

A New Approach to Market Equilibrium

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Abstract: *This paper introduces a new approach to market equilibrium that includes both price equilibrium and value equilibrium. The market equilibrium mechanism explains behaviors of the firm and the customer in market structure. Numerical models are used to examine such behaviors under perfect competition and imperfect competition. The study results also indicate the value balance between the firm and the customer, and the interrelationship between the value balance and the market equilibrium. The paper contributes a theoretical insight on the theory of value that creates further research on partial equilibrium and general equilibrium.*

JEL: D00, D40, D46.

Keywords: *value concepts, value balance, price equilibrium, value equilibrium, market equilibrium.*

1. INTRODUCTION

Theory of value encompasses all the theories within economics that attempt to explain why goods and services are priced as they are, how the value of goods and services come about. In neoclassical economics, the price of the goods and services (value-in-exchange) is determined by cost of production (supply) and utility (demand), the value of the goods and services (value-in-use) is mostly seen as the utility that has for user or purchaser (Fernandes, 2012). The concepts of price and value play a crucial role in determining relationship between demand and supply in markets, and resource allocation between firms and customers.

The value concept has a very long history in economic and philosophical thought that attempt to explain two meanings of value: *value-in-use* and *value-in-exchange*. Adam Smith (1776) believed that the word "value" have two different meanings of value-in-use and value-in-exchange: Value-in-use sometimes expresses the utility of some particular object; value-in-exchange sometimes expresses the power of purchasing other goods which the possession of that object conveys. Jeremy Bentham (1789) distinguished two core meanings of decision utility and experienced utility: Decision utility has been also called "wantability", it is inferred from choices and used to explain

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choice; Experienced utility refers to the hedonic experience associated with an outcome. Although Adam Smith and Jeremy Bentham have different approaches to define utility concepts, they have the same cognition about the difference between value-in-use and value-in-exchange. David Ricardo (1821) was first highlighted the difference between “value and riches” that seem to be feelings the way towards the distinction between marginal utility and total utility. Jules Dupuit (1844) was first led to the marginal utility theory by his attempt to construct a theory of prices that maximize utility. David Ricardo and Jules Dupuit constructed a theory of prices under law of diminishing marginal utility. Later, William Jevons (1871) and Carl Menger (1871) developed the new tool of marginal analysis as a means of understanding value in which value would depend on the utility the buyer expects to receive. Alfred Marshall (1890) was also amalgamating the best of classical analysis with the new tools of the marginalists in order to explain value in terms of supply and demand. Alfred Marshall emphasized that the price and output of a good are determined by both supply and demand: two curves are like scissor blades that intersect at equilibrium. Based upon market equilibrium, modern economists trying to understand why the price of a good changes still start by looking for factors that may have shifted demand or supply.

However, market equilibrium in neoclassical economics just only explains price of a good and service (price equilibrium), the explanation on value of a good and service is still the big challenge. Although many economists attempted to explain value derived from production or consumption, there is still not clearer understanding how value come about (value equilibrium). For this reason, this paper explores the value concept, in which the difference between value-in-use (value) and value-in-exchange (price) is the base of value theories. From this theoretical base, a new approach to market equilibrium is introduced with both price equilibrium and value equilibrium that explain behaviors of the firm and the customer in market structure.

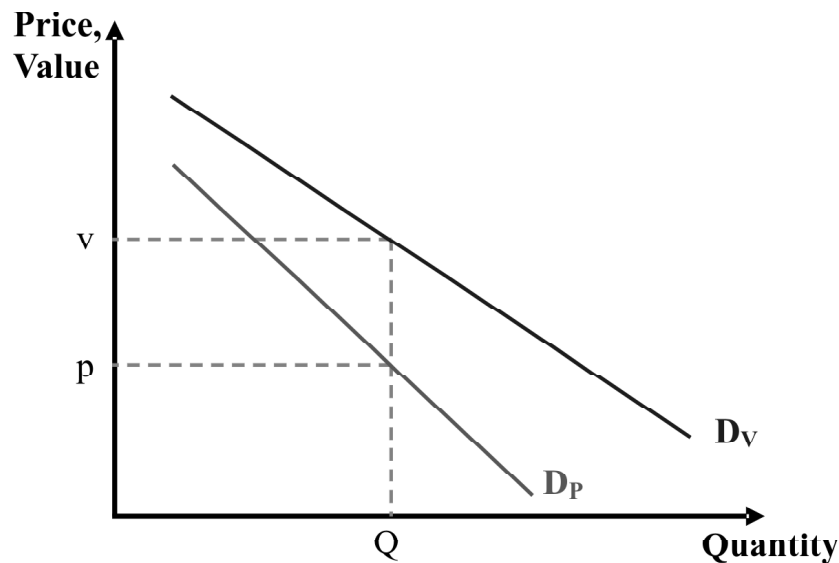
2. VALUE CONCEPT

In economics, theories of value fall into two main categories: objective theory of value and subjective theory of value, in which define objective value and subject value. While the objective value (usefulness) is valuable for its own sake, the subjective value (utility) is valuable for the sake of something else. This distinguish is very important that bases the theory of value and explains “diamond-water paradox” - water is essential for life and has a low market price, while diamonds are not as essential yet have a very high market price. The objective value is based on an objective perception of its true value. Water is essential for life and has a low market price, while diamonds are not as essential as water, so the objective value of water is higher than that of diamonds. The subjective value is based on a subjective perception of its marginal value. Since water is consumed with a large amount, the marginal value of water is very low, while diamond is consumed with a small number of diamonds, so the marginal value of diamond is very high. The price that customer is willing to pay for a commodity depends on its marginal value.

The value concept has become a central theme in many disciplines that tried to develop a clearer understanding of this vital concept in today's society and economy (Fernandes, 2012). Since neoclassical economics relies on the utility theory of value, neoclassical economists defined the utility as the benefit derived from consuming a good or service, whereas marginal utility refers only to the utility obtained from the last unit consumed. The price consumers are willing to pay declines as the quantity purchased increases because of the diminishing returns obtained from additional purchases. A well-known neoclassical economist, Alfred Marshall, defined value as the equilibrium price formed when the marginal cost equalled the marginal utility (Deane, 1978). Most economists tried to make a clear distinction between value and price of a good or service. Baier (1971) offered a broader definition such as "value is the capacity of a good, service, or activity to satisfy a need or provide a benefit to a person or legal entity". Contemporary value concept is something which is perceived and evaluated at the time of consumption (Grönroos, 2008; Vargo and Lusch, 2004; Wikström, 1996; Woodruff and Gardial, 1996). There is a common understanding that value is created in the users' processes as value-in-use (Grönroos, 2011).

Since value-in-use (value) is more appreciate guide to well-being than value-in-exchange (price), should economists use the law of diminishing marginal utility to explain demand curves. In fact, the neoclassical utility concept is the same as the contemporary value concept. Thus, the theory of value is constructed upon a law of diminishing marginal value. Since the value concept determines the relationship between supply and demand, the theory of value redefines market demand with both price demand (D_p) and value demand (D_v) as in Figure 1.

Figure 1: Market Demand



The price demand is the existing relationship between demand's price and its quantity demanded in a given time period, *ceteris paribus*. The value demand is the existing relationship between demand's value and its quantity demanded in a given time period, *ceteris paribus*. Law of demand states inverse relationship between the price and the value with their quantity demanded in a given time period, *ceteris paribus*. An explanation of the law of demand and downward sloping demand is based on the law of diminishing returns, in which marginal value and marginal utility declines as consumption increases, demand's value and utility declines as consumption increases. Since demand's price depends on demand's value and utility, demand's price also declines as consumption increases, which is the law of demand.

Determinants of demand are *ceteris paribus* factors that are hold constant when a market demand is constructed. When the determinants change, they cause a change in the market demand. The main determinants of demand are taste and preference; demand of related goods, consumer's disposable income; size of the market; expectations of future demand.

Based on the concept of value, the utility function is defined with incorporation of value and price (Trinh et al., 2014a) as follows:

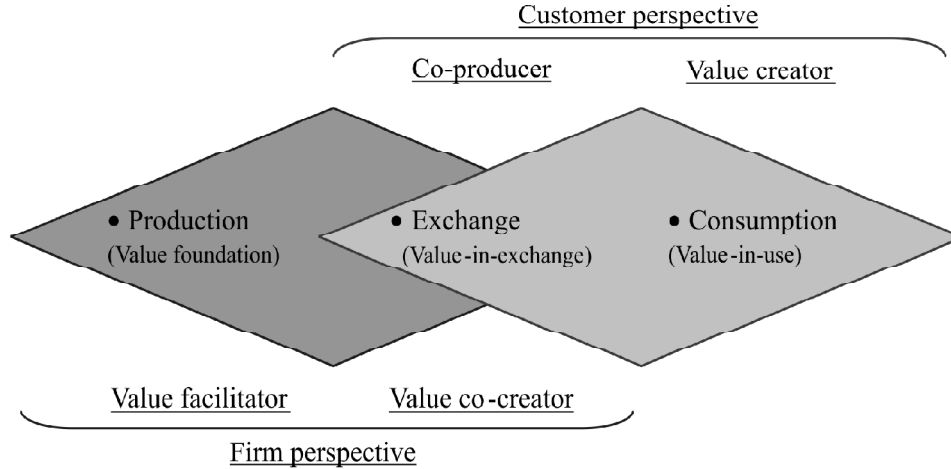
$$TU = u \times Q = (v - p) \times Q = TV - TR \quad (1)$$

Where, v , p , and u are unit value, unit price, and unit utility, respectively. TV , TR , and TU are total value, total revenue, and total utility, respectively.

The difference between value-in-use (value) and value-in-exchange (price) is important because they form the base of value theories (Hall *et al.*, 2008). The view of Good Dominant logic (G-D logic) is based on the value-in-exchange notion (Vargo *et al.*, 2008). In G-D logic, value is created (produced) by the firm and distributed in the market, usually through exchange of goods and money. This view implies that firm's production processes create value for customers through manufacturing and delivering of a product, in which the firm embedded value in such product. The customer then consumes or destroys this value embedded in the product they have purchased. The alternative view of Service Dominant logic (S-D logic) is based on the value-in-use notion (Vargo *et al.*, 2008). In S-D logic, customer is always the value creator while the firm is facilitator for value creation. Since customers use firm resources and add their resources and skills, the potential of these resources is developed into value-in-use. This view of value creation suggests that there is no value until goods or services are used, in which experience and perception are essential to value determination (Vargo and Lusch, 2008).

The foundation of value creation is rapidly shifting from firm-centric view to customer experience, and joint value creation (Ojasalo, 2010; Prahalad and Ramaswamy, 2004; Trinh *et al.*, 2014b). The value creation system involves three processes of production, exchange, and consumption as in Figure 2.

Figure 2: Value Creation Perspective



Source: Adapted from Grønroos and Voima (2012), Trinh (2014)

In firm perspective, the firm takes on the role of value facilitator in the production process, the firm could take part in the customer’s experience of value-in-use and influence it as a value co-creator. Firm’s production function is defined under the form of Cobb Douglas production function as follows:

$$Q = f(K_1, L_1) = A_1 \times K_1^{\alpha_1} \times L_1^{\beta_1} \tag{2}$$

Where, Q is total output of production. A_1 is firm’s total factor productivity. K_1 and L_1 are firm capital and firm labor, respectively. α_1, β_1 , are the output elasticities of input factors of production.

By using the least-cost combination of production inputs, firm’s cost function (TC_1) can be determined as a function of output, depending on input prices and the parameters of the firm’s production function as follows:

$$TC_1 = w_{K_1} \times K_1 + w_{L_1} \times L_1 \tag{3}$$

Where, TC_1 is firm’s total cost, w_{K_1} and w_{L_1} are unit costs of firm capital and firm labor.

Firm’s profit function is determined by the following formula.

$$\Pi = TR - TC_1 = p \times Q - w_{K_1} \times K_1 - w_{L_1} \times L_1 \tag{4}$$

Where, Π is firm profit and TR is total revenue ($TR = p \times Q$).

In customer perspective, the customer is always a value creator and may take part in the firm’s production process as a co-producer. Since the value is created in the

consumption process, customer capital (K_2) and customer labor (L_2) are added in the consumption function as follows:

$$Q = f(K_2, L_2) = A_2 \times K_2^{\alpha_2} \times L_2^{\beta_2} \quad (5)$$

Where, Q is total output of consumption. A_2 is customer's total factor productivity. α_2, β_2 , are the output elasticities of input factors of consumption.

By using the least-cost combination of consumption inputs, customer's cost function (TC_2) can be determined as a function of output, depending on input prices and the parameters of the customer's consumption function as follows:

$$TC_2 = w_{K_2} \times K_2 + w_{L_2} \times L_2 \quad (6)$$

Where, TC_2 is customer's total cost, w_{K_2} and w_{L_2} are unit costs of customer capital and customer labor.

Customer's utility function is determined by the following formula.

$$U = TU - TC_2 = (v - p) \times Q - w_{K_2} \times K_2 - w_{L_2} \times L_2 \quad (7)$$

Where, U is customer utility and TU is total utility ($TU = u \times Q = (v - p) \times Q$).

From the value creation perspective, the firm uses resources in the production process to create value foundation and facilitate the customer's value creation, and then the customers use firm resources and add their resources and skills in the consumption process to transform value foundation (objective value) into value-in-use (subjective value). In fact, the value creation process is driven by value-in-use (value), but monitored by value-in-exchange (price) through the exchange process that has an impact to the distribution between firm profit (Π) and customer utility (U). The joint cost function and the joint value function are determined as follows:

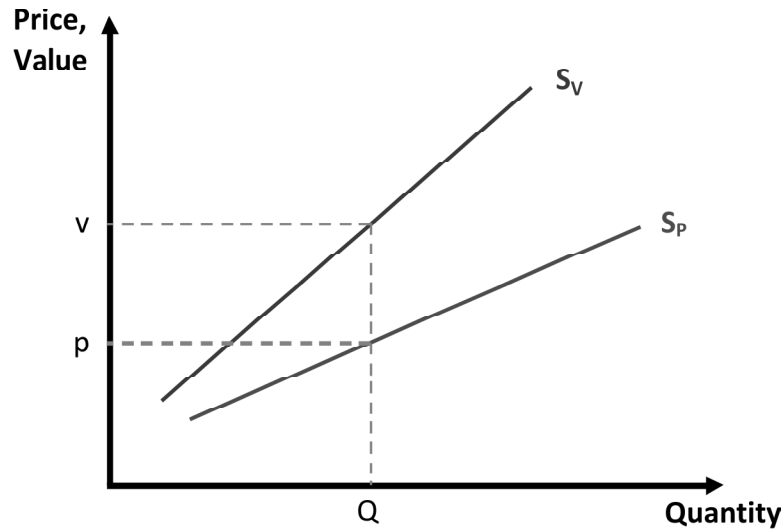
$$TC = TC_1 + TC_2 = w_{K_1} \times K_1 + w_{L_1} \times L_1 + w_{K_2} \times K_2 + w_{L_2} \times L_2 \quad (8)$$

$$V = \Pi + U = v \times Q - (w_{K_1} \times K_1 + w_{L_1} \times L_1 + w_{K_2} \times K_2 + w_{L_2} \times L_2) = TV - TC \quad (9)$$

Where, V is joint value, TV is total value ($TV = v \times Q$) and TC is total joint cost. w_{K_1} and w_{L_1} are unit costs of firm capital and firm labor. w_{K_2} and w_{L_2} are unit costs of customer capital and customer labor.

Since value-in-use (value) is created in the consumption process, both firm cost and customer cost have to consider in value creation. Thus, the theory of value also redefines market supply that includes price supply (S_p) and value supply (S_v) as in Figure 3.

Figure 3: Market Supply



The price supply is the existing relationship between supply's price and its quantity supplied in a given time period, *ceteris paribus*. The value supply is the existing relationship between supply's value and its quantity supplied in a given time period, *ceteris paribus*. Law of supply states direct relationship between the price and the value with their quantity supplied in a given time period, *ceteris paribus*. An explanation of the law of supply and upward sloping supply is based on the law of diminishing returns, in which firm's marginal cost and customer's marginal cost rise as production and consumption increases, marginal costs rise as production and consumption increases. Since supply's price depends on firm's marginal cost, and supply's value depends on both firm's marginal cost and customer's marginal cost. Supply's price and value rise as production and consumption increases, which is the law of supply.

Determinants of supply are *ceteris paribus* factors that are hold constant when a market supply is constructed. When the determinants change, they cause a change in the market supply. The main determinants of supply are production and consumption costs; supply of related goods, taxes and subsidies; size of the market; expectations of future supply.

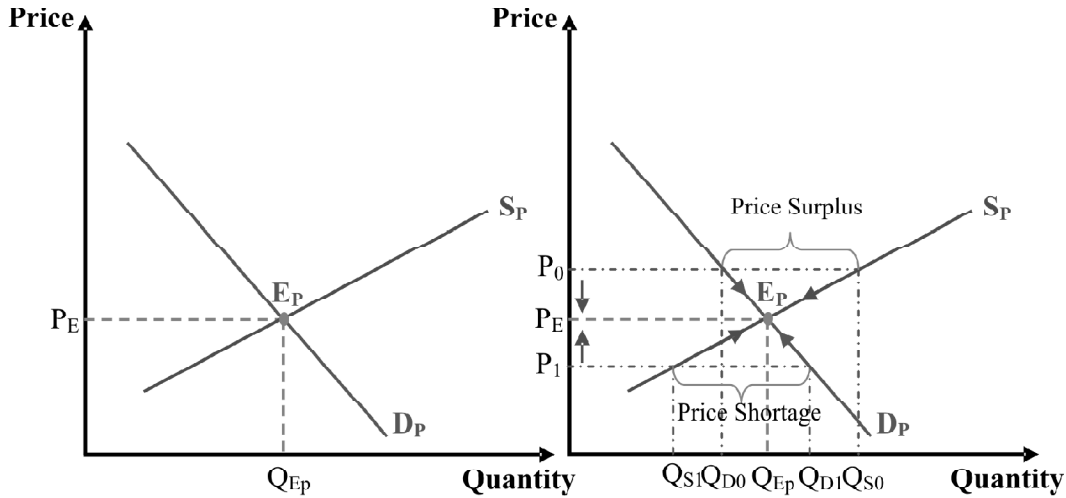
3. MARKET EQUILIBRIUM

3.1. Price Equilibrium

Price equilibrium (E_p) occurs at the price that the price's quantity demanded equals the price's quantity supplied as in Figure 4. In short run, price demand (D_p) and price supply (S_p) are no changes, the producers will change the market price equalling the

equilibrium price. This price equilibrium mechanism is so-called static price equilibrium. In long run, when the market price is higher or lower than the equilibrium price, price demand (D_p) and price supply (S_p) will change to reach the new market equilibrium. This price equilibrium mechanism is so-called dynamic price equilibrium.

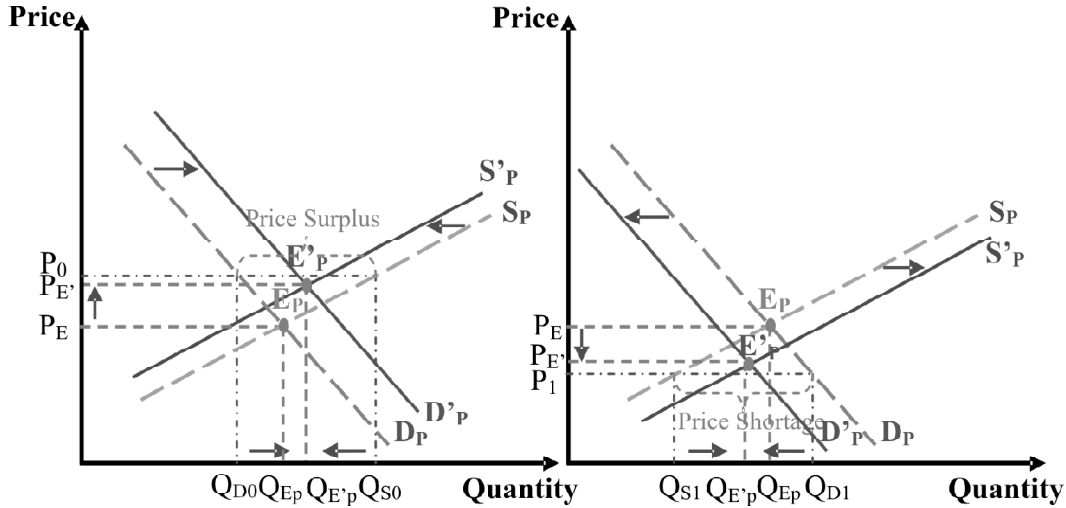
Figure 4: Static price equilibrium mechanism



When the market price (P_0) is higher than the equilibrium price (P_E), the market occurs *price surplus* because the price's quantity supplied (Q_{S0}) exceeds the price's quantity demanded (Q_{D0}). In short run, producers will need to lower their price to eliminate this price surplus. As they do so, the price's quantity demanded will increase and the price's quantity supplied will decrease, and the price surplus will fall. This process will continue until the price's quantity demanded equals the price's quantity supplied at the equilibrium price (P_E), and the price surplus will be disappeared as in illustrated Figure 4. In long run, the price demand will increase ($D_p \rightarrow D'_p$) and the price supply will decrease ($S_p \rightarrow S'_p$) to eliminate this price surplus. As the market does so, the equilibrium price will rise ($P_E \rightarrow P'_E$) and the price surplus will fall. This process will continue until the price's quantity demanded equals the price's quantity supplied at the new price equilibrium (E'_p), and the price surplus will be disappeared as illustrated on the left of Figure 5.

When the market price (P_1) is lower than the equilibrium price (P_E), the market occurs *price shortage* because the price's quantity demanded (Q_{D1}) exceeds the price's quantity supplied (Q_{S1}). In short run, producers will need to raise their price to eliminate this price shortage. As they do so, the price's quantity demanded will decrease and the price's quantity supplied will increase, and the price shortage will fall. This process will continue until the price's quantity demanded equals the price's quantity supplied

Figure 5: Dynamic Price Equilibrium Mechanism



at the equilibrium price (P_E), and the price shortage will be disappeared as illustrated in Figure 4. In long run, the price demand will decrease ($D_P \rightarrow D'_P$) and the price supply will increase ($S_P \rightarrow S'_P$) to eliminate this price shortage. As the market does so, the equilibrium price will fall ($P_E \rightarrow P_{E'}$) and the price shortage will also fall. This process will continue until the price's quantity demanded equals the price's quantity supplied at the new price equilibrium (E'_P), and the price shortage will be disappeared as illustrated on the right of Figure 5.

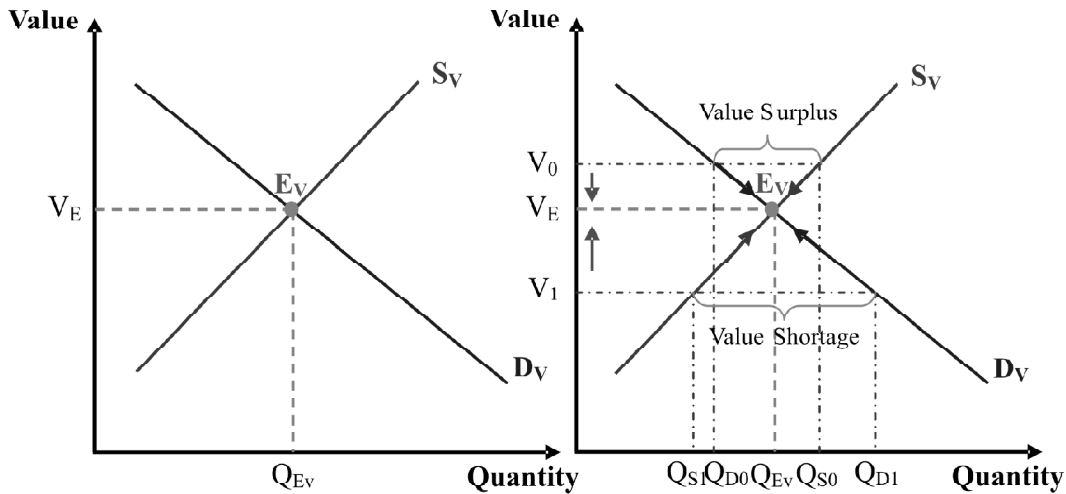
3.2. Value Equilibrium

Value equilibrium (E_V) occurs at the value that the value's quantity demanded equals the value's quantity supplied as in Figure 6. In short run, value demand (D_V) and value supply (S_V) are no changes, the customers will change the market value equalling the equilibrium value. This value equilibrium mechanism is so-called static value equilibrium. In long run, when the market value is higher or lower than the equilibrium value, value demand (D_V) and value supply (S_V) will changes to reach the new market equilibrium. This value equilibrium mechanism is so-called dynamic value equilibrium.

When the market value (V_0) is higher than the equilibrium value (V_E), the market occurs *value surplus* because the value's quantity supplied (Q_{S0}) exceeds the value's quantity demanded (Q_{D0}). In short run, customers will need to lower their value to eliminate this value surplus. As they do so, the value's quantity demanded will increase and the value's quantity supplied will decrease, and the value surplus will fall. This process will continue until the value's quantity demanded equals the value's quantity supplied at the equilibrium value (V_E), and the value surplus will be disappeared as illustrated in Figure 6. In long run, the value demand will increase ($D_V \rightarrow D'_V$) and the

value supply will decrease ($S_V \rightarrow S'_V$) to eliminate this value surplus. As the market does so, the equilibrium value will rise ($V_E \rightarrow V'_E$) and the value surplus will fall. This process will continue until the value's quantity demanded equals the value's quantity supplied at the new value equilibrium (E'_V), and the value surplus will be disappeared as illustrated on the left of Figure 7.

Figure 6: Static Value Equilibrium Mechanism

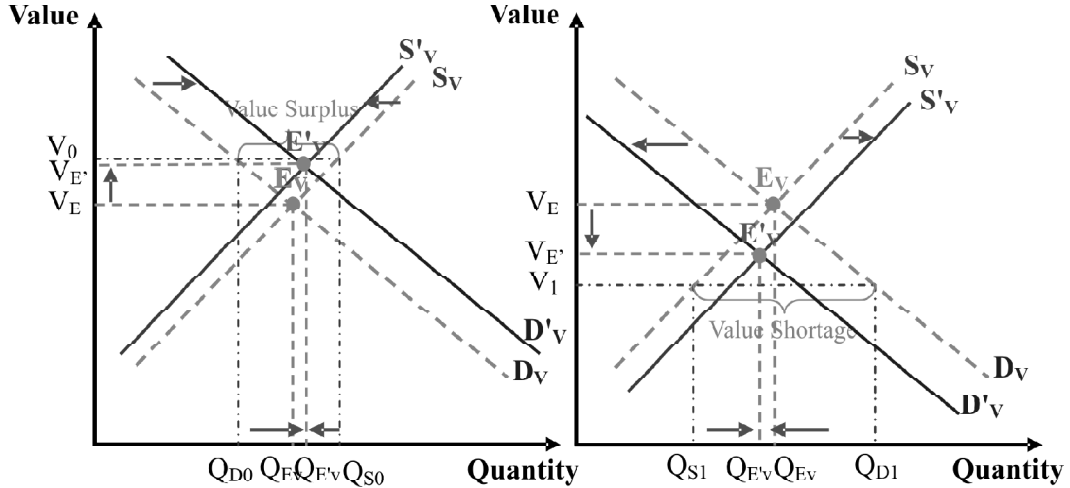


When the market value (V_1) is lower than the equilibrium value (V_E), the market occurs *value shortage* because the value's quantity demanded (Q_{D1}) exceeds the value's quantity supplied (Q_{S1}). In short run, customers will need to raise their value to eliminate this value shortage. As they do so, the value's quantity demanded will decrease and the value's quantity supplied will increase, and the value shortage will fall. This process will continue until the value's quantity demanded equals the value's quantity supplied at the equilibrium value (V_E), and the value shortage will be disappeared as illustrated in Figure 6. In long run, the value demand will decrease ($D_V \rightarrow D'_V$) and the value supply will increase ($S_V \rightarrow S'_V$) to eliminate this value shortage. As the market does so, the equilibrium value will fall ($V_E \rightarrow V'_E$) and the value shortage will also fall. This process will continue until the value's quantity demanded equals the value's quantity supplied at the new value equilibrium (E'_V), and the value shortage will be disappeared as illustrated on the right of Figure 7.

3.3. Market Equilibrium

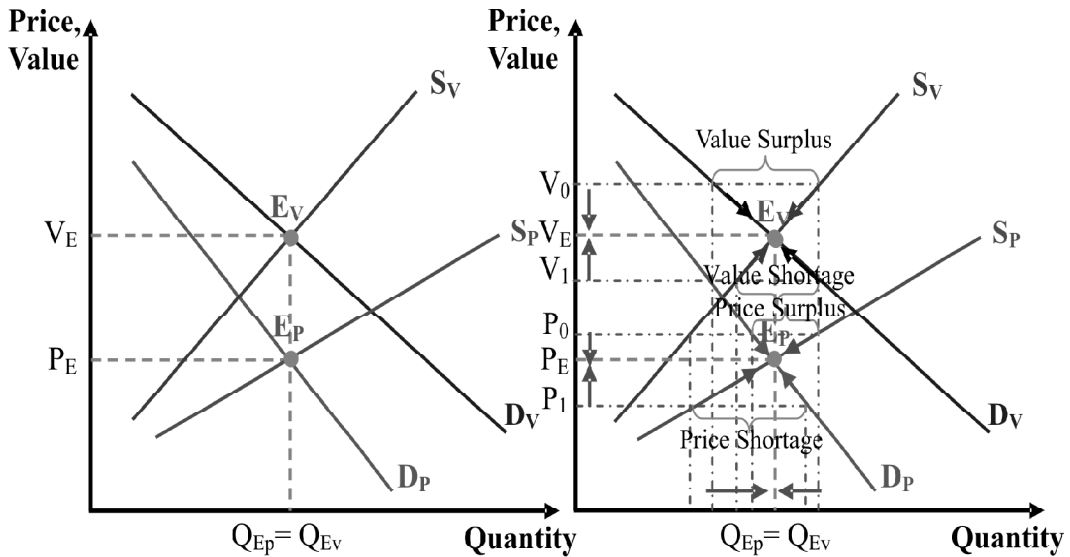
Market equilibrium (E_p, E_V) occurs at the equilibrium price (P_E) and the equilibrium value (V_E) that the price's equilibrium quantity (Q_{E_p}) equals the value's equilibrium quantity (Q_{E_V}) as in Figure 8. In short run, market demand (D_p, D_V) and market supply (S_p, S_V) are no changes, the producers will change the market price equalling the

Figure 7: Dynamic Value Equilibrium Mechanism



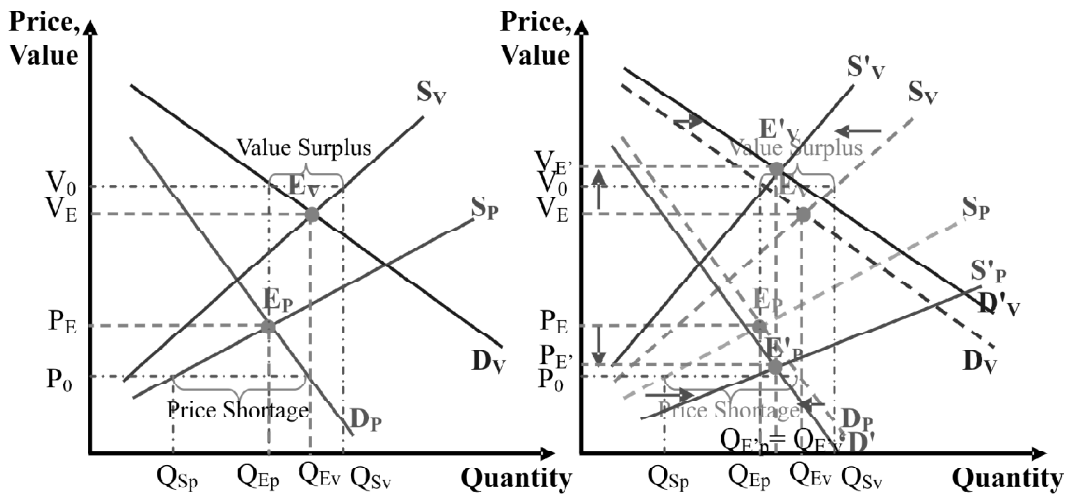
equilibrium price (P_E), and customers will change the market value equalling the equilibrium value (V_E). This market equilibrium mechanism is so-called static market equilibrium as illustrated in Figure 8. In long run, when the market is in disequilibrium status in which the price's equilibrium quantity (Q_{Ep}) is not equal to the value's equilibrium quantity (Q_{Ev}), market demand (D_p, D_v) and market supply (S_p, S_v) will change to reach the new market equilibrium. This market equilibrium mechanism is so-called dynamic market equilibrium.

Figure 8: Static Market Equilibrium Mechanism



When the price's equilibrium quantity (Q_{Ep}) is smaller than the value's equilibrium quantity (Q_{Ev}), the market value (V_0) at this price's equilibrium quantity (Q_{Ep}) is higher than the equilibrium value (V_E), and the market price (P_0) at this value's equilibrium quantity (Q_{Ev}) is lower than the equilibrium price (P_E). The market occurs *value surplus* and *price shortage* as illustrated in Figure 9. On the one hand, in order to eliminate this value surplus, the value demand will increase ($D_V \rightarrow D'_V$) and value supply will decrease ($S_V \rightarrow S'_V$). As the market does so, the equilibrium value will rise ($V_E \rightarrow V_{E'}$) and value surplus will fall. This causes increase in the price's equilibrium quantity ($Q_{Ep} \rightarrow Q_{E'p}$). On the other hand, in order to eliminate this price shortage, the price demand will decrease ($D_P \rightarrow D'_P$) and price supply will increase ($S_P \rightarrow S'_P$). As the market does so, the equilibrium price will fall ($P_E \rightarrow P_{E'}$) and the price shortage will also fall. This causes decrease in the value's equilibrium quantity ($Q_{Ev} \rightarrow Q_{E'v}$). This process will continue until the price's equilibrium quantity ($Q_{E'p}$) equals the value's equilibrium quantity ($Q_{E'v}$). The market reaches the new equilibrium status, the value surplus and price shortage will be disappeared at the new market equilibrium ($E'_{p'}$, $E'_{v'}$) as illustrated in Figure 9.

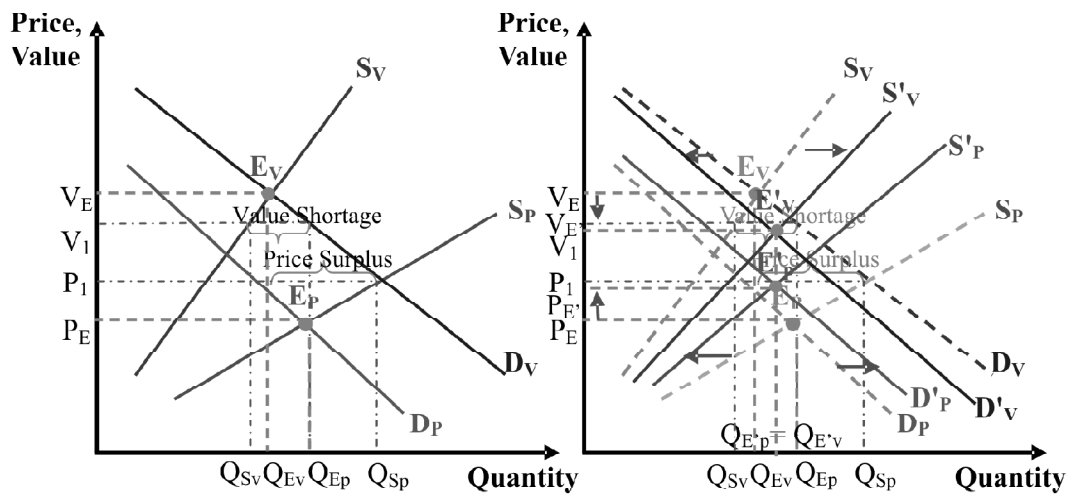
Figure 9: Dynamic Market Equilibrium Mechanism in Case of $Q_{Ep} < Q_{Ev}$



When the price's equilibrium quantity (Q_{Ep}) is larger than the value's equilibrium quantity (Q_{Ev}), the market value (V_1) at this price's equilibrium quantity (Q_{Ep}) is lower than the equilibrium value (V_E), and the market price (P_1) at this value's equilibrium quantity (Q_{Ev}) is higher than the equilibrium price (P_E). The market occurs *value shortage* and *price surplus* as illustrated in Figure 10. On the one hand, in order to eliminate this value shortage, the value demand will decrease ($D_V \rightarrow D'_V$) and value supply will increase ($S_V \rightarrow S'_V$). As the market does so, the equilibrium value will fall ($V_E \rightarrow V_{E'}$) and value surplus will also fall. This causes decrease in the price's equilibrium quantity

($Q_{E_p} \rightarrow Q_{E'_p}$). On the other hand, in order to eliminate this price surplus, the price demand will increase ($D_p \rightarrow D'_p$) and price supply will decrease ($S_p \rightarrow S'_p$). As the market does so, the equilibrium price will rise ($P_E \rightarrow P_{E'}$) and the price surplus will fall. This causes increase in the value's equilibrium quantity ($Q_{E_v} \rightarrow Q_{E'_v}$). This process will continue until the price's equilibrium quantity ($Q_{E'_p}$) equals the value's equilibrium quantity ($Q_{E'_v}$). The market reaches the new equilibrium status, the value shortage and price surplus will be disappeared at the new market equilibrium (E'_p, E'_v) as illustrated in Figure 10.

Figure 10: Dynamic Market Equilibrium Mechanism in Case of $Q_{E_p} > Q_{E_v}$



4. MARKET STRUCTURE

4.1. Perfect Competition

Perfect competition describes markets such that participants (firms and customers) are not large enough to have market power to set the price and the value on the markets. The firms are price taker and the customers are value takers, the individual participants have to accept the price and the value set by the laws of demand and supply. In perfectly competition market, there are a large number of buyers and sellers; the goods and services sold in this market are homogeneous; there are no barriers to entry or exit from this market; there is no information asymmetry and perfect information is available to the buyers and the sellers.

In order to examine behaviors of the firm and the customer in the perfect competition market, let's consider an example of perfect competition model.

A perfect competition market has demand function and supply function as follows:

Market's demand function: $Q_D = 1225 - 100P$; $Q_D = 845 - 20V$
 Market's supply function: $Q_S = -225 + 100P$; $Q_S = 68.75 + 25V$

Firm A sells to Customer B in this market, cost functions of the firm and the customer are given below:

Firm's cost function: $TC_1 = 75 - 12.75Q + Q^2$

Customer's cost function: $TC_2 = 200 - 20Q + Q^2$

Since the firm and the customer are price taker and value taker in the perfect competition market, the individual demand is perfectly elasticity at the equilibrium price and the equilibrium value as in Figure 11.

Figure 11: Market Demand and Individual Demand

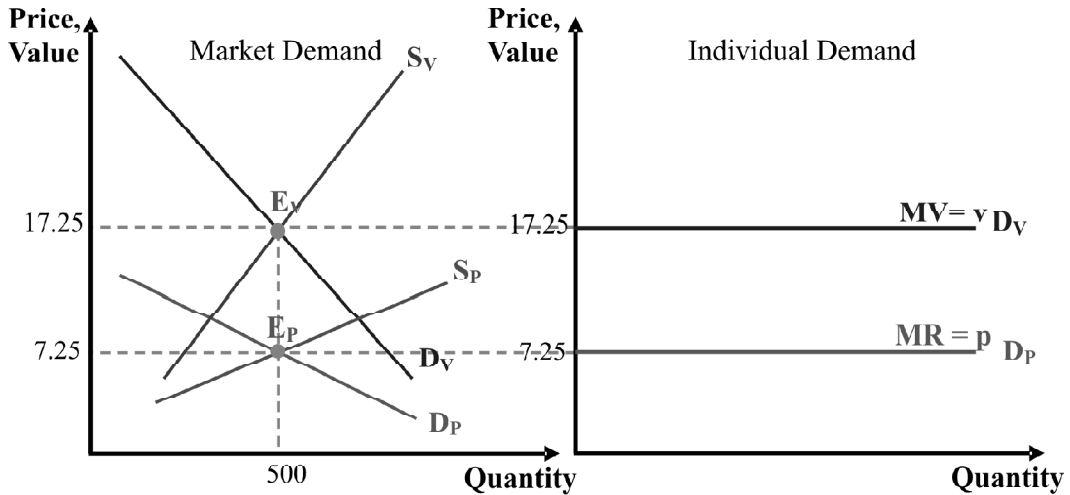


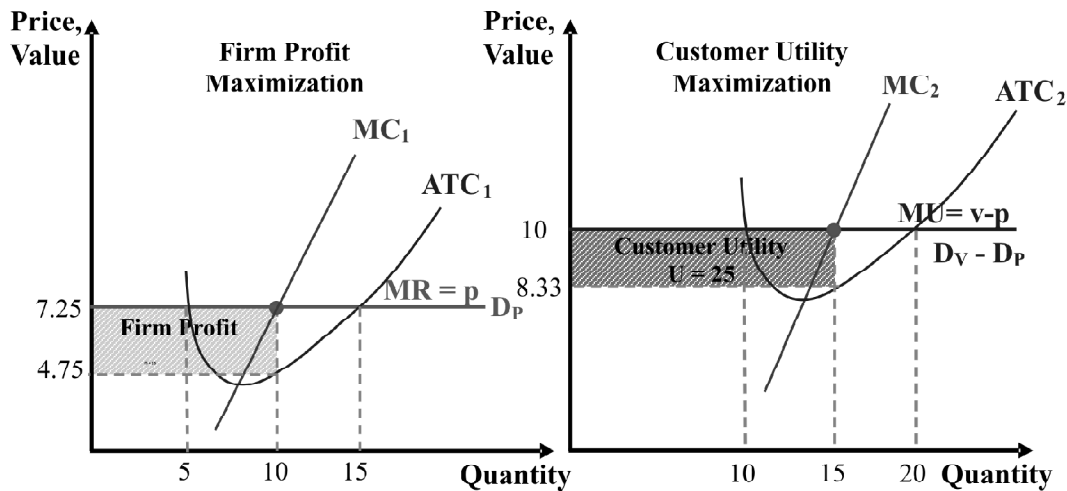
Table 1 shows production and consumption decisions that maximize firm profit, customer utility and joint value. A profit maximizing firm will produce at the quantity of 10 where firm's marginal revenue equals firm's marginal cost ($MR = MC_1$) as in Figure 12. At this quantity ($Q = 10$), firm profit is maximum ($\Pi_{Max} = 25$) and customer utility is zero ($U = 0$). A utility maximizing customer will consume at the quantity of 15 where customer's marginal utility equals customer's marginal cost ($MU = MC_2$) as in Figure 12. At this quantity ($Q = 15$), customer utility is maximum ($U_{Max} = 25$) and firm profit is zero ($\Pi = 0$).

In order to maximize joint value, the quantity of 12.5 ($Q = 12.5$) is determined at where marginal value equals marginal joint cost ($MV = MC$) as in Figure 13. Although the firm receives the profit of 18.75 ($\Pi = 18.75$) and the customer receives the utility of 18.75 ($U = 18.75$) lower than the maximum profit ($\Pi_{Max} = 25$) and the maximum utility ($U_{Max} = 25$), the joint value is maximum ($V_{Max} = 37.5$) at this quantity ($Q = 12.5$).

Table 1
Production and Consumption Decisions under Perfect Competition

<i>Production and Consumption Decisions</i>	<i>Firm profit Maximization</i> $MR = MC_1$	<i>Customer Utility Maximization</i> $MU = MC_2$	<i>Joint Value Maximization</i> $MV = MC$
Price (p)	7.25	7.25	7.25
Value (v)	17.25	17.25	17.25
Utility (u)	10	10	10
Quantity (Q)	10	15	12.5
Firm Profit (İ)	25	0	18.75
Customer Utility (U)	0	25	18.75
Joint Value (V)	25	25	37.5
Customer Utility			

Figure 12: Profit and Utility Maximization under Perfect Competition



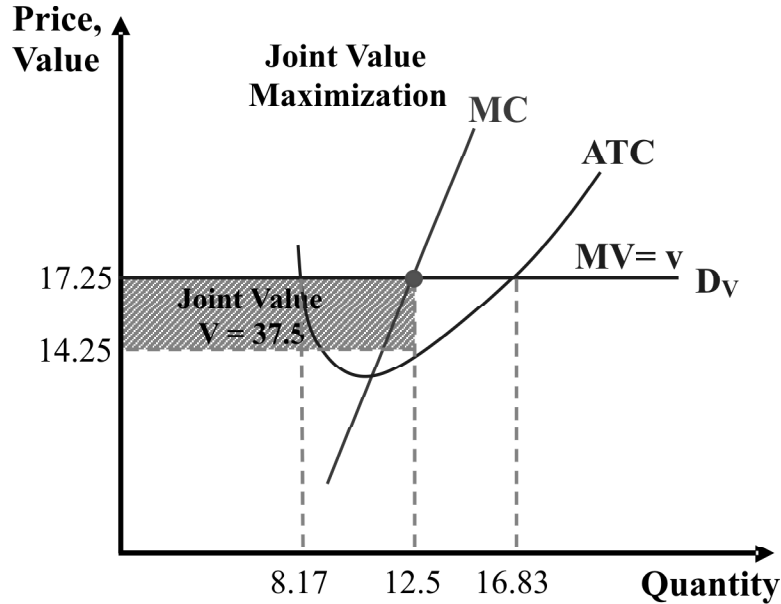
4.2. Imperfect Competition

Imperfect competition describes markets such that participants (firms and customers) have market power to set the price and the value on the markets. The firms are price makers and the customers are value makers, the individual participants face the downward sloping demand. The imperfect competition market will have characteristics that are opposite of the perfect competition market. The types of imperfect competition are monopoly, monopolistic competition, oligopoly, and monopsony.

In order to examine behaviors of the firm and the customer in the imperfect competition market, let's consider an example of imperfect competition model.

A monopoly firm has demand function as follows:

Figure 13: Joint Value Maximization under Perfect Competition



Market's demand function: $V = 37.5 - 1.5Q; P = 20 - Q$

Cost functions of the firm and the customer are given below:

Firm's cost function: $TC_1 = 150 - 20Q + Q^2$

Customer's cost function: $TC_2 = 300 - 27.5Q + Q^2$

Since the market demand is also the individual demand, both the firm and the customer are price maker and value maker. Table 2 shows production and consumption decisions that maximize firm profit, customer utility and joint value.

Table 2
Production and Consumption Decisions under Imperfect Competition

<i>Production and Consumption Decisions</i>	<i>Firm profit Maximization</i> $MR = MC_1$	<i>Customer Utility Maximization</i> $MU = MC_2$	<i>Joint Value Maximization</i> $MV = MC$
Price (p)	10	5	7.86
Value (v)	22.5	15	19.29
Utility (u)	12.5	10	11.43
Quantity (Q)	10	15	12.14
Firm Profit (Π)	50	0	40.82
Customer Utility (U)	0	37.5	25.25
Joint Value (V)	50	37.5	66.07

A profit maximizing firm will produce at the quantity of 10 where firm's marginal revenue equals firm's marginal cost ($MR = MC_1$) as in Figure 14. At this quantity ($Q = 10$), firm profit is maximum ($\Pi_{Max} = 50$) and customer utility is zero ($U = 0$). A utility maximizing customer will consume at the quantity of 15 where customer's marginal utility equals customer's marginal cost ($MU = MC_2$) as in Figure 14. At this quantity ($Q = 15$), customer utility is maximum ($U_{Max} = 37.5$) and firm profit is zero ($\Pi = 0$).

In order to maximize joint value, the quantity of 12.14 ($Q = 12.14$) is determined at where marginal value equals marginal joint cost ($MV = MC$) as in Figure 15. Although

Figure 14: Profit and Utility Maximization under Imperfect Competition

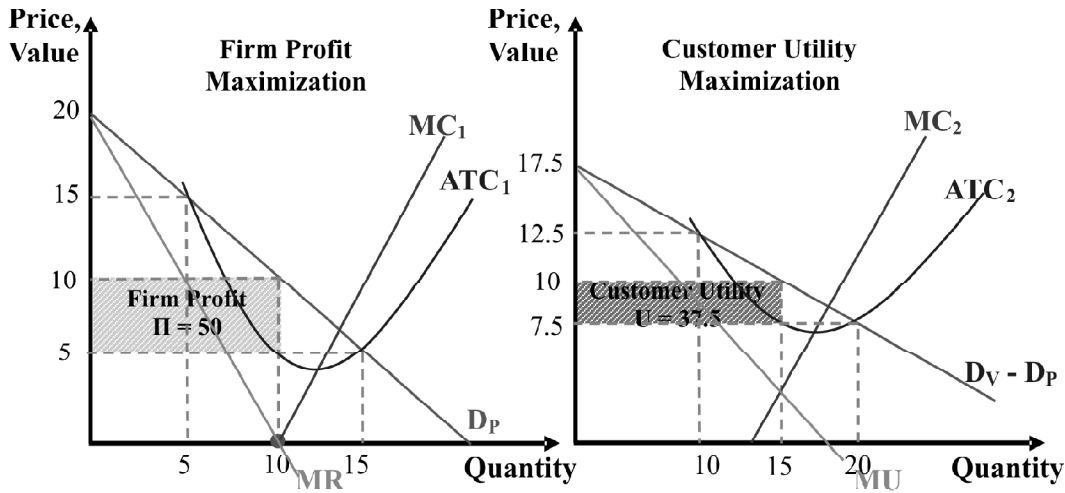
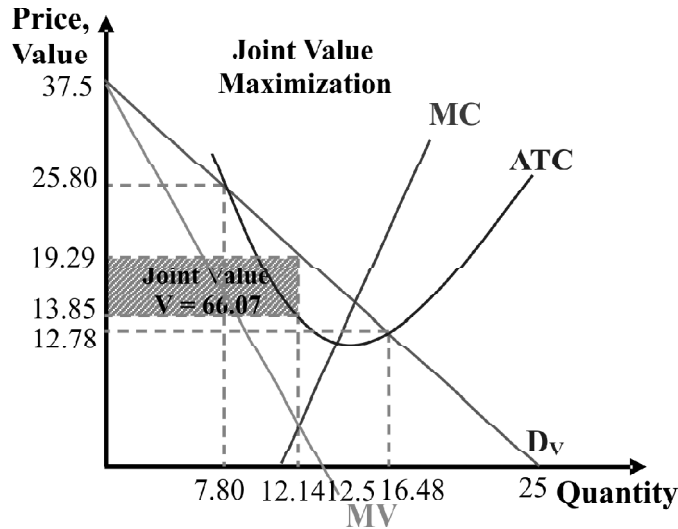


Figure 15: Joint Value Maximization under Imperfect Competition



the firm receives the profit of 40.82 ($\Pi = 40.82$) and the customer receives the utility of 25.25 ($U = 25.25$) lower than the maximum profit ($\Pi_{\text{Max}} = 50$) and the maximum utility ($U_{\text{Max}} = 37.5$), the joint value is maximum ($V_{\text{Max}} = 66.07$) at this quantity ($Q = 12.14$).

5. CONCLUSIONS

The paper introduces the new approach to market equilibrium that not only explains goods and service are priced as they are, but also explains how the value of goods and services come about. The new approach is based on the difference between value-in-use (value) and value-in-exchange (price) that form the base of value theories, the theory of value then redefines market demand and market supply under the concepts of price and value. Thus, market equilibrium includes both price equilibrium and value equilibrium. The market equilibrium mechanism provides a clear understanding of value concept that explains behaviors of the firms and the customers in market structure. Since value is created in the consumption process, both firm cost and customer cost have to consider in value creation. The joint value function is formulated to conduct a value balance between firm profit and customer utility. In addition, numerical models are developed to examine behaviors of the firm and the customer under the perfect competition and the imperfect competition. The study result indicates the value balance between firm profit and customer utility that maximizes the joint value. Moreover, there exists the relationship between the value balance and the market equilibrium. The market is in equilibrium status only when it exists the value balance between the firm and the customer. The paper contributes theoretical insights on theory of value for further researches on partial equilibrium and general equilibrium.

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