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Mechanism of Trading in the Stock Exchange - With Practical Applications

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Abstract

This scientific paper introduces the mechanism for determining security prices in the stock exchange and how transactions are executed based on the laws of supply and demand. The study aims to examine how the equilibrium price of securities is established through buy and sale order data, providing a detailed analysis of market mechanisms in this context.

The issue was studied through theoretical and empirical analysis of how supply matches demand in trading sessions, focusing on the tools and settlement methods employed in exchanges. This study used simulation models on purchase and sale order data to demonstrate how the equilibrium price is determined and how orders are executed at market prices.

The findings demonstrate that the market reaches an equilibrium price when actual demand equals or closely approaches actual supply. They also reveal that prices continuously fluctuate based on changes in supply and demand, highlighting the interaction between different market forces. This study contributes to identifying how financial markets operate and offers insights into how transactions are settled and how prices are determined in a continuous trading environment.

Keywords: *Financial markets. Stock exchange. Buy and sale orders. Equilibrium price. Clearing and settlement*

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1. *Introduction*

Research Background:

Financial markets are one of the fundamental pillars of global economic systems, playing a crucial role in the collection, allocation, and direction of capital toward the most productive investments. Stock exchanges serve as central platforms for trading securities between buyers and sellers, operating through mechanisms governed by the laws of supply and demand. Comprehending the mechanisms behind price determination and transaction execution in an environment marked by transparency and efficiency is essential.

Research Problem statement:

Despite considerable advancements in electronic trading systems and pricing mechanisms, imbalances between supply and demand remain a recurring issue, affecting price stability and market efficiency. This problem is particularly evident in price determination processes, which rely on accumulated buy and sell orders and can lead to unexpected market fluctuations. These circumstances raise questions about the effectiveness current pricing methods and ability to fulfill equilibrium between supply and demand.

Research Importance:

This study explains how prices are determined in stock exchanges through supply and demand mechanisms. It enhances understanding the dynamics governing order execution and offers insights into improving market efficiency and transparency. The study's results also help develop trading systems that are more responsive to economic and market variables, benefiting investors and financial decision-makers.

Research Objectives:

This research aims to analyze pricing mechanisms in financial markets, with a focus on the role of supply and demand in determining security prices. It seeks to introduce a model that explains how equilibrium between orders is achieved, while also examining the impact of supply and demand

fluctuations on final prices. Additionally, the study aims to offer recommendations for enhancing pricing processes and improving the efficiency of financial markets.

Research Questions:

• How do supply and demand mechanisms affect the determination of security prices?

• What factors contribute to price fluctuations in the stock exchange?

• How can the order execution process be enhanced to fulfill equilibrium between supply and demand?

Research Motivations:

The primary motivation for this research stems from the need to promote transparency and efficiency in financial markets, especially given the rapid pace of technological advancement. Understanding how prices are determined and what factors influence them is essential for enhancing market stability and mitigating the risks associated with price volatility.

Research Structure:

The research will address the following sections:

1. Introduction

2. Key Features of the Stock Exchange

3. Pricing, Execution, and Settlement in the Stock Exchange

4. Conclusion

5. References.

2. *Key Features of the Stock Exchange*

After identifying the stock exchange's position within the financial market landscape, we will now explore its operations by emphasizing its main characteristics and studying the mechanisms of trading within it, as follows:

2.*1 Historical Origin of the Term "Stock Exchange"*

By the end of the 13th century, Italian trading and banking houses began migrating to the Flanders region. Once established there, they created settlements in one of the world's most famous cities and commercial centers—Bruges, Belgium. The three Italian consulates of Genoa, Venice, and Florence established permanent headquarters in the heart of Bruges' business district. This concentration of consulates attracted more Italians, transforming the area into a hub for merchants and businesspeople.

Historically, the permanent headquarters of the Venetian consulate was originally a hotel owned by the Belgian "Van der Beurse" family. The family name came from the three money bags that adorned the hotel's entrance before it became the permanent location of the Venetian consulate. The Van der Beurse family, known as brokers for hotel guests arriving in the city, conducted this business throughout the 14th and the first half of the 15th centuries. Unsurprisingly, the square surrounding the three consulates, which became a gathering place for traders and businesspeople dealing in various goods, was named after this family.

These circumstances eventually led to the use of the term "Bourse" for the open space surrounded by arcades and columns in the Flemish Antwerp, known as Anvers in French. This exchange was built on the ruins of the Bruges stock exchange, which had played a prominent role in finance and trade from 1300 to 1450. Antwerp inaugurated its commercial exchange in 1485 after surpassing Bruges and expanded it in 1530, attracting traders from all over. The word "Bourse" in Germanic languages means "money bag." In German and French, it is "Bourse," in English, "Purse," in Latin, "Bursa," and in Italian, "Borsa" (Abdel Hamid Redouane, 1996).

2.2 *Stock Exchanges Types*

There are two types of exchanges (Mohammed Ahmed, Undated) :

2.2.1 Commodity Exchanges or Commercial Exchanges: These are sometimes called contract exchanges, where specific commodities such as wool, cotton, coffee, cocoa, sugar, wheat, silk, oil, rubber, copper, and more are traded.

2.2.2 Stock Exchanges or Securities Exchanges: These involve trading financial securities, such as stocks and bonds.

2.3 *The Concept of a Stock Exchange and its Distinction from Other Markets*

A stock exchange is a designated, well-known physical location where financial intermediaries gather regularly to trade securities, buying and selling on behalf of their clients within a strict legislative and regulatory framework overseen by an official body. One of the most famous stock exchanges in the world is the New York Stock Exchange (NYSE), which we will be used as a model in this research.

As for the relationship between stock exchanges and other markets, the latter is a subset of the broader market, where supply and demand meet. However, they differ in several key aspects: (Shimon, 1999) (Abdel Hamid Redouane, 1996).

- In general markets, various goods are traded, whereas in a stock exchange, the traded goods must meet specific criteria:
    - The commodity must be durable and last long without spoiling during storage. For instance, fruits and vegetables have markets but not exchanges.
    - The goods traded in the stock exchange must be uniform, meaning the units are homogeneous and well-defined in specifications. This enables easy sorting, classification, and trading without needing physical inspection.
    - Both supply and demand for the commodity must be subject to changing and volatile conditions, leading to price fluctuations. This volatility attracts speculators who aim to profit from price changes.
    - In markets, the actual delivery of goods occurs, whether payment is made immediately or later. In the stock exchange, delivery may occur in the future or may not occur at all, with transactions being settled by the price difference.
    - In markets, transactions involve tangible goods, whereas, in the stock exchange, transactions are based on samples.
    - In markets, buyers can obtain the goods themselves and pay for them directly, whereas transactions in the stock exchange are conducted through authorized brokers.

- Stock exchange transactions are often large in value and frequent, significantly impacting prices. Trading within the exchange often affects transactions occurring outside.

- Market prices may not always be disclosed to the public, whereas stock exchange prices are officially and daily announced due to their significance in the economic landscape.

- The stock exchange is distinguished from general markets by being a highly regulated and specialized environment. While the term "market" can apply to the stock exchange, the reverse is not true.

Timing and Locations: Markets are held at varying times and locations, whereas stock exchange transactions occur daily in fixed locations.

Price Fluctuations: Price fluctuations of goods in commercial markets directly impact the trading prices of stocks for the companies involved in the stock exchanges.

The relationship between stock exchanges and commodity exchanges is similar to the relationship between the tangible assets traded on commodity exchanges and the financial assets represented by the shares of institutions traded in stock markets. Specifically, commercial and industrial institutions that source their needs or distribute their products through commodity exchanges by making deals and executing sales and purchase contracts simultaneously have their shares traded in stock markets. Consequently, price fluctuations in commodity exchanges are immediately reflected in the trading prices of these institutions' shares in stock markets. Therefore, the relationship between the two is one of the dependency, with stock markets being the dependent variable and commodity exchanges the independent variable. This illustrates the connection between the two exchanges and the sensitivity of stock prices in financial markets to price movements in commodity exchanges (Abdel Hamid Redouane, 1996).

2.4 *Conditions for Establishing a Successful Stock Exchange*

Establishing a successful stock exchange depends on the availability of two complementary sets of essential conditions, primarily including (Fouad Al-Tamimi, 2010):

2.4.1 Basic Conditions:

This set of requirements shapes the environment for the stock exchange and its foundational pillars, which include the following components:

- A favorable investment climate is built on confidence in the existing economic, political, and social systems.
- A clear economic philosophy capable of attracting private capital, free from restrictions or barriers preventing the transfer of capital and savings abroad.
- Several investment tools contribute to expanding the range of options available to investors.
- A diverse and developed banking and financial sector capable of achieving the role of financial intermediary.
- An adequate volume of savings convertible into the market through various financial assets.

2.4.2 Supporting Conditions:

These conditions are considered "supporting" because their availability helps the market grow and enhance efficiency. They include:

- The existence of an institutional framework to regulate the market, governed by comprehensive administrative and legislative systems and overseen by a neutral and experienced body composed of market participants who are well-versed in financial and investment matters.
- Clear laws and regulations for market trading mechanisms, promoting competition, preventing monopolies, and ensuring a suitable foundation for supply and demand.
- Legislation and rules that protect the rights of market participants from fraud and manipulation, ensuring proper conduct and fostering investor confidence in the market system.
- Adequate disclosure of financial information reflects the true financial position of institutions, allowing investors to evaluate the real value of the shares being traded (Al-Sayrafi, 2008) .

- Efficient and advanced communication systems between market participants to ensure the continuous flow of buy and sell orders.

2.5 *The Role of the Stock Exchange in the Economy*

Stock exchanges benefit all participants, whether they are surplus holders, deficit holders, financial intermediaries, or the state in which the exchange operates. The following are some key benefits (Abdel Hamid Redouane, 1996) (Djabbar, 2017).

2.5.1 The Role of the Stock Exchange at the Macroeconomic Level:

- **Funding the National Economy:** The stock exchange mobilizes idle financial resources from surplus units and directs them towards funding productive investment projects available to units with financial deficits under conditions and costs that are competitive compared to national and international bank borrowing and lending from the money market.
- **Offering Liquidity:** The stock exchange provides liquidity to financial investors by enabling them to recover their invested funds in securities at any time, quickly and at a reasonable cost, as the exchange operates continuously.
- **Boosting Economic Growth:** By contributing to the growth of the Gross Domestic Product (GDP) through investment projects, the stock exchange supports the increase the national economy's growth rates.
- **Financing Development Plans:** The stock exchange provides funding for state development plans that require large capital investments. Instead of resorting to external borrowing and its associated burdens, the state involves the private sector in financing its development projects.
- **Supporting Privatization:** The stock exchange acts as the primary channel through which the state can transfer ownership or management of government institutions either fully or partially to the private sector. This process actively stimulates economic activity and enhances economic development.
- **Measuring Economic Performance:** The stock exchange mirrors the national economy's condition through fluctuations in the stock prices of listed institutions, representing an important aspect of the overall economic reality.

- **Absorbing Inflationary Pressures:** The stock exchange reduces inflationary pressures by absorbing excess liquidity and directing it towards productive investment rather than consumption. This contributes to increasing the overall supply of goods and services, aligning it with growth rates in aggregate demand.

- **Fair Evaluation of Listed Institutions:** Fluctuations in stock prices result from changes in supply and demand forces, which in turn reflect the institution's financial status. These price fluctuations offer an immediate evaluation of the institution's performance, demonstrating whether it is progressing toward prosperity or failure.

- **Hedging Financial Investment Risks:** The stock exchange facilitates risk management through several techniques, such as portfolio diversification, financial derivatives, and securitization, which help reduce potential financial losses.

- **Regulating and Monitoring Securities Issuance and Trading:** The stock exchange safeguards the integrity and fairness of transactions, preventing manipulations that could harm investors' rights, particularly those of minority shareholders, and averting severe economic crises that threaten both national and international economies.

- **Assessing Monetary and Fiscal Policies:** Stock exchange activity offers a general indicator of economic trends in savings and investment, and informs decisions concerning monetary and fiscal policies.

- **Integrating the National Economy with the Global Economy:** The stock exchange serves as a tool for integrating the national economy with the global economy by attracting foreign capital through indirect foreign investments.

- **External Oversight of Management Performance:** Institutions with effective management in investment, funding, operations, and marketing policies fulfill good business results. This increases demand for their securities and prices on the stock exchange, encouraging management and staff to keep their securities' prices rising as much as possible.

2.5.2 The Role of the Stock Exchange at the Microeconomic Level:

This refers to the advantages that a company gains from being listed on the stock exchange and the benefits for financial investors:

- **Enhancing the Company's Reputation:** Listing on the stock exchange increases its visibility, making it more widely known to national and international audiences.
- **Boosting Credibility:** Being listed on the stock exchange promotes the company's credibility, as it operates under regulatory and supervisory oversight, which increases public trust.
- **Ensuring Continuity:** The stock exchange helps ensure the company's continuity from one generation to the next, enabling it to continue its operations even after the departure or death of one of the founders. This is fulfilled by diversifying the shareholder base, especially for family-owned businesses, facilitating a smooth and transparent transfer of ownership.
- **Increasing Capital:** The stock exchange enables the company to raise capital and expand its base of shareholders, which is essential for business development.
- **Enhancing Opportunities:** Being listed increases the company's chances of securing partnership, merger, or acquisition opportunities, which is crucial for enhancing performance and competitiveness.
- **Encouraging Investment Savings:** The stock exchange offers opportunities for small investors who cannot undertake independent investment projects due to limited funds, thereby fostering investment savings.
- **Enjoying Tax Benefits:** The company and investors can benefit from differential tax advantages.

2.6 *Participants in the Stock Exchange*

2.6.1 Administrative and Regulatory Bodies in the Stock Exchange:

Despite similarities in administrative and organizational structures among stock exchanges globally, differences exist in their formation, operation, and jurisdictions. To avoid confusion, we will utilize the New York Stock Exchange (NYSE) as an example of a major, well-organized stock exchange.

2.6.1.1 Administrative Bodies:

The New York Stock Exchange is overseen by a Board of Governors, elected by exchange members. The board consists of representatives from listed companies, financial brokerage firms, and government representatives. Its responsibilities include reviewing membership applications, examining the proposed budget for the exchange, and allocating trading floors (booths) for specific securities. Additionally, the board ensures members adhere to established rules and imposes appropriate penalties for violations. (Ibrahim Hindi, 2006).

2.6.1.2 Regulatory Bodies:

The primary regulatory body for stock exchanges in the United States is the Securities and Exchange Commission (SEC), established by the Securities Exchange Act of 1934. It is an independent government agency consisting of five commissioners appointed by the U.S. President and confirmed by Congress for a five-year term. The SEC oversees stock exchanges and enforces the laws governing them to protect investors, ensure market integrity, and foster confidence in financial investments. Furthermore, it combats various illegal practices that could be perpetrated by lawbreakers seeking to profit at the expense of ordinary investors. (Sidra, 2017-2018).

2.6.2 Participants in the Stock Exchange:

The participants in the stock exchange include its members, who are accredited financial intermediaries by the supervising authority. These members, whether individuals or legal entities, act as intermediaries between those with financial deficits and those with financial surpluses. Trading in the exchange cannot occur without them.

A full-service financial intermediaries firm (brokerage houses) can offer various services, encompassing executing buy and sell orders for clients on the stock exchange, protecting and managing client portfolios, offering information, executing trades, providing credit facilities, and giving advice, among others, in exchange for a commission. (Ibrahim Hindi, 2006).

Below is a summary of the key members of the New York Stock Exchange: (Ibrahim Hindi, 2006) (Abdel Hamid Redouane, 1996).

2.6.2.1 The Commission Broker: This individual works on behalf of a specific brokerage firm and is prohibited from trading for personal gain. He operates in the stock exchange as an agent, earning a legally regulated commission while representing clients who authorize them to buy and sell securities on their behalf. During peak activity periods, floor brokers assist the commission broker in exchange for a portion of the commission.

2.6.2.2 The Dealer: This category includes individuals who buy and sell securities on their account rather than on behalf of others. They are prohibited from dealing directly with the public or executing orders for stock exchange members. Dealers rely on the volume of their transactions and the rapid turnover of securities to fulfill profits.

2.6.2.3 The Specialist: Specialists are exchange members who focus on trading specific types of securities or a limited group of securities, either for their account or on behalf of others for a commission. They perform functions that combine those of a dealer and a commission broker, but they are not allowed to deal directly with the public.

2.6.2.4 Market Makers: Market makers are traders or specialists who are always prepared to buy or sell securities. They take on the risk of holding sufficient inventories of securities to maintain a steady balance between supply and demand, thereby mitigating significant price fluctuations. They earn a profit margin from the difference between the buying and selling prices.

2.6.3 Entities with Financial Deficits and Surpluses:

2.6.3.1 Entities with Financial Deficits (Securities Issuers):

This group involves entities experiencing financial shortages in relation to their investment programs and can include (Bouras, Undated):

- **Governments:** Governments turn to the stock exchange to cover budget deficits or to fund large investment projects, especially those with a social dimension. They may also borrow to manage inflation rates in the economy.
- **Industrial and Commercial Institutions:** These include public limited companies (SPA) that necessitate capital to fund new investment opportunities or to expand existing operations.

2.6.3.2 Entities with Financial Surpluses (Securities Seekers):

This group has a surplus of financial resources that exceeds its consumption and investment expenditures, and it seeks to invest this surplus to obtain returns. This can be done through activities such as investment, speculation, gambling, balancing, hedging, and others. The main entities include: (le Saout, 2011).

- **Individuals:** These are natural persons whose cash inflows exceed their consumption needs.
- **Institutional Investors:** This category includes banks, insurance companies, pension funds, and collective investment schemes (OPCVM), among others. Institutional investors are regarded as important participants in the stock exchange, particularly in developed countries, due to the large and stable savings they bring.
- **Industrial and Commercial Institutions:** These institutions also participate in the stock exchange by investing their financial surpluses in areas that can generate substantial returns.

3. Pricing, Execution, and Settlement in the Stock Exchange

After a public limited company (SPA) is listed on the stock exchange, it issues security in the primary market, and investors subscribing to them through an accredited financial intermediary. The next stage involves trading in the organized secondary market (stock exchange), which aims to provide liquidity to investors who wish to sell their previously purchased securities. This research paper seeks to simplify the procedures for executing trading transactions on the exchange, starting from the client's order to the intermediary, through the pricing of the relevant security and the execution of the order up to the settlement stage.

3.1 Orders

If an existing or prospective trader wants to buy or sell securities on the stock exchange, the first step is to approach one of the accredited financial intermediaries, as trading on the exchange is impossible. The client will seek out an intermediary with a reputation for competence, trustworthiness, and good standing, as the intermediary will act as his agent to execute his orders. (Abdel Hamid Redouane, 1996).

If a client decides to place an order with a financial intermediary to buy or sell, it is beneficial to understand the types of orders he can give.

3.1.1 Order Definition:

An *order* is a mandate the client gives to the financial intermediary to buy or sell securities on their behalf. This mandate requires a written order containing the essential instructions associated with the transactions. Each order must include the following information: (Djebbar, 2017).

- Client identity
- Transaction type (buy or sell)
- Type of security involved in the transaction
- Security name or symbol
- Number of securities to be traded
- Price, whether specified or unspecified
- Order validity period, including the expiration date if not executed
- Market to which the order is directed, whether urgent or deferred, organized or unorganized

Communication between the client and the intermediary can be made through several methods, including personal meetings at the intermediary's office or via other means such as telephone or the Internet. (Bouras, Undated).

3.1.2 Orders Types:

Orders issued by clients can be classified into four main categories: orders specifying the execution price, orders specifying the execution time, orders combining both price and time specifications, and special orders. (Ibrahim Hindi, 2006).

3.1.2.1 Orders Specifying the Price Execution:

Orders which are characterized by the fact that the price specified by the client determines whether or not the transaction will be executed. They are divided into:

- **Market Orders:** These are among the most common types of orders. Under a market order, the client instructs the intermediary to execute the transaction as quickly as possible at the best price. The main advantages of this type are its speed and guaranteed execution. However, the downside is that the investor will only know the price at which the order is executed once they are notified.

- **Limit Orders:** In this type, the client specifies a particular price for executing the transaction. The intermediary must wait for the opportunity when the security price on the exchange reaches the specified price or lower (for a buy order) or higher (for a sell order). The main advantage is that the investor knows the exact price they will pay if it is a buy order or the minimum value they will receive in a sell order. The major disadvantage is that the market price may not reach the specified price, and thus, the transaction may not be executed, even if the price difference is minimal.

3.1.2.2 Orders Specifying the Execution Time:

These are orders where timing determines whether or not they will be executed. The duration of the order may be for a day, a week, or a month, or it may be open-ended, meaning there is no specific execution date.

- **Day Orders:** These orders are valid for the trading day. For example, if the intermediary receives the order at 10 a.m., it remains valid until the market closes. This is the most common type of order, and generally, a day order is assumed unless explicitly stated otherwise. It is often based on the anticipation that the day will provide the best conditions for trading the relevant security.

- **Week or Month Orders:** These orders expire at the end of the week or month they were issued. For example, an order issued on Monday is valid until the end of Friday on the New York Stock Exchange. Similarly, an order valid for a month expires at the end of its issuance. For instance, an order issued on October 22 will expire at the end of October 31.

- **Open Orders:** These orders are valid until they are executed or the client decides to cancel them. On the New York Stock Exchange, clients are required to renew open orders every six months. They are associated with two types of risks: the risk of forgetting and the risk of information changes.

3.1.2.3 Orders Combining Price and Execution Time:

These orders are of two types:

- **Price-Limit Orders within a Set Period:** These orders determine a particular price for execution but necessitate that the transaction be completed within a short time frame, a day, a month, or longer. They combine the advantages of price-specific and time-specific orders.

- **Open Orders with a Price Limit:** This type of order does not contain a specified period for execution but requires that the transaction be completed when the market price reaches the price set by the client or a better price. This type of order suits clients who believe that allowing sufficient time will ensure the order is executed under the desired conditions. However, a major disadvantage is that the order will not be executed if the market price is slightly higher (for a buy order) or slightly lower (for a sell order) than the specified price.

3.1.2.4 Special Orders:

- **Stop Orders:** These orders are only executed if the stock price reaches or exceeds a certain level. There are two types of stop orders: stop-loss orders for selling, where the intermediary must execute the sell order if the stock price reaches or falls below the specified level, and stop orders for buying, which require the intermediary to buy the stock if the price reaches or exceeds the specified level. These orders are designed to limit the reduction of profit margins or to prevent further losses. They relieve clients from monitoring market movements daily to protect their interests. However, a significant disadvantage is that if the specified price is close to the market price, a temporary price change might result in the order being executed, potentially harming the client instead of protecting their interests. On the other hand, executing the order might become impossible if the specified price is far from the market price.

- **Stop-Limit Orders:** These orders address the uncertainty concerning the price at which a transaction will be executed when utilizing stop orders. In stop-limit orders, the client sets

a minimum price for selling and a maximum price for buying. The transaction will only be executed at the specified price or better. A critical drawback of this type of order is that market prices may change rapidly, preventing the intermediary from executing the transaction at the specified price while prices continue to decline, potentially exacerbating the loss in the market value of the client's holdings.

Notably, there are other types of orders not covered here, such as "fill-or-kill" orders, where the intermediary has the discretion to complete the transaction as deemed appropriate without waiting for further instructions from the client. This is based on the client's full trust in the intermediary's competence, integrity, and judgment.

3.1.3 Costs of Executing Orders:

Executing orders involves two types of costs: direct costs and indirect costs. (Ibrahim Hindi, 2006)

3.1.3.1 Direct Costs: They include transaction costs, which typically account approximately 4% of the security value. Key components are the commission fee paid to the financial intermediary, the price discount given by the buyer to the seller, taxes, and fees associated with each transaction, all of which are borne by the seller, among other costs.

3.1.3.2 Indirect Costs: They include opportunity costs, which refer to the returns that could have been fulfilled if the available funds were directed toward other investment opportunities. Additionally, it involves the cost of time and effort spent in evaluating potential investments as well as the anxiety cost involved in investing in this area.

3.2 Pricing Securities on the Exchange and Executing Orders

The price at which a security is traded on the exchange is determined similarly to other goods traded in commercial markets through the interaction of supply and demand forces, represented by buy and sell orders submitted by clients based on the information received. (Shimon, 1999) (Djebbar, 2017).

3.2.1 Definition of the Security Price on the Exchange:

The **exchange price** is the market value reached by a specific security during one of the **trading sessions** (trading periods) held periodically in the exchange's **trading floor**. The **equilibrium price** maximizes number of executed trades and minimizes the imbalance between supply and demand for the security. This price is then recorded on the **official pricing table** after the trading session concludes and is published by the exchange management to announce the price or prices at which the security was traded during the session.

3.2.2 Pricing Methods:

With the assistance of financial intermediaries, exchange management utilizes various methods or techniques to determine the prices of securities on the exchange. These methods seek to facilitate and maximize the volume of trading transactions in quantity and quality. The main methods include:

3.2.2.1 Open Outcry Method: This traditional method involves financial intermediaries meeting face-to-face on the trading floor, shouting the name of the security they wish to trade until buy and sell orders align, negotiating to reach an equilibrium price. Securities are priced one by one through this process. Due to the noise and chaos, intermediaries use hand signals to indicate the nature of the transaction (buying or selling) by placing their arms horizontally towards the body for buying and vertically for selling. The main advantage of this method is transparency, as all participants can directly observe the transactions.

3.2.2.2 Drawer Method: This method differs from the previous one in that it is conducted in writing rather than verbally. All orders for a particular security are recorded on a card and placed in a drawer. Each listed security has its drawer, managed by a financial intermediary considered a specialist in handling that security. The intermediary collects and organizes the orders in the drawer to reach the appropriate price at which the maximum number of orders can be executed under the best conditions, all under the supervision of the exchange management. The specialization required by this method increases the reliability and efficiency of executing transactions.

3.2.2.3 The Box Pricing Method:

This method is utilized when numerous buy and sell offers are on the stock exchange. Intermediaries place their orders in a special box (like a mailbox) managed by the stock exchange administration. The administration supervises the sorting and matching these orders to determine an equilibrium price that satisfies the highest volume of offers and requests. This method provides

greater protection and transparency compared to previous methods due to the involvement of the stock exchange administration.

3.2.2.4 The Confrontation Method:

In this method, a record is kept for each security, listing the various sell offers and buy requests, along with the interactions of traders who verbally finalize transactions. It combines aspects of previous methods, providing a clearer understanding of the quantities to be bought or sold for the security in question and the range of offered prices. This process helps establish the equilibrium price.

3.2.2.5 The Electronic Method:

The electronic pricing (trading) system emerged as a result of technological advancements benefiting the stock exchange much like other sectors. In this system, securities are priced, and orders are executed through centralized electronic information systems without human intervention.

All stock exchange intermediaries involved in trading are connected to this system, with their role limited to entering their orders into the central computer's order log based on price priority and order of entry. The system then assigns serial numbers to these orders. The central computer is responsible for sorting and organizing the orders based on the type of security involved, the type of transaction (buy or sell), prices, and quantities offered. Intermediaries can also modify or cancel orders entered in previous sessions that have not yet been executed.

The system automatically matches buy and sell orders for each security to determine an equilibrium price that fulfills the largest quantity of executable trades or reduces the number of unexecuted trades, minimizing the imbalance between supply and demand for the security in question.

Orders entered into the electronic trading system are processed according to the liquidity of the relevant security utilizing two methods:

- **Fixed Electronic Pricing System:**

This system is employed to price less significant and less frequently traded securities. It determines a single equilibrium price for each security at a specific moment, typically at the beginning of the

trading session. This price applies to all transactions involving the security during the session, and is displayed at the session's end. This type of pricing offers the following advantages:

- Increases the volume of traded securities.
- Minimizes supply and demand imbalances.
- Reduces price fluctuations compared to the closing price of the previous trading session.

➢ **Continuous Electronic Pricing System:**

This system is utilized to price more significant and actively traded securities. This method changes the theoretical opening equilibrium price continuously throughout the trading session for the relevant security. Every incoming order becomes executable once a matching counter-order is available, as long as it falls within the allowable price limits.

The session concluded with different prices announced by the stock exchange administration. These include the opening price (the price of the first trade executed in the session for a particular security), the closing price (the price of the last trade executed in the session for the same security), and the highest and lowest prices recorded.

3.3 Settlement, Clearing, and Transfer of Ownership Procedures in Stock Exchange Trading Transactions

Settlement refers to all procedures associated with the delivery of securities by the selling broker and the payment of their price by the buying broker. This includes ensuring that the securities are free from fraud and verifying that there are no restrictions on their transfer, such as mortgages or other encumbrances.

Clearing involves offsetting debts between brokers, where each broker cancels out what they owe to the other against what the other owes them. This typically arises because brokers exchange creates a debt relationship, where each becomes a creditor and a debtor. Since payment is not made immediately upon completing a transaction, financial settlement between brokers is handled through clearing. If the debts are equal, they cancel each other out. If one debt is greater, the clearing is done up to the smaller debt amount, and the broker with the smaller debt pays the difference to the other.

Ownership transfer refers to transferring shares from the seller to the buyer.

While these processes occur in all markets, the specific procedures and the time required to complete them vary from one market to another. (Bin Suleiman bin Muhammad Al Suleiman, 2005).

These activities generally encompass everything from the moment of transaction commitment (contract) to the delivery of securities and the receipt of funds. The manner of payment by the buyer and the timing of the delivery of securities by the seller (if they exist physically) vary depending on the country, stock exchange, and type of security.

These processes also depend on the nature of the transaction, whether it is an immediate or deferred transaction. In an immediate transaction, after the order is executed, the buyer must pay immediately or within two or three days at most, while the seller must deliver the relevant securities. Both processes are carried out simultaneously through a settlement system.

Given the volume of transactions and the impracticality of settling them manually, most stock exchanges have established automated systems that complete settlements quickly without the physical transfer of securities. For instance, in the United States, the Depository Trust Company (DTC) manages the centralized custody of securities, minimizing costs and settlement times and overseeing related processes such as dividend and interest distributions. (Djebbar, 2017).

3.4 Practical Applications

After brokers enter clients orders into the central computer, the buy and sell orders for each security are sorted and matched. The Supply matches the demand, and the **equilibrium price** at which the security will be bought and sold is identified, as well as pending changes in supply and demand if the pricing continues during the session.

The following explains how this equilibrium price is determined (Djebbar, 2017).

There are several methods to identify the prices of securities listed on the stock exchange. Though they differ in form, they all converge on the basic principle of stock market trading: the law of Supply and demand. This is similar to commodity markets, where an increase in buy orders (demand) for a particular security, with Supply remaining constant, increases its price. Conversely,

if the number of buy orders decreases, the price falls. The same logic applies to sell orders (Supply); as the number of sell orders raises while demand remains unchanged, the security price decreases.

Conversely, the price raises if the number of sell orders decreases compared to demand. Therefore, the stock exchange is a marketplace for matching these orders (buy and sell), or in other words, for matching Supply and demand for various securities to exchange as many as possible. In short, it offers pricing mechanisms that enable the execution of the maximum possible number of buy and sell orders for each security under conditions of transparency and the supervision of the relevant financial authorities.

3.4.1 How the Price of a Security is Determined:

Previously, we discussed the types of orders, noting that, regardless of the execution timing or the conditions attached, they can be classified as either price-specified and market-price orders. Based on this, the following observations can be made, which outline the four basic pricing principles:

- An investor who wants to buy a particular security at the market price is willing to buy it at a higher price.
- An investor who wants to buy the same security at a specified price prefers and does not mind buying it at a lower price.
- An investor who wants to sell the same security at a specified price prefers and does not mind selling it at a higher price.
- An investor who wants to sell the same security at the market price is prepared to sell it at a lower price.

Based on this, sell orders and buy orders for each financial product are aggregated (see Table No. 06). Supply is matched with demand, and the equilibrium price at which the first securities are bought and sold is determined, pending any changes in supply and demand quantities. The price adjusts accordingly. As previously mentioned, according to the continuous pricing method (*Cotation en continu*), new prices for securities are determined whenever buy and sell orders are placed throughout the trading session

Table 1. Determining the Price of a Security (X) on the Stock Exchange

Demand (Buy Orders)		Price	Supply (Sell Orders)	
Nº	Cumulative Nº		Cumulative Nº	Nº
X	X	Market Price	-	-
X	XX	X	XXX	X
-	XX	X	XXX	X
X	XXX	X	XXX	-
X	XXX	X	XXX	X
X	XXX	X	XX	X
X	XXX	X	XX	X
-	-	Market Price	X	X

Source: (Djebbar, 2017).

From the previous table, the following observations can be made:

- Buy orders, illustrating the number of securities requested by investor clients, are arranged on the right side of the table according to each price they specified, including those orders that did not specify a price (market price orders). These orders are accompanied by the cumulative total demand for the relevant security at each specified price, with the ordering and accumulation going from top to bottom.

- Similarly, sell orders, representing the number of securities offered by sellers, are arranged on the left side according to each price they set, encompassing those orders that did not specify a price (market price orders). These orders are also accompanied by the cumulative total of the securities offered at each price, with the ordering and accumulation going from bottom to top.

- The prices in the middle column of the table are arranged in ascending order, from bottom to top. The lowest price is regarded as the best for selling, demonstrating that the seller is willing to sell at that price. Conversely, the highest price is considered the best for buying, meaning the buyer is willing to buy at that price.

- The prices set by investors, whether those wishing to buy or sell the security, are positioned between these extreme prices. The equilibrium price is determined among these prices,

where the maximum exchange occurs. As buy orders increase compared to sell orders, the security price rises, and vice versa.

- The equilibrium price is determined by examining the cumulative number of buy and sell orders at each specified price and determining the price at which effective demand matches effective supply or comes close. If both sides are equal at a certain price, it is the equilibrium price. If they are only close, the difference between supply and demand is identified, and not all orders at that price are fully executed. Only partial orders are executed near the equilibrium price, which is considered approximate. It is a principle accepted and practiced by all market participants that the price determined in this way on the stock exchange cannot be revised or rejected by anyone.

- Generally, market price orders (both sell and buy) are executed at the beginning of the session, as soon as the first price of the security is identified during the trading session. Subsequently, limit price orders are executed based on priority. The price specified in a buy order represents the highest price the buyer is willing to pay, while in a sell order, it represents the lowest price the seller is willing to accept. Therefore, buy orders with a price higher than the equilibrium price are executed first, followed by those matching it, and conversely for sell orders.

3.4.2 Example of How Securities Are Priced on the Stock Exchange:

Assume we have a security (**X**) listed on the stock exchange, and we aim to determine its price at the beginning of the session. Suppose the following orders have been received for that security:

Table 2. Buy Orders (Demand)

Order Nº	Securities Nº	Price in Algerian Dinars
210	800	Market Price
211	200	502,5
212	500	501
213	1500	500
214	1800	498,5
215	2000	497

Source: (Djebbar, 2017).

Table 3. Sell Orders (Supply)

Order N°	Securities N°	Price in Algerian Dinars
370	100	Market Price
371	500	497
372	600	498,5
373	800	499
374	1000	500
375	1150	501
376	1220	502,5

Source: (Djebbar, 2017).

Solution:

It should be noted that most orders have prices specified by the investors. There is also an order (or a set of orders) to buy 800 securities at the market price, represented by order number 210. Additionally, Table 2 includes an order (or a set of orders) to sell 100 securities at the market price, represented by order number 370.

The two previous tables can be combined into a single table, known as the price determination table, to determine the trading price. This takes into account the inverse relationship between buy orders (demand) and price and the direct relationship between sell orders (supply) and price, as follows:

Buy Orders			Price	Sell Orders		
Order N°	Securities N°	Cumulative N°		Cumulative N°	Securities N°	Order N°
210	800	800	Market Price	-	-	-
211	200	1000	502,5	5370	1220	376
212	500	1500	501	4150	1150	375
213	1500	**3000**	**500**	**3000**	1000	374
-	00	3000	499	2000	800	373
214	1800	4800	498,5	1200	600	372

215	2000	6800	497	600	500	371
-	-	-	Market Price	100	100	370

From the previous table, the following observations can be made:

First Observation: A total of 3,000 securities were exchanged, the equilibrium quantity, for 500 dinars, which is the equilibrium price.

Second Observation: Examining columns three and five on one side and four on the other, we find that as the price increases to 497 dinars, 498.5 dinars, etc., the demand decreases from 6,800 securities, 4,800, etc. This is logical in a competitive market due to the inverse relationship between demand and price. In contrast, as the price increases to 497, 498.5, 499, 500, etc., the supply increases from 600, 1,200, 2,000, etc., demonstrating the direct relationship between supply and price.

Third Observation: The market mechanisms for determining the prices of securities are clearly introduced in this table. For instance, for 497 dinars, there is a clear imbalance between supply (600 securities) and demand (6,800 securities), with low supply and high demand at this price level pushing the price up to 498.5 dinars. However, there is an imbalance between supply (1,200 securities) and demand (4,800 securities), which drives the price further until it reaches 500 dinars, where supply equals demand. The price then continues to rise to 501 dinars, where there is a reverse imbalance (low demand and high supply at this price), leading the price to revert to 500 dinars and stabilize there as the equilibrium price. The same interpretation of market mechanisms or supply and demand forces applies if we start from a price of 502.5 dinars, though in this case, the relationship between supply, demand, and price would be reversed. With many traders and competitive conditions, the equilibrium price stabilizes at 500 dinars, allowing the equilibrium quantity of 3,000 securities to be traded, as previously observed.

Fourth Observation: Order execution begins, as previously demonstrated, with orders accepted at the market price. In this example, orders 210 and 370 are executed as soon as the first trading price is determined, followed by the execution of limit orders. For other buy (demand) orders, execution starts with the most favorable orders, i.e., 211, 212, and 213, because their owners accepted buying at a price higher than the determined equilibrium price. For sell (supply) orders, execution starts with orders 371, 372, 373, and 374, as they are willing to sell below the determined price. Afterward, the total quantity of requested and offered securities reaches 3,000, which can be

exchanged. This means demand orders for this security numbered 214 and 215, and supply orders numbered 375 and 376 were not executed. Confirming that all orders are executed at the uniform price of 500 dinars, regardless of the prices proposed for buying and selling by investors, is important.

Fifth Observation: Demand and supply may not always be perfectly equal but may only approach each other. In this case, the supply or demand has approached or touched the price. In the previous example, the number of securities requested at the price of 500 dinars could be 2,980 (resulting from the number of securities requested by order 213 was only 1,480), and the number of securities offered is 3,000. Thus, 2,980 securities are exchanged at the specified price of 500 dinars, assuming that trading occurred for the largest possible number of securities. In this instance, it is said that demand has approached the price.

Referring back to the previous example, this situation can be illustrated in the following price table:

Buy Orders			**Price**	**Sell Orders**		
Order N°	**Securities N°**	**Cumulative N°**		**Cumulative N°**	**Securities N°**	**Order N°**
210	800	800	Market Price	-	-	-
211	200	1000	502,5	5370	1220	376
212	500	1500	501	4150	1150	375
213	1480	**2980**	**500**	**3000**	1000	374
-	00	2980	499	2000	800	373
214	1800	4780	498,5	1200	600	372
215	2000	6780	497	600	500	371
-	-	-	Market Price	100	100	370

The 20 unexecuted securities were selected based on the "First In, First Out" (FIFO) principle. They are carried over to the next trading session unless the orders expire and are included in the opening order book for the following day.

4. *Conclusion*

Pricing securities on the stock exchange is a central operation that balances supply and demand and determines prices based on market dynamics. The previous analysis emphasized various key points contributing to comprehending how securities prices are determined. It was highlighted that prices are directly impacted by the number of buy and sell orders and the price levels set by investors.

Key Results:

1. **Mechanism for Determining Equilibrium Price:** It was interpreted that the equilibrium price is determined by matching buy orders with sell orders, depending on the balance of supply and demand. As the number of buy orders increases or decreases, the price adjusts accordingly until the price at which supply and demand are equal is reached.

2. **Effect of Settlement Mechanism:** The study indicated how automated systems contribute to speeding up the settlement process and reducing the costs related to transactions by minimizing the need for physical delivery of securities, thereby promoting market efficiency.

3. **Impact of Market Orders:** It was clarified how market orders affect immediate pricing and how orders are executed based on priority, emphasizing the significance of the market's quick response to changes in supply and demand.

Suggestions for Future Research:

1. **Exploring Alternative Pricing Methods:** Investigate other methods of determining prices in different markets and analyze their impacts.

2. **Analyzing the Impact of Modern Technology:** Examine how modern technologies like artificial intelligence affect securities pricing.

3. **Expanding Research Scope:** Conduct comparative studies between different financial markets to evaluate the variation in the effect of supply and demand on pricing.

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