sciendo Ovidius University Annals Series: Civil Engineering, Year 20, 2018
DOI: 10.2478/ouacsce-2018-0001

Vertical Connections on the Construction Market

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***Abstract* – The specificity of construction as an economic activity and of the construction product (goods and services) determine the existence of a complex vertical chain of links, involving different actors, which they perform simultaneously the function of the buyer of the product from a previous participant and vendor product to the next participant. In practice, this means that in every unit of the vertical chain construction firm as a buyer of resources and services can be monopsony or oligopsony, on the other hand as the seller of the created product may be in the role of a monopoly or oligopoly on the market. The aim of the study is the analysis the model of a bilateral monopoly on the resource and product market, the conditions of equilibrium and the behavior of the construction firm at the entrance and the exit, taking into account the specificities of different segments of the construction market.**

Keywords – bilateral monopoly, construction firm-buyer, construction firm-seller, imperfectly competition, monopsony, monopoly, perfect competition, vertical connections.

1. INTRODUCTION

The specificity of construction as an economic activity and the construction product (goods and services) determine the existence of a complex vertical chain of links, involving different actors, as buyers and sellers which create value at each stage of construction and perform different tasks and functions (fig.1).

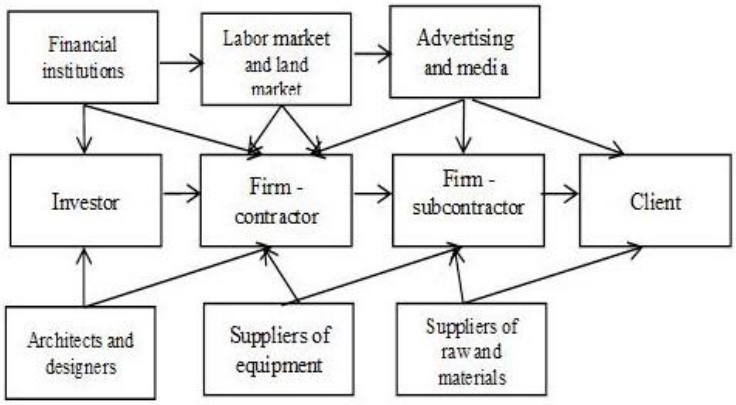

Fig.1 Vertical connections between the different actors involved in the construction process

ISSN 2392-6139 / ISSN-L 1584-5990

In this vertical chain main subject and factor is the investor - the person, which finances the entire construction activity own and credit funds. The investor may be public - the state or municipalities, or private, physical person - companies, households. Public investment in construction (mostly in infrastructure) depend to a large extent the possibilities of the state budget to fund major building projects the country's priorities in the given period, its fiscal policy and various political factors. Private investment in construction depends above all expectations of economic agents for future economic development, expected return from the construction object, the credit policy of the banks and many other primarily psychological factors. Investments in construction are investments in real capital, real assets, which means that they do not exist or rarely exist an element of speculative capital. On the other hand however, often the investment solution itself is speculative, resulting primarily from the impact of future expected factors risk assessment and expectations of high returns over a relatively longer period of time.

The creation of each construction product starts with the determination of the requirements, the preferences of the investor (client) regarding the construction site (area, technology, terms, quality, and price). The expressed claims of each client are a function of his knowledge for about what is being sought on the market, with what technology can be realized. They find their place in the development of individual, unique construction project (from the point of view of location, infrastructure, functionality, design, ecology, etc.), which embodies the highly qualified work of architects and designers/constructors. The created service-level project is re-supplied to the investor for corrections, changes and a final decision (to start or to refuse realization),which is broken down by its estimate of expected return, expected changes in economic conditions, expected changes in the market, etc. Therefore, the investor is a buyer and the construction company is a seller (vendor) of a service, commissioned an external investor. The contractor works with subcontractors to whom it entrusts the execution of certain tasks for the realization of the final product. The executive firm is now a buyer, and the sellers of the service are subcontractors. These are usually small companies who perform separate activities in which they are specialized or activities related to maintenance, repairs that are not of interest to large companies. The creation and realization of the end product means that the investor and the construction company are the sellers of this product to the end user (households, firms) [1].

At each stage of the construction process, construction firms - contractors and subcontractors use, combine in a certain way (depending on the technology chosen) different materials, labor, including the basic and most expensive resource - the land. They incur costs for their purchase from the respective suppliers and generate revenue from the product they sell. The volume of these costs and revenues is, in principle, a function of the specifics of the activity performed. Therefore, the participants in the construction process simultaneously perform the function of a buyer of a product from a previous participant and a seller of the product to the next participant. This means that in every unit from the vertical chain of relationships construction firm as a buyer of resources and services can be monopsony or oligopsony, on the other hand, as the seller of the created product may be in the role of a monopoly or oligopoly on the market [2], which substantially changes the behavior and conditions of market equilibrium.

Every participant in the chain searches, collects, analyzes different offers from contractors and subcontractors, and chooses one to work with and control over its activities. This costs each company significant transaction costs (external) [3], which influences the formation of the final price of the construction product. These specifics of the construction market require an in-depth analysis of the market activity of the construction firm at the entrance and exit. In addition, the construction market includes different market segments,

both on the part of different buyers and their different behavior, both on the part of companies, offering different construction activities with different geographic, territorial locations. Every segment has a different number of buyers / sellers with different characteristics, different behavior formed under the influence of various factors, and mainly a function of the different competitive conditions, which determines their different market power.

The aim of the study is to analyze the model of a bilateral monopoly on the resource and product market, the conditions of equilibrium and the behavior of the construction company at the entrance and exit, taking into account the specifics of the various segments of the construction market, such as: 1) Assume, that the two markets --the product and resource (factor) markets have a perfectly competitive structure, create an ideal market outcome (effect)and deduce the conditions of equilibrium(determination of the equilibrium price of the construction product and the equilibrium quantities), 2) With relevant structural changes in the market/industry (product and resource markets are imperfectly competitive), the behavior of the participants changes and, above all, buyers have a market influence that changes the equilibrium conditions of the construction market.

2. THEORETICAL FRAMEWORK TO THE STUDY

In order to explore the real relationships and behavior of investors (clients), contractors and subcontractors as buyers and sellers on the construction market, we will accept the assumption that the two markets - the product and resource (factor) markets have a perfectly competitive structure and create an ideal market outcome. As a result of structural changes in the market/industry, the behavior of participants (buyers gaining market influence) and market equilibrium conditions changes.

2.1. Equilibrium in perfect competition of product and resource construction market

Both markets have a perfectly competitive structure if the following conditions are met:

1) A large number of companies compete to buy / rent a construction product (goods and services) of specified quality, which is offered by many competing sellers.
2) Each company buys/rents only a small part of the total quantity available on the market and is therefore unable to change market demand independently.
3) Every seller (vendor) of a construction product (goods and services) offers only a small part of the total supply and is unable to have an independent impact on the market supply.
4) Sellers of a construction product are free to enter and exit the construction market and have the opportunity to transfer their resources from one way to another and from one location to another in response to price dynamics.
5) The construction product which is sold in the relevant market is standardized in the eyes of buyers.
6) The participants of the two markets are fully informed about the market conditions, the prices and the quality of the construction product that is offered and sought.
7) The participants of both markets are perfect competitors, which assumption is of significant importance because demand in a market is a function of supply of product creation in other markets.

On the perfectly competitive construction market total demand is formed by all firms buyers a standardized construction product and the total supply is formed by the supply of all firms- contractors, sellers of the given standardized construction product. From the total demand and supply of the given standardized construction product, the equilibrium price and the equilibrium price, which is fixed and no buyer or seller can affect it.

The construction firm-buyer and a perfect competitor on the construction product market, aiming at maximizing profits to determine the optimum volume of construction output it will buy, must compare the Marginal Revenue of Construction Product (MRCP) that you will receive at the sale of the marginal/additional construction product with the price it has to pay or with the transaction external marginal costs to conclude the deal with the subcontractor and the purchase of the marginal additional construction product - - MCCP (Marginal Cost of Construction Product).

The firm - a perfect competitor to the product construction market is the recipient of the price of the created construction product, so that each unit of output, incl. and the last produced/additional will be realized at the determined market price of the product PCP (PCP - Price Construction Product). The proposed marginal construction product - MCP (Marginal Construction Product) multiplied by the corresponding market price of the product, will determine the marginal revenue of the buyer company: MRCP = MCP. PCP.

The marginal revenue from the construction product (MRCP) reflects the demand for construction output by the respective buyer and is graphically depicted with a negative slope search curve, because of diminishing returns to variable factor in a short run. At the market-set, fixed price, it can buy an optimal volume of construction output following the rule -equal marginal revenue with marginal transaction costs. If the marginal revenue (MRCP) from the sale of marginal/additional construction product is greater than the transaction costs the seller, the construction company will increase the volume of their purchases, and vice versa - if the marginal revenue from construction product is less than the transaction costs, it will reduce the volume of purchases (contracts).

The firm seller of construction product and the perfect competitor maximizes your profits by striving to equalize the marginal revenue - MRCP from the sale of an additional unit of construction output (equal to the price - PCP under perfect competition) with the marginal costs - MCCP (equal to the average cost and product price) for its creation - MRCP=MCCP. It determines the optimal volume of construction output it will offer and sell at this current market price, following the rule - the market price of the product (marginal revenue) is equal to the marginal cost of creating each additional unit product. If marginal revenue, i.e. the cost - PCP is greater than the marginal cost

$$MRCP=PCP> MCCP,$$

the company has an interest in increasing the volume of the product offered and vice versa

$$- \text{if } MRCP=PCP<MCCP,$$

its interest dictates shortening the volume of the product offered (performed activities that are negotiated with the buyer). Therefore, the curve of offering the sales company of construction products in a market with perfect competition is the classic positive slope and shows a right connection between price and supply volume of output. The equalization of the total demand for construction products, determined by the marginal revenue from the construction product - MRCP, which the buyer will receive and the total supply of construction output determined by the seller's marginal cost - MCCP determines the

equilibrium price P*CP, the equilibrium quantities (Q*CP) and the equilibrium of the construction market (p. E), where buyers and sellers are perfect competitors (fig. 2).

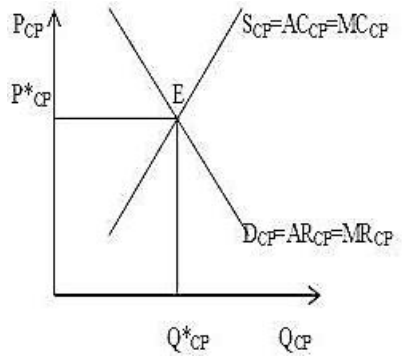

Fig. 2 Equilibrium in perfect competition of product and resource construction market (buyers and sellers - perfect competitors)

2.2. Equilibrium in imperfect competition of product and resource construction market

The equilibrium conditions of the construction firm, which is both a buyer and a seller in the vertical chain of links, are different when the product and factor markets are imperfectly competitive. In economic theory are three models with different degrees of imperfection.

The first model assumes that the firm has monopolistic impact of the product market (mainly driven by product differentiation or economies of scale),but in the resource market is a buyer-perfect competitor. The demand curve for its product has a negative slope, but for each level of production, the price is higher than the marginal revenue (Pcp>MRcp) and hence marginal revenue curve deviates under the curve of demand for the product. Since the resource market has a perfectly competitive structure, total demand and supply of resources form the equilibrium price. The company is one of the many buyers on this market and it can not influence that price. With the current market price, the firm can buy as much as it wants, following the rule - the marginal cost of each resource unit is equal to the market price – MCcp = Pcp. Under the given conditions, the company - monopolist of the product market buys fewer resources at the specified market price, and sells the finished product at a higher price.

In the second model, the firm has a monopsony influence, i.e. there is only one big buyer of resources (including labor). In an imperfect competitive structure of the resource market, the supply curve of a resource (factor) is with the classical positive slope - if the company wants to increase the resource purchases, it will have to pay a higher price. With an increasing supply factor curve hiring an additional resource unitin creases overall costs with a higher magnitude ,than the price increase because the higher price is paid not only for the last unit purchased, but for all previously purchased resource units. It follows that the marginal cost curve (reflecting the change in total costs resulting from hiring an additional resource unit) for purchasing resources is growing and located above and to the left of the supply curve or above average labor costs. In a monopsony market, the firm realizes its monopsony power by purchasing less resources (defined by equality of marginal revenue with marginal cost) at a lower price - MRCP=MCcp>Pcp, compared to a perfectly competitive market.

The third model analyzes the behavior of a firm (seller) with a monopoly influence on the product market and a monopsony influence (buyer) on the resource market, i.e. a combination of the previous two. Under these circumstances, the market is in equilibrium when the monopsony and monopoly company equals the marginal revenue from the end product with the marginal cost of purchasing the necessary resources for its production. Due to the monopolistic influence of the company on the product market the price of the created product is higher than the competitive price and the demand quantity is lower. Since demand for resources is a function of demand for the resource-produced product, and as a result of monopoly-monopsony power, the price and quantity of resources purchased are lower than the competitors.

3. APPLICATION THE THEORETICAL FRAMEWORK TO STUDY THE VERTICAL CONNECTIONS IN THE CONSTRUCTION MARKET

3.1. Behavior of the construction firm with a bilateral monopoly on the product and resource market

The most common model of the construction market is the model that implies a market structure with two market participants, a monopoly on the part of the product market, and a monopsony on the part of resource market. When a single seller (monopoly) and single buyer (monopsony) collide on one market, the market structure is defined as bilateral monopoly.

If the firm-buyer of a construction product is a monopsony and the construction firm-seller has a monopoly impact on the product market, their behavior changes substantially:

1) The construction firm-seller that has a monopoly/oligopoly influence on the product market, resulting from product differentiation, asset-specific differentiation or economies of scale control this market and has market power, that allows it to impose and maintain a price of the product offered higher than marginal revenue- PCP>MRCP. It will seek to negotiate with the company-buyer the volume of output it has to perform for which the marginal revenue is equal to its marginal cost of product creation (purchasing resources and organizing production subject to the buyer's requirements in the contract)

$$MRCP=MCCP \text{ and a price - } PCP,$$

at which to sell such output, higher than the specified equality

$$PCP>MRCP=MCCP.$$

2) The construction firm-buyer of the construction product is monopsonic market impact. In this situation, its search for a construction product with certain characteristics will be determined by the marginal revenue it will obtain from the realization of the product at a later stage, but because of the monopoly position of the seller, the market price for each quantity is higher than the marginal revenue for that quantity and therefore the marginal revenue curve is below the demand curve (average income).

On the other hand, the firm –buyer and monopsony is facing a supply (in this case a monopoly), which may itself and independently used in its own interest. It is well known that within the monopoly market structure for the monopolist there is no uniquely defined supply curve. Consequently, the marginal cost curve for production can also be seen as a

curve, identical to its supply (with a positive slope and an expression of average costs). At the conclusion of the contract, the buyer is primarily interested in marginal (transactional, external) costs incurred by the transaction and which will compare with the marginal revenue from the realized construction product at the respective market price. Due to monopsonic position the buyer company marginal costs are higher than the transaction price (average costs) because the higher price applies not only to the last concluded transaction but also to all previous ones) and the marginal cost curve of the monopsony is above the supply curve of the monopoly.

3) The marginal costs and revenue allow determining the decisions the participants in the deal should adopt in order to maximize their profits and achieve market equilibrium. The monopsony as the only buyer in the market, maximizes the profit in point A (fig.3), where equalize the marginal revenue from the construction product determined by the demand for the product - MRCP with marginal costs - MCCP or MRCP=MCCP. The optimal volume of construction output from the monopsony will be Q*ACP and the agreed price (on the supply curve) will be set at P*ACP level.

The monopolist, as sole seller, maximizes its profit at point B (fig.3), where marginal revenue MR equals with marginal costs MCCP (equal to average costs, product cost), or MRCP=MCCP. From the positions of the monopolist, the optimal level of production volume is Q*BCP, and the optimum price (lies on the search curve) is P*BCP.

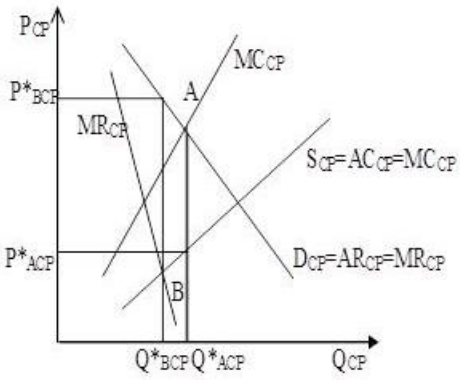

Fig. 3 Equilibrium of the construction market with bilateral monopoly (monopsony buyer and seller-monopoly)

The optimum price P*APS for buyer-monopsony determines the lower (lowest) limit to which the market price of the resource may fall. It can only be achieved if the seller-monopoly is forced to act as a perfect competitor. The optimal price P*BCP for monopoly - selling is upper (highest) price limit that can be achieved if the buyer-monopsony is forced to act as a perfect competitor.

The analysis of market behavior in this case can not give a single answer about what the equilibrium price and quantity will be since the different objectives of the two parties with market power on both markets can not be realized at the same time. Under these conditions can only determine price limits (between P*ACP - P*BCP) within which the negotiations will be conducted between the participants - the construction firm-buyer and the construction firm-seller. The level of which will be determined agreed price depends on the skills and strength to bargain the buyer and seller, as well as the specifics of the construction market segment.

3.2. Vertical connections and behavior of the construction firm of various segments of the construction market

On the housing market, demand is formed by households (as buyers of the product), which are enough in each country, and at first glance can be attributed to the perfectly competitive market of buyers. The new realities of this market show that consumers are becoming more demanding, cautious in choosing and buying decision, informed in advance of the company that builds and offers housing, about its history, its objects and ultimately express more clearly their desires, preferences and impose their requirements for quality, timeliness, correctness of the implementation of the signed contracts. Consequently, buyers who form demand on the housing market can be identified as participants with increasing market influence that can be bargained and impose better conditions upon conclusion of the transaction (mainly price reduction on equal terms) [4].The growing market power of buyers is the result of the following factors:

1) The large number of small construction companies that offer this market and compete to win the buyer mainly through price discounts (price war).

2) Not very well expressed and understandable for consumers, the differentiation of the construction product, therefore they tend and can easily switch and change one company to another until they find an offer that best combines quality and price.

3) The high cost of purchasing a home and the high relative share of each household's income lead to the purchaser's natural desire to reduce these costs.

4) The existence of a secondary housing market. These are old homes with well-built infrastructure, which are also the object of sale.

5) The large volume of purchases of housing of "green" and the inability of some construction companies to complete them for purely objective economic reasons or phantom construction companies that simply collect buyers' money and disappear with them. This creates uncertainty for buyers on this market and makes them particularly attentive when making the deal.

The only alternative to the construction firm is to improve, develop and differentiate its product and its business as a response to buyers' market power. The ability to differentiate, distinguish its product transforms its users into customers with high loyalty, which in practice means growing market power of the operating company and an opportunity to impose higher prices on that market, considered over a sufficiently long period of time.

On the market for non-residential customers of the product are usually several large investors (foreign or private entities, often combined with large local firms) which form oligopsony of this market segment. From a theoretical point of view, this means significant market power and the ability to purchase smaller volumes of end product at a lower price.

Large investors (buyers) on this market have clear preferences and requirements for the desired site (especially the construction of prestigious business buildings and retail outlets), and usually work with several vendors on the basis of repeated contracts and specifics of transactions [5]. The experience gained in these long-term relationships is a guarantee for the realization of another site of the required quality within the set timeframe, and this makes one of the construction companies a preferred partner with activity for years to come. The effect of this specialization of companies is to differentiate the product and turn it into a special, specific, unique product and growing monopoly power. The monopsony power of the buyer, coupled with the monopoly power of the seller, offering the unique, desirable product means that the objectives of the two parties with market power can hardly be realized simultaneously and can hardly be given an unequivocal

answer to what equilibrium price and what equilibrium quantities will satisfy their interests. It is certainly possible to set the price limits within which the negotiations will be conducted. The output depends on the real market power and influence of the buyer or the seller, but the specialization of the construction firm and its long-term stable relations with the investor are a guarantee of its advantages in the negotiation.

On the market for civil construction has a clear buyer (monopsony) of a specialized production and that is usually the state (or municipalities). As a rule, the seller on this market is a large firm (monopoly) with differentiated assets and specialized in the construction of such large objects or a consortium of domestic and foreign companies, who earn announced tenders for public procurement. Besides the state, the buyer (monopsony) of particular specific construction production can be also big companies with specialized production, which usually work with one, also narrowly specialized firm in the construction of the desired objects and the implementation of the necessary maintenance. In the case of bilateral monopoly in both markets and unknown end result in terms of price and agreed quantity (work volume), lasting relationships between the two market players can logically grow in even closer relationships along vertical lines or vertical integration, by merging companies involved in the chain. The vertical relationships thus created generally reduce the monopoly power of the participants and increase economic efficiency.

Practice shows extremely tight and lasting connections that build between the buyer and the seller on such a specialized market, which guarantees security and stability in both countries' activities. In such a market, it is obvious that the interests of the two parties with market power can hardly be realized at the same time. It is possible to determine the price limits within which the negotiations will be conducted, but the outcome depends on the actual market power and influence of the buyer or seller. The buyer's power must be sufficient to prevent monopolistic price rise seller, but not too large to prevent the buyer himself to fix monopolistic prices, when he will act as a seller of his own production. Strong buyers can limit the market power of vendors in different ways - backward integration, merging with suppliers or other competitors, mutual opposition of sellers. The balancing power of buyers can lead to price reduction if some sellers even be aware of their interdependence they do not have enough strength to unite and act together against the separating policy of strong buyers.

4. CONCLUSIONS

The subject of the study in the proposed article is the links between the different entities (investors/clients, contractors and subcontractors), which build a complex vertical chain of links in the construction market. In this chain each participant performs simultaneously the function of a buyer of the product from a previous participant and a seller of the product to another participant. In practice, this means that in every unit of the vertical chain has conditions for bilateral monopoly -construction firm as a buyer of resources and services can be monopsony or oligopsony; on the other hand the output as a seller of the created product can be in the role of monopoly or oligopoly.

To examine the real relationship and behavior of investors (clients), contractors and subcontractors as buyers and sellers on the construction market, the author assumes first that the two markets - the product and resource (factor) market have a perfectly competitive structure and create ideal market outcome (effect). Equilibrium in perfect competition and on the product and resource market is determined by the classic rule: equal marginal

revenue from the construction product, which will be received the buyer – MRCP with the seller's marginal costs - MCCP which also determines the equilibrium price P*CP.

These conditions of equilibrium of the construction company that in the vertical chain links is both buyer and seller are different when the product and resource markets are imperfectly competitive. The construction firm-seller with a monopoly/oligopoly influence on the product market will seek to negotiate with the company buyer volume output where marginal revenue equals marginal cost of production MRCP = MCCP and sell this volume at a higher price - PCP>MRCP=MCCP. The construction firm-buyer with a monopsony influence on the market will seek to equalize the marginal revenue from the construction product - MRCP with the marginal cost of the transaction MCCP, and purchase this volume of output at a lower price - PCP<MRCP=MCCP.

Under the terms of a bilateral monopoly, it is impossible to determine precisely what the equilibrium price and quantity will be as different purposes of the two participants with the market power of the two markets can not be realized simultaneously. Under these circumstances, it is only possible to determine the price limits in which the negotiations will be held between the participants - the construction company-buyer and construction company-seller. The level at which the agreed price will be determined depends on the negotiation skills and buyer and seller power, as well as on the specificity of the market construction segment.

Many large, small, equivalent sellers are operating on the housing market in an effective monopoly competition. The large number of buyers (each household in the country is a potential buyer in this segment) have an ever-increasing market impact and opportunities for imposing conditions and prices on the conclusion of contracts. Construction companies can respond to increasing market power to buyers by improving, developing and differentiating their product and activity and creating loyal consumers.

In the market for non-residential construction, buyers are usually several large investors - oligopsony, with significant market power. They almost always one-sidedly define the parameters of the transaction and impose their requirements for quality, price, timeliness of the projects and objects. The buyers (oligopsony) usually work with several firm (sellers) based on repeated contracts, transaction specifics, and experience. The effect of this specialization is the differentiation of the company's product and the increasing monopoly power of the seller.

In the civil construction market, the buyer is always only one - the assignor, in the face of various state institutions. This is a typical monopsony market with a large market power that fully determines the operating conditions of construction companies. A seller on this market is a large company (monopolist, which reduces the market power of the buyer) with differentiated assets and specialized in the construction, which works with various small contractors and subcontractors. In this case, a typical bilateral monopoly in both markets the final result in terms of agreed price and volume of work is usually similar to the ideal market outcome (effect) in the perfect competition, which increases economic efficiency.

The overall conclusion of the author is that the different market segments, the buyer and the seller have different market power, and the final market outcome (price / quantity) depends on which of the parties will take leadership positions in pricing, although none of the price options dictate prevents the realization of maximum aggregate profit. The buyer's power must be sufficient to prevent monopoly increases seller’s prices, and the seller's power must be sufficient to prevent monopsony high prices from the buyer, which is a factor in increasing the economic efficiency of the market, and improving the relationships between the participants in the vertical chain.

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