be internalized, whereas transactions lacking this characteristic tend to be carried out through market contracts (Williamson, 1975, 1985). TCE-inspired empirical studies of phenomena other than make-or-buy choices *per se* have similarly found an impressive

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amount of evidence supporting its main prescriptions (for surveys, see Shelanski and Klein, 1995; Klein, 2005; Macher and Richman, 2006).

While a large number of make-or-buy and related studies have been carried out, to our knowledge no study has to date been conducted on data from an entire population of firms in an industry. The earliest make-or-buy studies tested TCE hypotheses on data from one or a few very large firms. Later studies have examined make-or-buy data from samples of firms in a given industry or across industries. Both types of studies, however, have tended to exclude the smallest firms in the population, usually because data was not available on them. This is a potential shortcoming because small firms' make-or-buy behavior could be different from that of larger firms. For example, perhaps smaller firms tend to use market contracting even for transactions involving asset specificity because they face capital constraints that preclude internalization.² We seek to address this shortcoming in the literature by analyzing a database consisting of the entire population of firms in the U.S. auto industry, over the historical period 1917–1933. We examine firms' decisions to make or buy the engine for each of its models as a function of the characteristics of the engines themselves, make-or-buy choices for related components, firm characteristics, industry production levels, and time. Our main finding is that the asset specificity associated with an engine was indeed associated with a greater likelihood that the engine would be produced internally rather than procured from external suppliers. This suggests that the exclusion of small firms from previous studies has not unduly limited our understanding of firm boundary decisions. We also find, however, that other potentially related variables were important in determining make-or-buy decisions in our population, particularly the length of industry experience and the nature of firms' pre-entry history. These findings are consistent with the effects of differential firm capabilities over time (e.g., Chandler, 1990; Klepper, 1996).

Engine transactions are of particular interest because engines are critical components of automobiles, accounting for 20–30 percent of a vehicle's total cost during the period of our study.³ Engines also have a very important impact on key features of an automobile for which consumers are willing to pay, such as acceleration, speed, and quality of ride. Indeed, in many cases during our period of study, engine design was part of an automobile's styling (e.g., Flammang and Kowulke, 1989). We therefore expected, consistent with TCE's efficiency orientation (Williamson, 1985), that the financial performance of an auto firm that organized its engine procurement inefficiently would suffer during this highly competitive period. For this reason, we expected that auto firms would have considered their engine procurement decisions carefully.

We begin by stating our transaction cost and related capabilities-based hypotheses. We then review selected make-or-buy studies in order to highlight our contribution here. We discuss our data and methods, present our results, and conclude.

1. Transaction cost economics, industry experience and vertical integration

Transaction cost theory argues that there are hazards associated with conducting certain kinds of transactions through the market, and that these kinds of transactions will therefore tend to be internalized within a firm (Coase, 1937). The main contractual hazard emphasized by Williamson (1985) and Klein et al. (1978) is hold-up, whereby the party whose investments in the transaction

² Lerner and Merges (1998), for example, found evidence that capital constraints affected governance choice in the biotechnology industry.

³ We relied upon industry experts at the Behring Automotive Museum in Danville, California, for these figures.

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