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RESUMO/ABSTRACT

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Outsourcing and Vertical Integration: a Survey of Empirical Literature

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Abstract

This paper provides a survey of the empirical literature of outsourcing and vertical integration. This literature shows that outsourcing and integration behave in waves, with periods of greater outsourcing activity and others of a greater activity of vertical integration.

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1. Introduction

Outsourcing has become an important part of today's business. Grossman and Helpman (2005), citing a report of World Trade Organization (1998), details the production of a particular "American car": "Thirty per cent of the car's value goes to Korea for assembly, 17.5% to Japan for components and advanced technology, 7.5% to Germany for design, 4% to Taiwan and Singapore for minor parts, 2.5% to the United Kingdom for advertising and marketing services and 1.5% to Ireland and Barbados for data processing. This means that only 37% of the production value is generated in the United States)." Feenstra (1998), citing Tempest (1996), describes similarly the production of a Barbie doll. According to Feenstra, Mattel procures raw materials (plastic and hair) from Taiwan and Japan, conducts assembly in Indonesia and Malaysia, buys the moulds in the U.S., the doll clothing in China and the paints used in decorating the dolls in the US. Domberger (1998) mentions that Japanese firms such as Toyota and Nissan purchase approximately 80 percent of the components required for their vehicles assembly from other firms and American car manufacturers such as Ford and General Motors, at around 50 and 30 percent respectively.

Shy and Stenbacka (2004) provide more examples on how manufacturing outsourcing is widespread in a variety of industries, from textile finishing (Benetton) to telecommunications (Motorola and Nokia). Nokia makes use of more than 300 domestic subcontractors in addition to an almost equally high number of foreign subcontractors. Most producers of personal laser printers do not make their engines, but instead buy the engines from Canon, a Japanese manufacturer. Other examples can be found in companies such as Intel, NIKE, etc.

The examples above seem to reveal a tendency for firms to vertically disintegrate. The evidence here seems to be mixed. There are some empirical papers that show an increase in the number of vertical mergers in the last 20 years and others that show clearly a tendency for vertical disintegration, but for particular industries.

2. Outsourcing Literature

Among the empirical papers that document a tendency for firms to outsource, there are papers that provide this evidence at a domestic level (U.S. example) and others at an international level. As mentioned by Antras and Helpman (2004), at a domestic level, there is no systematic analysis of this trend. In this case what we have are studies that reveal a tendency to outsourcing in particular industries. Abraham and Taylor (1996) provide evidence of rising outsourcing of business services in thirteen U.S. industries; Helper (1991) documented the increasing outsourcing in the U.S. automobile industry; and The Economist (1991) also reveals an increase in outsourcing in manufacturing in the U.S.

At an international level, Antras and Helpman (2004) mention that "the increasing international disintegration of production is large enough to be noticed in aggregate statistics. Feenstra and Hanson (1996) use U.S. input—output tables to infer U.S. imports of intermediate inputs. They find that the share of imported intermediates increased from 5.3 percent of total U.S. intermediate purchases in 1972 to 11.6 percent in 1990. Campa and Goldberg (1997) find similar evidence for Canada and the United Kingdom (but not for Japan). And Hummels et al (2001) and Yeats (2001) show that international trade has grown faster in components than in final goods. But how important is intra-firm relative to outsourcing trade in intermediate inputs? A firm-level data analysis is needed to answer this question, and no such analysis is available at this point in time. And despite the fact that the business press has stressed the spectacular growth of foreign outsourcing, Hanson et al (2003) document an equally impressive growth of trade within multinational firms. Nevertheless, the fact that, according to data from the Bureau of Economic Activity, imports from foreign affiliates of U.S.-based firms had fallen from 23.9 percent of total U.S. imports in 1977 to 16.1 percent in 1982, and remained roughly at this level until 1999, suggests that the growth of foreign outsourcing by U.S. firms might have outpaced the growth of their foreign intra-firm sourcing."

From the last paragraph we can see that, at an international level, the empirical literature does not makes a distinction between inputs received from a subsidiary – intra-firm inputs (in our model this would be equivalent to the scenario of the final producer setting its own supplier firm or acquiring the supplier since all the transaction

between the subsidiary and the parent firm will be considered intra-firm) and inputs received from an external supplier (in our model this corresponds to the outsourcing scenario). Thus, as mentioned by Antras and Helpman (2004), there is no empirical evidence that shows how important is outsourcing relative to the scenario of setting an own supplier or acquiring an international supplier.

In sum, what we have is several empirical studies that use the import of inputs as a proxy of international outsourcing. Although it might seem an imperfect measure of outsourcing, the authors do show that there has been rapid expansion in international specialization for a varied group of industries that includes textiles, apparel, footwear, industrial machinery, electrical equipment, transportation equipment and chemicals and allied products. Based on this evidence, Grossman and Helpman (2005) mention "It seems safe to tentatively conclude that the outsourcing of intermediate goods and business services is one of the most rapidly growing components of international trade."

Considering then the rising in outsourcing over the last years (systematic or not), some empirical studies have tried to analyse the reasons why firms are outsourcing more. Gorzig and Stephan (2002) summarize some of these reasons. It has been hypothesized that this increase results from the decline in transaction costs in connection with the intensified use of information technology (Abraham and Taylor, 1996; Groot, 2001)[2]. Abraham and Taylor (1993) distinguish three broad theoretical considerations for outsourcing, namely savings on wage and benefit payments, transfer of demand uncertainty to the outside contractor, and access to specialized skills and inputs that the firm cannot afford itself. In an empirical study, based on establishment level data, they provide evidence that a combination of these three reasons is reflected in the decision to contract out (the analysis was restricted to manufacturing industries). Two specific reasons are advanced for the observed increase in contracting out activities in recent years. The first is the increasing gap between labour costs at contracting firms and the market price of labour available to perform a particular task. Secondly, there

[2] Hummels et al (2001, p.94) also discusses the reasons for what he documents as an increase in vertical specialization: "Improvements in communications technologies (faxes, e-mail, and video-conferencing) and sharp declines in the costs of information transmission have made it easier for firms to coordinate and monitor production in diverse locations. These technological developments may also be tied to the increasing importance of foreign direct investment, which has grown faster than international trade in recent decades. Multinationals themselves may play an integral role in the vertical specialization process, as they allow production to fragment across countries while it remains internal to the firm (…). A second possibility is that reductions in the cost of moving goods have driven the increase in vertical specialization. Tariffs and transportation costs penalize a good produced sequentially in multiple countries each time the good-in-process is shipped to another country. Hence, reductions in these barriers yield a multiplied reduction in the cost of producing a vertically specialized good."

may have been an increase in the comparative advantage of specialized service establishments due to (i) increased demand (and greater potential to achieve economies of scale by spreading fixed costs over larger output and reducing the price) and (ii) improvements in communications infrastructure, allowing greater specialization and realization of greater economies of scale.

It has also been argued that part of the process of desindustralization is associated with outsourcing. Today, activities that used to be performed in-house (e.g. auditing, maintenance, repair, transportation, janitorial and legal services) are usually outsourced to firms in the business service sector. Consequently, outsourcing has contributed significantly to the growth of business-related services during the last decade (Fixler and Siegel, 1999). Moreover, manufacturing firms are outsourcing not only services but also internal production. One prominent example is the automotive industry, where some large car manufacturers only perform the final assemblage of major parts whose production is outsourced to external suppliers. Since this type of outsourcing quite often occurs at an international level, it is also closely related with the globalization process (Feenstra and Hanson, 1996).

In the empirical literature we also find other papers that look at particular issues of outsourcing. We present some of these papers below.

A first strand of papers looks at the impact of outsourcing in performance. In overall, the impact of outsourcing in firm performance is positive. However, there are few empirical papers in this area. Fixler and Siegel (1999) find a positive association between productivity growth and outsourcing. This result was also previously verified by Ten Raa and Wolf (1996) for the goods sector.

Gao (2005) uses a sample of US domestic outsourcing transactions from 1990 to 2003 and investigates the benefits of outsourcing from a financial markets and accounting performance perspective. He finds that that around the contract announcement date, suppliers firms experience significantly positive abnormal returns; while in the long-run acquirers firms realize significantly positive buy-and-hold abnormal returns. They also find evidence that acquirers experience significant improvement in operating efficiency for each of the three years following the contract taking effect. This change in operating efficiency is significantly positively related to the client firm's long-run abnormal stock returns.

Using firm-level panel data from the German cost structure survey over the period 1992-2000, Gorzig and Stephan (2002) show that firms tend to overestimate the

benefits accruing from outsourcing of services previously provided internally but the benefits from outsourcing of inputs are positive. They use gross operating surplus as a measure of performance.

In a more comprehensive study, Kurz (2004) uses data of US manufacturing firms and find that outsourcers are "outstanding," in that there is a premia for outsourcers over non- outsourcing organizations for plant and firm characteristics, except for wages paid to production workers. In other words, outsourcing plants and firms have significantly higher employment, shipments, value added, capital, investment, skilled worker fraction, and average wages, even when controlling for size, industry, state, exporter status, and multi-unit status. They also find that organizations that outsource have higher productivity and given controls similar to the previous specifications, firm-level productivity growth is significantly higher for outsourcers, a result that does not hold at the plant level.

Some other papers look essentially at the impact of international outsourcing on wages (U. S. wages). These include the studies by Feenstra and Hanson (1996, 1999, 2001), Feenstra (1998), and Slaughter (2000). They try to measure the impact of outsourcing on the demand for skilled and unskilled workers and wage levels and inequality of wages.

There is some empirical evidence that outsourcing or less integration is more prevalent in large markets (final product market). Holmes (1995) show that there is a negative correlation between market density and vertical integration and Pirrong (1993) provides evidence that markets reduce transaction costs, leading to less integration. However, in a recent empirical study about vertical integration, Acemoglu et al (2004) do not find a statistically significant relation between the number of downstream firms and the level of integration.

The idea that outsourcing is more prevalent when the market of suppliers is more competitive was only obtained from anecdotal evidence. This was referred in three books: Domberger (1998), Greaver (1999) and Corbett (2004). Domberger (1998, p.91) mentions that "Another factor requiring consideration is whether the industry from which the service may potentially be sourced is sufficiently developed and competitive to offer a suitable choice among service providers. A negative answer to this question is often seen as a sufficient reason for retaining activities in-house, particularly if it concerns the public sector." Greaver (1999, p.15) says that the number of outsource providers increased 65 percent between 1989 and 1994, reflecting, among other things,

the growth of outsourcing market. Corbett (2004, p.40), referring to international outsourcing by Procter and Gamble (P&G) of it's IT programs mentions "P&G found that it wasn't just lower local rates that created the cost difference; it was also the competition between outside organizations bidding for P&G's work. … It was the rates, competition, and work ethic that combined to create an offshore cost advantage". In a recent empirical study about vertical integration, Acemoglu et al (2004) provide contrary evidence. They show that a greater number of firms in the supplying industry leads to more vertical integration. This is just a secondary result of their paper and they also mention that they don't find apparent explanation for this result, saying that this result "is not consistent with the popular claims that greater competition is leading to the demise of large vertically-integrated firms.

We also find some empirical evidence that firms are outsourcing from more efficient suppliers. Domberger (1998, p.143) provides two examples where the firms obtained a cost reduction due to outsourcing from more efficient suppliers: "IBM entrusted the running of its offices to Norrell Corp. – experts in the field of office management. We can see that after that there was a reduction in IBM costs… British Airways (BA) outsources, among other things, engine maintenance, IT functions, etc. The reason is finding some company who can provide the service at a cheaper price." Greaver (1999, p.20) mention a statement in an annual report of JLG Industries one of the world's leading manufacturers: "They clearly mention 'manage our manufactured components that may be more efficiently and economically sourced from outside vendors.'". Gorzig and Stephan (2002) also model this idea that firms outsource from more efficient producers.

The idea that firms will decide to outsource due to capital constraints is referred in Gorzig and Stephan (2002). Although they do not model this issue (in fact, this is an empirical paper), their explanation for outsourcing is that is saves internal resources either in terms of labor costs or capital investment or both. A quote from the paper summarizes the outsourcing decision: "We presume that firms engage in outsourcing activities because they expect a positive impact on firm performance by saving resources in terms of both labor and capital. If for instance intermediate goods are not longer internally produced but purchased from an external supplier, this leads to a reduction of both labor costs and capital investments." In the list of reasons to outsource, Greaver (1999, p.4) mentions some financial reasons, namely reduction in

investments in assets and free up these resources for other purposes; and generate cash by transferring assets to the supplier.

The Corbett (2004, p.11) book mentions several reasons to outsourcing. According to a survey realized to managers during the 2004 Outsourcing World Summit the main reasons to outsourcing are: reduce costs (49%); improve focus (17%); variable cost structure (12%); access to skills (9%); grow revenue (4%); improve quality (3%); conserve capital (3%); and innovation (3%). They also present several anecdotal examples for each of these reasons. They provide an example where the outsourcing helped to recover the asset value from the asset sold in the outsourcing agreement. "In December 1992 McDonnell Douglas signed a $3 billion ten-year information technology contract with IBM. As part of the transaction, more than $100 million in information technology assets were transferred to IBM, and McDonnell Douglas received a cash payment for those assets. That money was used to help fund a corporate wide restructuring of the business and reinvestment in the core business". In another study, Deavers (1997) also presents the Top 5 reasons to outsource: Improve company focus, access to world-class capabilities; accelerate benefits from reengineering, to share risks and to free resources for other purposes.

There are also some empirical papers that try to analyse which activities are better candidates for outsourcing. In the context of international outsourcing and its impact in wages, Feenstra (1998) refers that the activities that are outsourced will be those that use a large amount of unskilled labor, such as assembly of components and other repetitive tasks. Hanson (1996) also mentions that less skilled intensive activities are better candidates to outsourcing. Yeats (2001), on the other hand, provides evidence that activities that are outsourced from foreign countries (usually less develop countries) are more labor intensive.

3. Vertical Integration literature

Most of the empirical studies above mentioned can be categorized in "empirical studies about outsourcing" since there are often concerned with measures of outsourcing, recent trends in outsourcing, impact of outsourcing on wages, on performance, etc. In another set of empirical literature, we have the "empirical studies about vertical integration". In this set of papers, the concern is in explaining vertical integration, namely testing existing theories of vertical integration. We might have thought that these empirical studies were in the same "group" since vertical integration can be understood as the reverse of vertical integration. However, this distinction seems to occur in the literature.

In a recent survey of empirical studies about the make-or-buy decision, Klein (2004) provides some examples that help to demonstrate how different firms outsource or choose the level of vertical integration in different proportions. "Some firms are highly integrated: IBM, for example, produces many of its components and software and maintains its own sales force for mainframe computers. Others are much more specialized: Dell Computer outsources virtually all its hardware and software components, selling directly to end users through its catalogue and website, while the shoe company Reebok owns no manufacturing plants, relying on outside suppliers to make its products."

As referred by Klein (2004), most of the empirical work on the make-or-buy decision adopts the transaction cost economics (TCE) framework and follows the same basic model[3]. The efficient form of organization for a given economic relationship - and, therefore, the likelihood of observing a particular organizational form or governance structure - is seen as a function of certain properties of the underlying transaction or transactions: asset specificity, uncertainty, frequency, and so on. Organizational form is the dependent variable, while asset specificity, uncertainty, complexity, and frequency are independent variables. Also, most of these studies are single industry case studies. There are very few cross-sectional studies. Joskow (2003) also mentions some examples of single industry case studies: automobile components, (Klein, Crawford and Alchian, 1978; Klein, 2000, 2002; Monteverde and Teece, 1982;

[3] The emergence of the transaction cost approach to vertical integration in the 1970s and 1980s (Williamson, 1971, 1975, 1985, and Grossman and Hart, 1986) generated a substantial body of empirical research on vertical firm boundaries and related issues in contracting and organizational design. A survey by Boerner and Macher (2002) estimates the number of empirical papers in transaction cost economics at over 600, and a large share of these focus on vertical integration.

Walker and Weber, 1984; Langois and Robertson, 1989); coal (Joskow, 1985, 1987, 1988b, 1990; Kerkvliet 1991); aerospace systems (Masten, 1984); aluminum (Stukey, 1983); chemicals (Lieberman, 1991); forestry (Globerman and Schwindt, 1986)); carbonated beverages (Muris, Scheffman and Spiller 1992); pulp and paper (Ohanian, 1994); property-liability insurance (Regan, 1997).

Many of these papers test whether variations in transaction attributes such as asset specificity affect the choice between vertical integration and market contracting as TCE theory predicts. The General Motors' (GM's) 1926 decision to acquire Fisher Body is the most commonly cited example of a hold-up problem solved by vertical integration, as discussed in Klein, Crawford, and Alchian (1978) and Klein (1988). Factors that influenced the integration decision included the need for transaction-specific investments in stamping presses and dies after the transition from wooden bodies to closed metal bodies, friction over the price of sales exceeding the quantities covered in the contract, and the refusal of Fisher to locate its facilities closer to GM. Monteverde and Teece (1982) collected data on internal and external procurement of automobile components by GM and Ford. They found that component production was more likely to be vertically integrated if the component required a greater amount of design engineering, which served as a proxy for human capital specificity.

As we mentioned in the previous section of outsourcing, there seems to be a tendency for firms to outsource, at least for particular industries. However, a recent study by Fan and Goyal (2002) shows that a significant fraction of mergers during the 1962-1996 period had a significant vertical relatedness. Other important conclusions obtained from this study are the following. They find that vertical merger activity has been increasing over time. Mergers in the 1980s and the 1990s provide significantly higher opportunities for vertical integration. Vertical mergers result in significant positive wealth effects that are comparable to those in horizontal mergers. The wealth effects of vertical mergers are greater in the post-1980 period compared with those in the 1960s and 1970s. Over time, they find a significant co-movement in wealth effects in vertical mergers and vertical merger activity. Periods of intense vertical merger activity are also periods in which vertical mergers create positive wealth effects. They conjecture that economy-wide shocks could have induced vertical merger activity. They also find a systematic decline in systematic risk around vertical mergers, a finding that supports the specific assets rationale for vertical mergers.

In a recent empirical paper about incomplete contract theory and vertical integration, Acemoglu el al (2004) use UK data to study the determinants of vertical integration. They find that backward vertical integration is more likely when the producing industry is more technological intensive and the supplying industry is less technology intensive. Moreover, both of these effects are stronger when the supplying industry accounts for a large fraction of the producer's costs. These results are consistent with the incomplete contracts theories of the firm and emphasize both the potential costs and benefits of vertical integration in terms of investment incentives. They also show that backward integration is more likely when the supplier accounts a larger fraction of the inputs costs of the producer, because, in this case, there is greater scope for hold-up by the supplier and backward integration protects the producer against this hold-up.

4. Conclusions

This paper provides a survey of the empirical literature of outsourcing and vertical integration. This literature shows that outsourcing and integration behave in waves, with periods of greater outsourcing activity and others of a greater activity of vertical integration.

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