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João C. A. Teixeira

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Universidade dos Açores (DEG e CEEAplA)

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RESUMO/ABSTRACT

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João C. A. Teixeira
Universidade dos Açores
Departamento de Economia e Gestão
Rua da Mãe de Deus, 58
9501-801 Ponta Delgada

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João C. A. Teixeira[1]

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Abstract

This paper provides a survey of theoretical models of outsourcing and vertical integration. It develops an overview of the models that rely on incomplete contracting and on strategic outsourcing.

[1] University of the Azores and Centre of Applied Economic Studies of the Atlantic – CEEAplA, Department of Economic and Business, Rua Mãe de Deus, s/n, 9501-801 Ponta Delgada, Portugal.

1. Introduction

This paper provides a survey of theoretical models of outsourcing and vertical integration. In the papers subjacent to this literature, we can find several synonymous of outsourcing, namely the terms vertical separation, arm's length (international outsourcing), disintegration, subcontracting, contract manufacturing (in case of outsourcing in the manufacturing industry) and cross-supplies (if firms outsource to each other). A firm that supplies the input in an outsourcing transaction can be named vendor, supplier, contractor or upstream firm. On the other hand, a firm that outsources can be named acquirer, buyer, subcontractor or downstream firm. The terms intermediate goods and inputs are used interchangeably. Horizontal competition means competition among final producers (downstream firms).

Although it seems that outsourcing is the reverse of vertical integration, the focus given to each of these topics has changed through time. While the vertical integration decision has deserved more attention in the past, the new literature seems to focus more on the decision to outsource, as several empirical studies and survey reports show a tendency towards outsourcing in recent years, both domestically and internationally.

The outsourcing/vertical integration decision is related with the economic theory of the boundaries of the firm, which has in Coase (1937, Economica) its seminal contribution. The proposition of Coase is that a firm will substitute market transactions as long as management costs are less then transaction costs. Following this work, the choice of a firm's production mode has often been discussed in the context of transaction costs analysis, which argues, roughly speaking, that a firm's choice of its production mode is based on a comparison of the costs associated with internal transactions and transactions over the market. Prominent contributions by Williamson (1985), Grossman and Hart (1986), Hart and More (1990), and Bolton and Whinston (1993) have further pointed out that asset specificity and incomplete contracts tend to make the transactions of the market more difficult, inducing firms to vertically integrate2. The property rights approach introduced by Grossman and Hart (1986) also

[2] Holmstrom and Roberts (1998) and Spulber (1999, chapter 11) offer updated surveys of the research about the boundaries of firms and, in particular, Holmstrom and Roberts summarize the past two decades of research as having emphasized the importance of "hold-up" problems between transacting parties.

emphasizes the importance of relationship-specific investments to the organization of supply relations.

We are now in position to group the several approaches to the vertical integration/outsourcing problem. There seems to be a clear distinction between two approaches: (1) based in transaction economics and incomplete contracts and (2) “Strategic outsourcing” or papers that have highlighted the role of strategic competition for a firm’s decision to choose a particular production mode. The papers presented in these two approaches are discussed in the next pages.

2. Approach based on transaction economics and incomplete contracts

Sub-approach 2.1

The first sub-approach relies on transaction economics and incomplete contracts. The most important contribution in this area is probably the paper by Grossman and Helpman (2002). They model the integration/outsourcing decision as a tradeoff between the costs of running a larger and less specialized organization and costs that arise from search frictions and imperfect contracting. A vertically integrated may face a higher cost of producing components and services, because such a firm has many divisions to manage, and because the organization does not benefit from the learning that comes with specializing in a single activity (the integrated firm has higher variable and fixed costs that arise from governance costs). But a firm that opts to outsource its components must search for a suitable partner, and if successful, must try to provide its partner with incentives to produce inputs to its specifications and in the quantity it demands. Search is costly and does not always end in success. And contracting may be imperfect, if some attributes of the input are not verifiable by third parties.

They also identify sectoral equilibrium that leads to one or the other equilibriums. They analyse how the intensity of competition in final product and the specificity of inputs affects the decision to outsource. When markets are highly competitive - because consumer products are highly substitutable for each other - the occurrence of outsourcing requires a large per-unit cost advantage for specialized input producers relative to integrated firms. This advantage must be large enough to overcome search frictions and the pricing disadvantage that stems from the holdup problem. In contrast, when markets are not highly competitive, the viability of outsourcing hinges mostly on a comparison of the fixed costs that must be borne by an integrated firm and those that are paid by specialized producers.

Relying in property-rights theory, Levy (2005) points out the importance of final product firms to share their input suppliers as these suppliers can achieve economies of scope by serving multiple final product firms. They study how the make-or-buy decision of a firm depends on the organization of its peers. They consider a multi-firm framework in which firms choose whether to integrate into the supply of an intermediate input or to outsource its production, and choose the size of their supplier network if outsourcing. Firms find it optimal to share the same set of suppliers, as there

are economies of scope in investment to suppliers taking multiple designs. These economies are due to spillovers of technical or operational know-how between projects and to savings in the setup costs on physical capital. They also present the idea that it will be better form firms to have more suppliers: "Firms control the access to their design's blueprint, and can decide on the size of their supplier network. Granting access to more suppliers mitigates the firm's fears of being held up and strengthens its incentives to make relationship-specific investments but at the same time dilutes the incentives of the suppliers". They also conclude that outsourcing is more likely in larger markets, since in this case the economies of scope (for suppliers) are stronger.

Focusing on the design of the outsourcing contract, Grossman and Helpman (2004) discuss a model where heterogeneous firms choose their location of the subsidiaries or suppliers and decide whether or not to outsource. The outsourcing decision involves in this case a trade-off between monitoring costs (low in vertical integration scenario) and other aspects related with the design of the outsourcing contracts.

Sub-approach 2.2

Intimately related with the papers in sub-approach 2.1, most of the papers in sub-approach 2.2 maintain the background of the transaction costs and incomplete contracting theory but now consider international outsourcing instead of domestic outsourcing. Among these we have the papers by McLaren (2000), Antras (2003), Antras and Helpman (2004), and Grossman and Helpman (2005).

McLaren (2000) analyses the effect of international openness on the vertical integration decision in an industry equilibrium. The idea is that the suppliers of inputs incur a sunk cost of producing the specialized input. Thus, due to the specialized nature of the input, the suppliers know that under outsourcing, they may face the problem of being "held up" by the downstream firm, not recovering its costs ex post. Their only alternative is that there may be alternative buyers for the input, given them more bargaining power and allowing them to demand a more remunerative price. On the other hand, there is the vertical integration possibility but in this case there are other costs, as legal costs from negotiating and enforcing a contract or the costs of a merger. Thus, the outsourcing decision is seen as a trade off between the hold-up problem in case of outsourcing and the governance costs in case of integration.

They also provide the idea that the bigger (or "thicker") is the market of buyers, the more alternatives the suppliers have, and the bigger is the advantage of prevailing an outsourcing equilibrium. They then conclude that growth in international trade explain in some sense the trend to more outsourcing.

Antras (2003) develops an incomplete-contracting, property-rights model of the boundaries of the firm (namely the outsourcing decision), which he then incorporate into a standard trade model with imperfect competition and product differentiation. He derives a model where, in equilibrium, transaction costs of using the market are increasing in the capital intensities of imported goods. In his model, final good producers need to obtain specialized inputs from their suppliers. Production of these intermediate inputs requires a combination of noncontractible and relationship-specific investments in capital and labour.

Antras and Helpman (2004) develop a model where they integrate the decision to choice the organizational structure (vertical integration vs. outsourcing) with the decision related with the localization of its suppliers (independent domestic suppliers, foreign independent suppliers or dependent foreign suppliers – foreign direct investment). In choosing between a domestic and a foreign supplier of parts, a final-good producer trades off the benefits of lower variable costs in the South against the benefits of lower fixed costs in the North. On the other hand, in choosing between vertical integration and outsourcing, the final good producer trades off the benefits of ownership advantage from vertical integration against the benefits of better incentives for the independent supplier of parts. These trade-offs induce firms with different productivity levels to sort by organizational form. They show that the equilibrium sorting patterns depend on the wage differential between the North and the South, on the ownership advantage in each one of the countries, on the distribution of the bargaining power between final-good producers and suppliers of components, and on the headquarter intensity of the technology.

The location decision of the suppliers is also analysed in Grossman and Helpman (2005). In fact, this paper is an extension of Grossman and Helpman (2002). While the focus of Grossman and Helpman (2002) was on the decision to integrate or outsource, Grossman and Helpman (2005) concentrate on the decision to locate the subcontracted activity. Independently of using some different assumptions to the problem, the main difference between these two papers and Antras and Helpman (2004)

is that Antras and Helpman (2004) integrates in one model both decisions, while the other papers consider each decision per si. Grossman and Helpman (2005) conclude that the extent of international outsourcing depends on the thickness of the domestic and foreign market for input suppliers, the relative cost of searching in each market, the relative cost of customizing inputs and the nature of the contracting environment in each country.

3. Approach of " Strategic outsourcing"

In this approach we have several papers that highly the role of strategic competition for a firm's decision to vertically integrate or outsource. Three of these papers study the vertical integration of a retailer: Bonanno and Vickers (1988), Jansen (2003) and Gal-Or (1999). The remaining papers focus in the vertical integration of an input supplier: Chen (2001), Chen (2005), Shy and Stenbacka (2003), Chen et al. (2004), Buehler and Haucap (2003), Shy and Stenbacka (2004), Chen (2004), Chen et al. (2004), Gilbert et al. (2003) and Fixler and Siegel (1999).

Bonanno and Vickers (1988) study the incentives for firms to choose vertical separation (disintegration) when two-part tariff contracts are available. They consider a model where two manufacturers sell their differentiated products through two retailers, and each manufacturer chooses whether to vertically integrate its retailer or to keep the retailer as a separate firm. Vertical separation is profitable as it induces more friendly behavior from the rival manufacturer (by rising the price to the retailer, through franchising fee, the result is an increase in the price of the remaining manufacturer). Since the manufacturer can charge a franchise fee to the retailer, the fee will transfer the entire retailer's surplus to the manufacturer.

In a related paper, Jansen (2003) builds a model where a vertically separating firm trades off fixed contracting costs against the strategic benefit of writing a (two-part tariff, exclusive dealing) contract with its retailer. They show that the existence of asymmetric vertical industry structures in equilibrium depends on the interaction of retailers in the final good market. When oligopoly retailers supply closely substitutable final good quantities, equilibrium coexistence of vertical separation and integration is possible. However, when the retailers are Cournot duopolists or when final goods are supplied to independent markets, vertical separation and integration do not coexist in equilibrium.

The third paper about vertical separation of a retailer, Gal-Or (1999), explores how asymmetric information between a manufacturer (producing differentiated products) and a retailer and horizontal competition between manufacturers affects a manufacturer's decision to integrate with or separate from a retailer. The idea is that if sales are separated, we might have an adverse selection problem: the retailer knows more than the firm. Vertical integration helps to solve this problem.

The paper by Chen (2001) models the integration/outsourcing decision in a context of horizontal competition. They consider a model where there are two downstream firms competing in price (also consider quantity competition with homogeneous products) producing differentiated products. This production requires them to acquire input from an upstream market, where more than two suppliers also compete in price. One of the downstream firms will vertically integrate one of the suppliers in two possible situations: (1) the supplier has a marginal cost lower than the marginal cost of all other suppliers or (2) the firm can produce more efficiently then the supplier. This produces an efficiency effect from vertical integration: since the marginal cost is now lower, it intensifies price competition in the final market and tends to make vertical integration procompetitive.

In addition to the choice of organizational structure, they also consider how the integration decision will affect the competition in the final product market since the other competitor will have to choose whether to acquire the input from the integrated firm or from other suppliers. Thus, vertical integration changes a downstream producer's pricing incentive, due to becoming a supplier of its rival. In this case vertical integration causes a collusive effect since it softens competition in the final market and changes rival's incentive in selecting input suppliers. Which effect dominates depends on the costs of switching suppliers and the degree of downstream product differentiation.

It's is interesting to see how they model the integration decision. They assume that one of the suppliers has a marginal cost lower than the remaining of the suppliers. It will be this supplier who will be integrated. They also assume a cost of having multiple suppliers.

In a related paper, Chen (2005) studies how economies of scale affect the vertical disintegration (outsourcing) decision. They say that economies of scale are obtained if the suppliers can also sell the input to the rivals of the firms that sell in the final product. They consider horizontal competition in the downstream market (duopoly). The upstream producer of inputs has economies of scale. They assume ex-ante that this input producer is vertically integrated with one of the firms. However, the integrated firm will only exists in equilibrium if the rival downstream firm acquires the input from the integrated firm. However, this later firm will only do that if the integrated firm supplies the intermediate input at a price sufficiently lower than those from alternative suppliers.

This rival might strategically not purchase from the integrated firm. Thus, in order to continue benefiting from economies of scale of the input division, the integrated firm will decide to vertically disintegrate that division. In their model they consider both differentiated products and price competition and homogeneous product and quantity competition.

The main difference between Chen (2005) and Chen (2001) is the following. In Chen (2001) an upstream producer has an exogenous cost advantage, thus the strategic purchasing behavior by downstream firms leads to vertical integration. By the contrary, in Chen (2005) the upstream producer cost's advantage is endogenous: its ability to exploit economies of scale depends on the purchase of its competitors. Thus the strategic purchasing behavior by downstream firms leads to vertical disintegration.

In Shy and Stenbacka (2003 differentiated Bertrand duopolists can either undertake irreversible investments into in-house production facilities for an input, or they can buy that input from a subcontractor, but at higher variable cost (there is a mark-up in the input market due to imperfect competition). The study has identified the strategic incentives of Bertrand competitors in differentiated industries to outsource production of key components. A central contribution of this analysis has been to demonstrate that introducing competition into the component- or input-producing industry does not reduce efficiency even if the production of essential components exhibit increasing returns to scale at all production levels. There are two reasons for that. First, price competition ensures that average production cost of the component is minimized. Second, the firms producing the final goods will choose a subcontractor which can make at least normal profit given its price offer. This means that under increasing returns, in equilibrium all final goods producers will choose the same subcontractor so that economies of scale will be fully utilized. Consequently, competition among subcontractors will achieve the double goal of making components available at average cost together with full utilization of economies of scale.

The model by Buhler and Haucap (2003) relies in some of the assumptions of Shy and Stenbacka (2003, JEBO). As in the previous paper, they model the outsourcing decision as a trade-off between making irreversible investments and incurring higher marginal costs (again due to mark-up in input market). However, they propose a reduced-form approach towards analysing sequential strategic outsourcing. They analyse how a decision by one firm will induce the other firm to outsource or not. As an important conclusion they state that in addition to saving fixed costs, a firm's decision

to outsource serves to soften competition in the final product market. It softens market competition because outsourcing is seen as an instrument of raising rival's cost. Outsourcing implies a higher variable cost. More specifically, if firms face a trade-off between making irreversible investments and incurring higher marginal cost when making their "make-or-buy" decisions, and if, in addition, input prices vary with the industry's vertical structure, outsourcing may serve as an instrument of collusion or raising rivals' cost.

In another model, Shy and Stenbacka (2004) analyse the outsourcing decision of a certain proportion of the required components – partial outsourcing. The main idea subjacent to the paper is the following. Firms have to decide whether to produce inputs in-house or whether to outsource them. By outsourcing an activity the firm can exploit a (marginal) cost advantage determined by, for example, the bargaining power of the subcontractor, the degree of competition between the subcontractors and the wage level in the subcontractor's country. However, the firm can exercise this outsourcing option only by accepting the increased organizational monitoring costs for management and quality control as an irreversible expense. Thus, the firm's optimal production mode is determined by the required fixed monitoring costs, the marginal cost advantage on outsourced production as well as the parameters characterizing the revenue function.

In their framework, there is the assumption that subcontractors are more efficient. They introduce the idea of "diminishing advantage" and "rising advantage" of subcontractor in cost terms. They also consider the type of product more able to be outsourced, based in technological characteristics. One research question that seems to be directly related to our model is the following: How does a change in the intensity of competition in the market for the final goods affect the level of outsourcing? They established a proposition relating the competition in the final product and the level of outsourcing: intensified competition promotes outsourcing. They also do some comparative statics to see how outsourcing decision is influenced by parameters.

As main findings of this model we have the following. They demonstrate that, in a Cournot model, with a continuum of inputs, intensified competition in the market for the final good enlarges the set of outsourced activities relative to the set of in-house activities. Thus, the proportion of outsourced inputs increases with enhanced competition. As they mention "Dealing with a continuum of inputs enabled us to explicitly explore the strategic properties of outsourcing. In particular, we identified how changing the number of outsourced components by one firm affects outsourcing of

rival firms. The outsourcing decisions were found to be strategic substitutes. Thus, rather than responding to a rival's increased degree of outsourcing with more outsourcing so as to achieve marginal cost advantages, the firm has an incentive to avoid the implied increase in the fixed monitoring cost as well as the induced price reduction. The firm can achieve this by adjusting its production mode towards more in-house production, which induces savings with respect to the fixed monitoring costs and relaxes the intensity of competition in the market for final goods. These findings apply to markets with homogeneous final goods under quantity competition as well as to markets with differentiated products under price competition."

A second model of partial outsourcing is presented by Chen (2004). They model the decision to outsource as a trade-off between economies of scale (obtained from the suppliers) and production control. The focus of the paper is to investigate how the incumbents will strategically choose the quantity outsourced to deter the entry of the outside provider.

The paper by Chen et al. (2004) is about strategic outsourcing in an international context and also multi-market contact. That's why it is also included in the approach (3) of horizontal subcontracting. They model the outsourcing decision in a context where the final product producer might outsource from a more efficient supplier which is also a rival in the final product market. In this case, the usual cost-saving motive for outsourcing could be accompanied by a strategic motive, and that the strategic outsourcing in response to trade liberalization in input goods can result in higher prices for both input and final product markets. It assumes Bertrand competition in the final product market. They present the idea that: the market for suppliers has become more efficient due to the increase in the market of buyers: "Trade liberalization therefore unambiguously enhances efficiency because of thickening of the market."

The paper by Gilbert et al (2003, WP) explores production and outsourcing decisions for two equipment manufacturers (OEM) who produce partially substitutable products and have opportunities to invest in reducing the manufacturing cost.

Finally, the paper by Fixler and Siegel (1999) presents a model of outsourcing of services. This paper is both theoretical and empirical. The empirical part of the paper is not very important for our model. What is important is to see how they model outsourcing. This is in some sense similar to my model. Idea that firms outsource to benefit from cost differentials. Outsourcing becomes relevant to the firm if (1) equivalent services can be purchased outside of the firm and (2) monitoring costs and

other transactions costs are not significant. It follows that a firm will outsource when price of outsourcing input is lower than marginal cost of in-house production. Thus, the propensity of the firm to outsource is a function of the difference between the price or marginal cost of the service and the marginal cost of 'in house' production. Since we are considering services that are relatively labor intensive, it is likely that the magnitude of the cost differential will be predominately determined by differences in wages. Other determinants could include the use of a superior technology, economies of scale, or monitoring and transactions cost savings. To summarize, in their simple framework, they assume that firms outsource to take advantage of cost differentials. The latter may arise from wage differentials, economies of scale, technology, monitoring and transactions cost savings or the desire to smooth production cycles.

4. Conclusions

This paper provides a survey of theoretical models of outsourcing and vertical integration. It develops an overview of the models that rely on incomplete contracting and on strategic outsourcing.

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