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An empirical analysis of manufacturing competitive factors and offshoring

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ABSTRACT

Offshoring is one of the defining phenomena of 21st century manufacturing. It attracts significant attention in academic, business, and social circles in both developed and developing economies. Despite the relevance of this phenomenon, there is limited research exploring to what extent offshoring effort is explained by manufacturing strategy. In this study I investigate whether offshoring effort can be predicted by manufacturing competitive factors such as cost, flexibility, and delivery, particularly when controlling for structural covariates from internalization theory. Data from an international manufacturing survey enable the analysis. Results suggest that competing based on cost and flexibility, but not on delivery, explains the effort to relocate sourcing and design activities to a foreign country.

1. Introduction

Manufacturing offshoring is a subject of great interest both in the academic and popular press (Baily and Lawrence, 2004; Bertrand, 2011; Rasheed and Gilley, 2005). That interest is often centered on the effects of offshoring on employment, wages, and welfare, particularly in the more developed countries. Whereas some studies have suggested a weak relationship between offshoring and unemployment in the United States (Baily and Lawrence, 2004) and Belgium (Michel and Rycx, 2012), others have provided evidence that offshoring may eliminate low-skilled jobs, and increase wage disparity between low-skilled and high-skilled jobs in the home country (Crinò, 2010; Davis and Naghavi, 2011; Mullen and Panning, 2009).

However, there appears to be significantly less attention devoted to the strategic antecedents of offshoring in manufacturing. In other words, to what extent is offshoring of production, sourcing, and design activities associated with the manufacturing strategy? From a theoretical perspective, this translates into which manufacturing "competitive factors" (MCFs) (Slack, 1994) explain offshoring efforts, beyond the effects of structural covariates such as firm size, international facilities, and international competitive focus.

Studies of offshoring under a manufacturing strategic perspective are scarce. A common theme across the existing studies has been the need to align offshoring decisions with MCFs (Dana et al., 2007; Dou and Sarkis, 2010; Ritter and Sternfels, 2004). On one hand, offshoring may be beneficial to manufacturers competing based on cost competitiveness, particularly those with high labor content; on the other hand, it may be detrimental to those competing based on differentiation based on quality, flexibility, or delivery advantage (Dana et al., 2007; Grossman and Rossi-Hansberg, 2008; Kinkel and Maloca, 2009; Ritter and Sternfels, 2004).

There appears to be limited development and validation of these relationships, particularly by studies supported by multi-country data. Previous empirical studies on MCFs and offshoring focused on specific countries such as New Zealand (Dana et al., 2007) and Germany (Kinkel and Maloca, 2009) or processes such as clinical trials in the pharmaceutical industry (Thakur, 2010). Gray et al. (2009) used international data, but investigated MCF relationships with outsourcing rather than offshoring, which as explained by Sako (2006), Manning et al. (2008), and Kinkel and Maloca (2009) are different concepts, one relating to ownership and the other to location of operations. Using data from a previous International Manufacturing Strategy Survey (IMSS-IV), Größler et al. (2013) investigated relationships between MCFs and international sourcing, which is one of the three offshoring indicators used in the present study. Perhaps more importantly, there is limited if any empirical research that controls for effects of structural covariates from internalization theory such as production scale, international sales, and international facilities (Buckley and Casson, 1976) on relationships between MCFs and offshoring.

This study addresses this gap in the literature. It is aimed to validate a model of relationships between offshoring effort and manufacturing strategies that controls for theoretical covariates. The analysis uses a large dataset of manufacturers of metal products, instruments, and machinery from 21 countries. Results indicate that competing based on cost and on flexibility are positively associated with the effort to offshore sourcing and

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design activities, and that these relationships occur above covariate effects. Robustness analyses suggest the findings are not moderated by GDP per capita and labor content, except for a positive effect of GDP per capita on the relationship between cost and production offshoring.

2. Theoretical background

2.1. Manufacturing offshoring

Manufacturing offshoring is the transfer of production, supply, and R&D activities from homegrown to foreign locations (Cusmano et al., 2010; Manning et al., 2008). Offshoring may be driven by various needs including cost reduction or access to rare resources or skills (Nachum and Zaheer, 2005). For example, research on offshoring from high-wage countries often emphasizes benefits of hiring labor from low-wage economies (Dana et al., 2007; Davis and Naghavi, 2011; Kinkel and Maloca, 2009; Michel and Rycx, 2012) particularly under favourable exchange rates (Baily and Lawrence, 2004; Delios et al., 2009). Firms may offshore operations to access knowledge or assets that may be difficult to find in the home country (Lewin et al., 2009; Lynn and Salzman, 2009; Manning et al., 2008; Ok, 2011). Whereas reducing costs often justifies offshoring from high-wage to low-wage countries (Crinò, 2010; Davis and Naghavi, 2011; Jabbour, 2010; Rasheed and Gilley, 2005), seeking resource-based advantages may explain also "reverse offshoring" (Marshall and Cohan, 2003) from low-wage to high-wage economies (Jabbour, 2010). Both types of offshoring appear to have intensified after economic liberalization acts, such as the European Union treaty, facilitated international trading (Buckley and Casson, 2009; Casson, 2013; Onaran, 2011), and international operations (Fawcett, 1992), and as new technologies reduced the transaction costs and risks of international trading (Buckley and Casson, 2009; Casson, 2013; Dana et al., 2007; Fawcett, 1992).

Several economic and international business theories have been proposed to explain international trade and business phenomena including offshoring. Buckley and Casson (2009) divide the traditional branches into trade, industrial economics, and internalization theory, whereas Mtigwe (2006) suggests four groups including classical, early and later market imperfection, and internationalization theory. Economic theories focus on the terms and flows of international trade; they include the Heckscher–Ohlin theorem (e.g. Buckley and Casson, 2009; Mtigwe, 2006; Warne, 1973), and modern trade theories focused for example on heterogeneous firms and goods (Alagidede, 2010). International business theories address the development of global business and the multinational enterprise (MNE) (Buckley and Casson, 2009; Mtigwe, 2006). Mtigwe (2006) reviewed and compared several of these theories to refine the concept of "international entrepreneurship".

Following the rationale in Buckley and Casson (2009), the study model is based on internalization theory in particular because of its focus on management and rational decision making, which is consistent with manufacturing strategy frameworks. As Rugman and Verbeke (2003) indicate, despite having limitations such as assuming unidirectional transfer of knowledge from headquarters to subsidiaries, and viewing offshoring decisions as planned, 'top-down' decisions, internalization theory remains a valid framework for the analysis of MNEs.

2.2. Offshoring and the manufacturing strategy

As Kinkel and Maloca (2009) and Casson (2013) indicated, the study of relationships between MCFs and offshoring effort can be assisted by internalization theory (Buckley and Casson, 1976, 2009). The theory suggests that firms move activities abroad to explore regional economies in non-tradable production factors, e.g. labor and land, particularly when (i) the non-tradable factors are difficult to substitute with tradable factors, e.g. materials and machinery, and (ii) when savings related to non-tradable factors exceed any increase in costs associated with international communication and transportation (Buckley and Casson, 1976; Casson, 2013; Rugman and Verbeke, 2003). The first condition is illustrated in reverse by Atzeni et al. (2010) who indicated that substituting old technologies such as injection molding with new technologies such as rapid manufacturing could allow customized production locally, even in high wage countries. The second condition reflects the trade-off between production and transaction costs of Coase (1937), whose work was a foundation of internalization theory (Buckley and Casson, 1976, 2009).

Buckley and Casson (1976) explored the balance between production, communication, and transportation costs in two cases of offshoring. In Case 1, locating production activities focused on minimizing production and transportation costs. In Case 2, locating distribution and R&D activities considered not only production and transportation, but also communication costs across locations. Communication costs include overhead, inspections, and control processes (Rugman and Verbeke, 2003). According to Rugman (1981), R&D transfers must also consider costs of controlling knowledge dissemination across borders. These cost functions were later formalized in a model by Buckley and Hashai (2004) to guide the optimal choice of location and control structures of MNEs.

Whether a company will pursue such economies on a global scale depends also on past strategic or organizational choices (Buckley and Casson, 1976). In particular, (i) large companies may favor the centralization of production, distribution, and (intermediate) R&D activities to obtain economies of scale; (ii) companies selling to foreign markets may build regional design and production facilities to support distribution channels; and (iii) companies with existing international operations may relocate initial and final R&D stages to benefit from proximity to those facilities, markets, and "the major sources of technical and marketing information" (Buckley and Casson, 1976: 55).

Studies such as Maskell et al. (2007) provide evidence that firms have used offshoring to reduce non-tradable production costs, particularly labor, as indicated in Buckley and Casson's (1976) theory. As stated by Davis and Naghavi (2011: 334), "Offshoring is seen chiefly as a cost-saving strategy for firms, who at times see it as their only means of survival". This appears to occur more often with manufacturers located in high income economies (Crinò, 2010; Davis and Naghavi, 2011; Jabbour, 2010; Maskell et al., 2007; Rasheed and Gilley, 2005; Swamidass and Kotabe, 1993) and with establishments with high labour intensity (Kinkel and Maloca, 2009; Nichols and Taylor, 1995). For example, a review by Manning et al. (2008) of *Offshoring Research Network* (ORN) surveys (Lewin and Couto, 2007) indicated that reducing labor costs and other related costs were the main reasons cited for offshoring by US and European companies between 2004 and 2006. Likewise, Kinkel and Maloca's (2009) survey of German manufacturers, and Ok's (2011) analysis of Dutch manufacturing and service companies found that reducing wage costs was the major offshoring driver in both cases. Dana et al. (2007) provided further evidence with case studies of small apparel manufacturers in New Zealand.

In contrast to cost factors, studies suggest mainly negative implications of offshoring for manufacturers competing based on quality or delivery. This can be explained by diseconomies related to international operations, such as higher communication costs resulting from more stringent quality specifications (Das, 2011)