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The effect of the capital asset pricing model (CAPM) on the market value of stock prices
An analytical study of a sample of companies listed in the Iraq Stock Exchange for the period from (2011-2020)

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Abstract : The aim of the research is to demonstrate the appropriateness of the capital asset pricing model (CAPM) for use in the Iraqi stock market, and whether it has an impact on the market value of stock prices, as the research sample consisted of (37) companies distributed over (6) economic sectors (banking sector, the industry sector, the hotel and tourism sector, the services sector, the insurance sector, the agricultural sector) for companies listed on the Iraq Stock Exchange for the period from (2011-2020), A set of financial and statistical methods (SPSS.V23, Eviews12, Microsoft Excel 10) were adopted to analyze data and test the validity of hypotheses, The research reached a set of conclusions, the most important of which is the existence of an inverse relationship between the capital asset pricing model (CAPM) and the market value of stock prices, which means that the higher (return and risk) the lower the market value of stock prices with it, and the research concluded with a set of recommendations, the most important of which is that companies benefit from the results And the research that showed the extent of the model's ability to estimate the market value of stock prices, and thus its investment operations can be built in the financial market under this model, and the need for companies to seek the assistance of experts and economic and financial analysts to follow up and analyze the movements of the market value of stock prices because they are unstable in light of Iraq's adoption of the economy rent in order to provide solutions that can help companies in the event of an economic crisis in the country.

***Key words (capital asset pricing model CAPM , Market value)**

الملخص : هدف البحث الى بيان مدى ملائمة نموذج تسعير الموجودات الرأسمالية (CAPM) للاستخدام في سوق العراق للأوراق المالية , وما إذا كان له تأثير على القيمة السوقية لأسعار ألأسهم, إذ تكونت عينة البحث من (37) شركة موزعة على (6) قطاعات اقتصادية (قطاع المصارف, قطاع الصناعة, قطاع الفنادق والسياحة, قطاع الخدمات, قطاع التأمين, قطاع الزراعة) للشركات المدرجة في سوق العراق للأوراق المالية للفترة من (2011 - 2020) , وتم اعتماد مجموعة من الأساليب المالية والاحصائية (Microsoft Excel$_{10}$, Eviews$_{12}$, SPSS.V$_{23}$) لتحليل البيانات واختبار صحة الفرضيات , وتوصل البحث إلى مجموعة من الاستنتاجات أهمها وجود علاقة عكسية بين نموذج تسعير الأصول الرأسمالية (CAPM) والقيمة السوقية لأسعار الأسهم ، مما يعني أنه كلما ارتفع (العائد والمخاطر) انخفض القيمة السوقية لأسعار الأسهم معها, واختتمت البحث بمجموعة من التوصيات أهمها ينبغي على الشركات الاستفادة من نتائج البحث التي اوضحت مدى قدرة النموذج على تقييم القيمة السوقية لأسعار الأسهم وبالتالي يمكن بناء عملياتها الاستثمارية في السوق المالية على ضوء هذه النموذج , وضرورة استعانة الشركات بخبراء ومحللين اقتصاديين وماليين لمتابعة وتحليل تحركات القيمة السوقية لأسعار الأسهم لأنها غير مستقرة في ظل اعتماد العراق على الاقتصاد الريعي من أجل تقديم حلول يمكن أن تساعد الشركات في حالة حدوث أزمة اقتصادية في البلاد..

*** الكلمات المفتاحية (نموذج تسعير الموجودات الرأسمالية CAPM , القيمة السوقية)**

INTRODUCTION

Investment motives vary in order to obtain a return that achieves the highest profits in return for the lowest risks, as some investors prefer to invest in secured securities (treasury transfers, government bonds) in order to avoid risks and obtain an acceptable return, Others are investors who prefer to take risks and invest in high-risk securities (stocks, bonds).

Estimating the expected returns from individual stocks is a central issue that is subject to many investment and financial decisions, such as managing investment portfolios, evaluating financial performance, preparing budgets, acquisition or merger between financial institutions, but the most important question is how to evaluate investment in securities (stocks, bonds). What are the appropriate models that can be used for the purpose of evaluation, and can they affect the market value of stock prices in the financial market? . The beginning of the evaluation and pricing of capital assets (stocks) in 1952, as Harry Markowitz developed a formula through which the expected rate of return of a portfolio can be extracted, the expected risk is measured and the variance is calculated for it. The purpose of this study is to verify the ability of the CAPM model to influence the market value in the Iraqi market for securities, and to show the benefit that the study sample companies can achieve from using this model and its reflection on the development of the Iraqi market for securities.

RESEARCH METHODOLOGY

1. THE RESEARCH PROBLEM

In light of Iraq's dependence on the rentier economy (oil) as a main source of revenue and the non-activation of the rest of the industrial, agricultural and other commercial sectors that could contribute to supporting companies to enter and invest in the Iraqi market for . Absence of planning and lack of openness to Arab and international markets, in addition to the instability of macroeconomic variables, This leads to a weak investment environment in securities, and then a deterioration in the market value of stock prices, thus exposing companies to large losses, Therefore, companies should find an appropriate mechanism that will help rationalize decisions and reduce losses as a result of fluctuations in the market value of stock price Therefore, many models appeared on this subject, which differ in their ability and accuracy from one model to another, Hence, the problem of the study emerges in the following questions:

A. How appropriate is the Capital Asset Pricing Model (CAPM) in influencing the market value of stock prices?.
B. To what extent can the Capital Asset Pricing Model (CAPM) be relied upon to rationalize decisions to ensure increased profits and maximize the value of the company?.

2- THE RESEARCH IMPORTANCE

The subject of the study is one of the most important topics in showing the impact of using the CAPM model on the market value of stock prices, as it studies the relationship between return and stock price risks in order to give a clear and accurate picture of companies to rationalize their decisions and reduce losses, and it can also help companies achieve profits and avoid risks. When investing in securities, and thus will contribute to encouraging companies to direct their savings towards investing in the Iraqi market for securities, and then this will reflect positively on the development of the Iraqi market.

3- RESEARCH OBJECTIVES

The study aims to clarify the suitability of the pricing model (CAPM) for use in the Iraqi stock market, and whether it has an impact on the market value of stock prices, And analysis of the correlation and impact between the capital asset pricing model (CAPM) and the market value of stock prices.

4- RESEARCH HYPOTHESES

A. The first main hypothesis (there is no significant correlation between the CAPM model and the market value of stock prices).
B. The second main hypothesis (there is no statistically significant effect between the CAPM model and the market value of stock prices).

5- COMMUNITY AND SAMPLE RESEARCH

The research community consists of companies listed in the Iraq Stock Exchange, where the study sample consisted of (37) companies distributed over (6) economic sectors, They are (the banking sector, the industry sector, the hotel and tourism sector, the services sector, the insurance sector, and the agriculture sector). due to the availability and completeness of their data during the study period (2011-2020). And based on the annual financial reports of the Iraq Stock Exchange and audited by the relevant authorities, such as the Office of Financial Supervision.

6- THE LIMITS OF THE STUDY

A. Spatial limits: - The spatial dimension of the study in the Iraqi Stock Exchange.

B. Temporal limits: The temporal dimension that was adopted in the research is to test the correlation and effect between its variables according to a time series for the period from (2011 - 2020).

C. General limits: - The general dimension of the subject of the study is the capital asset pricing model (CAPM) and the market value of stock prices.

7- SOURCES FOR COLLECTING INFORMATION AND DATA

In completing the requirements for its success, the study relied on a number of sources in the theoretical aspect, it was relied on the following available sources:-

- Arabic and foreign books.
- Academic Theses and Theses.
- Arab and foreign periodicals.
- The Internet.

With regard to the practical aspect, the study relied on data extracted from the annual economic reports of the Central Bank and the annual financial reports of the Iraq Stock Exchange.

8- THE FINANCIAL AND STATISTICAL MEANS USED

The study relied on a set of financial and statistical methods to analyze the data and test the validity of the hypotheses, where the program (Microsoft Excel10) was used to extract the percentages of change in the market value of stock prices and the rates of change in economic factors. In addition to calculating the expected rate of return and the required rate of return for the study sample companies, and from that the statistical analysis program (Eviews12) was used to test whether the study variables were normally distributed or not, and the program (SPSS.V23) to test the validity of the researched hypotheses for the research sample companies.

THE THEORETICAL SIDE OF THE RESEARCH

1- Capital Asset Pricing Model (CAPM)

The capital asset pricing model (CAPM) is the first quantitative model in financial economics to express the relationship between risk and return for financial assets. It was introduced by William Sharpe in 1964 and John Lintner in 1965 as a model for calculating the theoretical rate of increase in assets and thus the expected price (Adnyana & Nurwulandari,2020:21). This model is widely used to evaluate financial decisions and required rate of return (Fletcher, 2000:235). This model is based on the modern portfolio theory Markowitz, as it focuses on the systematic risks that are difficult to get rid of by diversifying investment assets and away from the unsystematic risks (Perold, 2004, 24). The CAPM model remains the main tool for evaluating the cost of capital, evaluating investment strategies, and measuring portfolio performance and diversification (Koumou, 2020, 34). The CAPM model can be defined as a model for assessing the return and risk of assets on the basis of the beta coefficient, and determines the price of the security based on the conditions of financial market equilibrium (Husnan, 2003: 159). It is also known as a model for pricing the risks of assets according to the market balance in a well diversified portfolio with the aim of showing the relationship between return and risk because it provides the correct prediction between the risks of the asset and the expected return (Liem ,2015:266-267). The CAPM model is of great importance in the field of modern finance and capital theory because it is an important tool for estimating the cost of capital and the returns achieved for banks and companies. It explains the differences in rates of return on securities as a function of the rate of return on a portfolio consisting of all publicly traded stocks (market portfolio). Moreover, it provides an intuitively powerful prediction and formula for calculating the return on a security based on the relationship between the return and the level of risk (Chen, 2016:18). The role of the Capital Asset Pricing Model (CAPM) is mainly to consider the rationality of the prices of different securities, meaning that the correct expected return for any asset should be equal to the risk-adjusted risk-free interest in addition to the risk-adjusted return for the risks of the entire market portfolio (Zeng, 2021:4) . This model is one of the most widely used models in applied research because it evaluates and calculates the required rate of return that relates return and risk to the value of securities using a measure of beta (β). This model is based on the following formula: (Elshqirat & et al, 2018:18)

$$(Rit)=RF+(Rm-Rf)$$

Since :-

***Rit*:** the required rate of return for the security.

RF: risk-free rate of return (treasury bills, government bonds)

Rm: Market rate of return It is the average rates of stock prices in the market.

βi: the stock's beta (the degree of sensitivity of the stock's return to the market's return).

This model is based on a set of assumptions that most researchers and writers rely on to evaluate investment in securities (stocks) and predict the current prices of the value of assets in the financial markets. William Sharp relied on several assumptions in building this model:

A. All investors can borrow or lend at a fixed rate of interest free of risk without any restrictions that hinder the process of buying and selling securities (Robert, 2010:19).

B. Investors focus on a single period of time to invest in securities in order to maximize the expected benefit of their wealth by focusing only on the expected return and the related risks in the portfolio (variance) (Reilly & Brown, 2003:618-642).

C. Information is available to all dealers in the financial markets without exception at the same time and with the same degree of accuracy and clarity, meaning that the market in which they are dealt is complete, free of errors and in a state of equilibrium (Al-Qudah, 2017:127).

D.Investments in the financial markets are limited to financial assets traded in the market and investors cannot influence the prices, in addition to that all these investments are divisible and transferable indefinitely. (Bekaert & Hodrick,2012:446)

E.There is no inflation or any change in interest rates as well as no taxes or costs on transactions of buying and selling securities (Barberis & at el, 2015: 64).

F.Investors do not like risk and at the same time seek to own highly efficient portfolios, ie fully diversified portfolios with high returns (Pratt, 2010:113).

2- Market value of stock prices

The market value is one of the important indicators that are used to express the company's performance, as it is considered a main goal to maximize the value of the company, in addition, it fluctuates significantly because it changes according to economic factors, up and down, in addition to the company's financial position, It is viewed as an indicator of the success or failure of companies in the financial markets (Hasuna, 2011: 159). It is determined on the basis of previous information, public relations such as (financial position, result, economic conditions, economic distributions of profits), and accordingly the market value represents the real value of the asset, especially if the financial market condition is of an efficient level (Al-Nuaimi, 2018: 4). It means the share price that is traded in the financial markets, which is subject to many conditions such as supply and demand in those markets, knowing that these conditions often reflect the surrounding economic, political and social environment (Kapoor, et.al,2009:81). It also means the price at which shares are traded in the financial market, where the greater the company's profits, the greater the demand for its shares in the market, which leads to a rise in the market value of the company's shares In the financial market, the market value depends on the general economic conditions in the country and the conditions of companies (Youssef et al., 2019 :170). Table (1) shows a group of factors that affect the market value of shares, according to some researchers:

Table (1)
factors that affect the market value of shares, according to some researchers

sequence	researcher and year	Factors that affect the market value of shares	market
1	Karathanassis &Philippas , 1988	Divider of earnings, retained earnings and volume	Greece
2	Midani ,1991	Earnings per share and leverage	Kuwait
3	Irfan & Nishat ,2002	Dividends, leverage and volume distribution	Pakistan
4	Pradhan ,2003	Divider of earnings	Nepa
5	AL-Omar & AL-Mutairi ,2008	Book value per share and earnings per share	Kuwait
6	Khan ,2009	Divider of earnings	Bangladesh
7	Uddin ,2009	Earnings, earnings per share and net asset value per share	Bangladesh

Source : Nirmala, P. & Sanju, S & Ramachandran, M., Determinants of Share Prices in India, Journal of Emerging Trends in Economics and Management Sciences, VOL: 2, pages: 124-130, 2011.

3- The relationship between the capital asset pricing model (CAPM) and the market value of stock prices:

The return represents the driving force for any investment process, as it can be determined by the expected return that may or may not occur in the future, The achieved return is affected by the market value of the shares, as this return is related to how to act and manage the money that investors expect, that is, the increase in the value of the distributed profits affects the market value of the shares, Therefore, there is a direct relationship between the distributed profits and the market value, with the stability of other economic factors that affect the values of shares, as the more companies increase the distribution of profits to shareholders, a large purchasing power will be generated, which leads to an increase in the market value of shares and vice versa (Gali, 2017: 177) . While risk is one of the most important factors affecting the value of companies because of its direct impact on the levels of the market value of shares in the financial market, so there is a direct relationship between risk and the market value of shares, The greater the risk that companies may be exposed to, the greater the losses will be in the market value of the shares, and then the lower the market value in the financial markets (Ziad, 2016: 202-203).

THE APPLIED ASPECT OF RESEARCH

After collecting the required data from its own sources, whether related to the theoretical or analytical aspect, and determining the financial equations to calculate the required rate of return, it is necessary to analyze the selected data from (37) companies distributed over (6) sectors listed in the Iraq Stock Exchange, The required rate of return for each company will be calculated by extracting the systemic risk factor, the risk-free return (0.04)[1], and the market rate of return for each of the selected sectors according to the following equation:

$$E(Ri)=Rf+(Rm-Rf)\beta$$

It is noted from Table No (2) that the companies surveyed for all sectors witnessed variation in their achievement of returns, as there were (22) companies that achieved a positive required return, and (15) companies that achieved a negative required return. They are ranked from highest to lowest and the companies with the highest and lowest required rate of return will be delved into each sector as follows:

a. The companies that achieve the highest positive required rate of return from capital gains according to each sector:

Baghdad Company for the manufacture of packaging materials from the industrial sector achieved the highest required rate of return of (0.14), Elite General Contracting Company from the services sector achieved the highest required rate of return of (0.096), The Middle East Fish Production Company from the agricultural sector achieved the highest required rate of return, which amounted to (0.083), in addition, the Iraqi Investment Bank from the banking sector achieved the highest required rate of return, which amounted to (0.052), while Al-Ameen Company from the insurance sector achieved the highest rate of return Required, which amounted to (0.05).

B.Companies that achieved the lowest negative required rate of return from capital gains by sector:

The National Bank of Iraq from the banking sector achieved the lowest required rate of return, which amounted to (-0.224), then the National Company for Tourism Investments from the tourism sector achieved the lowest required rate of return, which amounted to (-0.136), while the Baghdad Iraq Company for Public Transport from the services sector achieved the lowest rate A required return, which amounted to (-0.014).

Table (2)

The required rate of return according to the CAPM model for the companies surveyed for the period from (2011-2020)

companies	R_i	R_m	β	CAPM
Baghdad for packaging materials industry	**-0.096**	0.066	0.619	**0.14**
Elite General Contracting	**-0.167**	0.025	0.289	**0.096**

(1)The percentage that the central bank gives companies as a risk-free rate of return is (0.04).

Middle East for fish production	**-0.046**	0.067	0.385	**0.083**
Al-Mansour Pharmaceutical Industries	**-0.014**	0.066	0.492	**0.079**
Canadian for the production of veterinary vaccines	**-0.012**	0.066	0.421	**0.073**
Iraqi Investment Bank	**-0.143**	-0.08	0.176	**0.052**
Chemical and plastic industries	**0.009**	0.066	0.189	**0.051**
Al Amin Insurance	**-0.001**	0.012	0.783	**0.05**
Iraqi for meat production and marketing	**0.023**	0.067	0.238	**0.05**
North Bank	**0.012**	-0.08	0.037	**0.044**
Baghdad for soft drinks	**0.187**	0.066	-0.009	**0.041**
Ready-to-wear production	**0.264**	0.066	0.001	**0.04**
Al-Mansour Investment Bank	**-0.054**	-0.08	-0.044	**0.037**
Iraqi carpets and furnishings	**0.09**	0.066	0.201	**0.035**
Babel Bank	**-0.201**	-0.08	-0.029	**0.032**
Metal industries and bicycles	**0.101**	0.066	0.27	**0.031**
Gulf Insurance	**0.025**	0.012	0.851	**0.029**
Commercial Bank of Iraq	-0.094	**-0.08**	**0.464**	**0.023**
Iraqi Islamic Bank	**-0.058**	-0.08	0.564	**0.023**
Al Maamoura Real Estate Investments	**0.073**	0.025	0.611	**0.011**
Iraqi Seed Production	**0.158**	0.067	0.314	**0.011**
Iraqi agricultural products	**0.135**	**0.067**	**0.518**	**0.005**
Sumer Bank	**-0.052**	-0.08	-0.4	**-0.014**
Baghdad, Iraq for public transport	**0.17**	0.025	0.372	**-0.014**
The tourist city in the Mosul Dam	**-0.111**	-0.044	0.194	**-0.024**
Mosul Bank	**0.008**	-0.08	0.274	**-0.033**
Karbala Hotel	**-0.154**	-0.044	0.267	**-0.036**
Gulf Commercial Bank	**-0.142**	-0.08	1.033	**-0.043**
Kurdistan International Bank	**-0.077**	-0.08	0.439	**-0.049**
Babylon Hotel	**0.147**	-0.044	0.264	**-0.115**
Middle East Bank	**-0.118**	-0.08	0.574	**-0.121**
Baghdad Hotel	**-0.037**	-0.044	0.419	**-0.129**
National Tourism Investments	**-0.065**	-0.044	0.47	**-0.136**
United Investment Bank	**-0.213**	-0.08	0.811	**-0.141**
Ashur International Bank	**-0.077**	-0.08	0.816	**-0.161**
Baghdad Bank	**-0.056**	-0.08	0.523	**-0.193**

National Bank of Iraq	**0.064**	-0.08	0.449	**-0.224**

Source: Prepared by the researcher based on the researched companies' reports and the Excel program.

The correlation between the CAPM models and the market value of the stock prices of the researched companies will be tested using the statistical analysis program (SPSS V.23). The direction of the relationship between the two indicators will also be identified, is it a positive or negative relationship, according to the inputs for each model, by relying on the Pearson correlation coefficient, as follows:

1- Testing the first main hypothesis:

H0 : there is no significant correlation between the CAPM model and the market value of stock prices.

H_1: there is significant correlation between between the CAPM model and the market value of stock prices.

The correlation relationship between the independent variable (CAPM) model and the dependent variable (the market value of stock prices) will be clarified, as well as identifying the direction of the correlation, was it positive or negative through the researcher relied on the correlation coefficient (Pearson), as shown in Table (3):

Table (3)

The results of testing the correlation between the CAPM model and the market value of stock prices

dependent dimension / independent dimensions	Market value		
	R	**Sig**	**The decision**
CAPM	**-0.337**	**0.041**	**reject the null hypothesis H0**

Source: Prepared by the researcher based on the outputs of the statistical program (SPSS V.23).

Table (3) shows the results of the correlation (R) between CAPM and the market value of stock prices. The nature of the relationship can be stated as follows:

A- The value (R) of the correlation between the CAPM model and the market value of stock prices was (-0.337), and it was found that the direction of the relationship between the two variables was negative (an inverse correlation), which means the higher the return and the risk, the lower the market value of stock prices.

B- The level of significance was (0.041), which is lower than the level of significance assumed by the researcher (0.05), and this means that the results reached are more than (99%) reliable.

C- A decision was reached on the correlation hypothesis between CAPM and the market value of stock prices which states that the null hypothesis (H0) is rejected, Which states that "there is no statistically significant correlation between CAPM and the market value of stock prices".

2- Testing the second main hypothesis:

H0 : there is no statistically significant effect between the CAPM model and the market value of stock prices.

H_1: there is statistically significant effect between the CAPM model and the market value of stock prices.

The impact relationship between the independent variable (CAPM) and the dependent variable (the market value of stock prices) will be clarified, as well as identifying the direction of the influence relationship, whether it was positive or negative, as shown in Table (4):

Table (4)
The results of testing the impact relationship between the CAPM model and the market value of stock prices

Model	Standard coefficients	T	Sig
	Beta		
Constant	-0.337	3.215	0.003
CAPM		-2.119	0.041

Source: Prepared by the researcher based on the outputs of the statistical program (SPSS V.23).

Table (4) shows the results of the impact relationships between CAPM and the market value of stock prices. The nature of the relationship can be stated as follows:

A- The coefficient of (R^2)) recorded a ratio of (0.11), and this means that the CAPM model explains the amount of (0.11) of the discrepancy in the market value of stock prices.

B- B - The standard coefficient of the regression Beta was estimated at (-0.337), which means that there is an inverse relationship between the two variables.

C- The level of significance was (0.041), which is lower than the level of significance assumed by the researcher (0.05), and this means that the results reached are more than (99%) reliable.

D- C- A decision has been reached regarding the impact hypothesis between CAPM and the market value of stock prices, which states that the null hypothesis (H0) is rejected, And the adoption of the alternative hypothesis (H1), which states "there is a statistically significant effect between the CAPM and the market value of stock prices."

Conclusions

1- The capital asset pricing model can analyze the market value of stock prices, as it was shown through the available data for each variable and the use of mathematical equations that there is a relationship between the model and the market value of stock prices for the research sample companies listed on the Iraq Stock Exchange.

2- After analyzing (37) companies from the sectors that were investigated, and after extracting the required rate of return according to the (CAPM) model, where (22) companies achieved a required positive return, and (15) companies achieved a required negative return. Baghdad Company for Packaging Materials Industry achieved the highest required rate of return, which amounted to (0.14), while the National Bank of Iraq achieved the lowest required rate of return, which amounted to (-0.224).

3- After conducting the simple correlation coefficient (Pearson) test to determine the correlation, the coefficient of determination (R2) and the standard coefficient of regression Beta to determine the influence relationship between the CAPM model and the market value of stock prices, it was found that the direction of the relationship between the two variables was negative (an inverse correlation), which means the more The higher the return and the risk the lower the market value of stock prices.

Recommendations

1- It is necessary for companies to benefit from the research results that showed the ability of the model to assess the market value of stock prices, and thus their investment operations in the financial market can be built in the light of this model.

2- It is necessary for the companies listed in the Iraq Stock Exchange to open up to the Arab and international markets due to the stability of the economic environment in most markets and thus the ease of obtaining the highest possible return with the least possible degree of risks.

3- It is necessary for companies to use economic and financial experts and analysts to follow up and analyze the movements of the market value of stock prices because they are unstable in light of Iraq's dependence on the rentier economy in order to provide solutions that can help companies in the event of an economic crisis in the country.

4- It is necessary for companies not to invest in securities in the long term in the Iraqi market due to the instability of the economic situation in the country.

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