

An Investigation Of The Impact Of Intellectual Capital Elements On Stock Returns Of Companies Listed ON Tehran Stock Exchange

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Abstract: One of the Major Existing limitations and Weaknesses in Traditional Accounting System is the Lack of Intellectual Capital assessment and is Reflection in Companies' Financial Statements. Due to the Importance of intellectual Capital Issue and Willingness of Companies to Assess and report it, This Paper investigates the Impact of the added Value of intellectual Capital Elements (Physical, Human, and Structural Capital) on Stock Returns of Companies Listed on Tehran Stock Exchange During the Years 1385 to 1389. The Study Sample consists of 60 Companies. To Test the Hypotheses, First, Necessary Data Is Collected Based on PULIC Model. In Order to Analysis Data, Combined Data Method and Multivariate Regression Analysis are Used. Software used to Perform Statistical Methods is Eviews6. By Studying Research Literature, Three Hypotheses Were Developed. Results of the First Hypothesis Testing Shows That There is a Positive and Significant Relationship Between Value Added of Physical Capital and Stock Returns. Results of the Second Hypothesis Testing Also Shows that There is a Positive and Significant Relationship Between Value Added of Human Capital and returns on Stocks. Finally, Based on the Third Hypothesis Testing, it Was determine That There is a Positive and Significant Relationship Between Value Added of Structural Capital and Stock Returns.

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KEYWORDS: Physical Capital, Human Capital, Structural Capital, Stock Returns.

*INTRODUCTION:

Nowadays, the Role and Importance of intellectual Capitals used in Continuous Profitability and Sustainability of Companies is More Compared to Returns on the Employed Financial Capital. In Other Words, in Today's knowledge _Based Societies, the Role and Importance of Financial Capitals in determining Sustainable Profitability is Reduced Significantly Compared to Those of Intellectual Capitals. In 20th Century, Economy was Based on Industry. In This Century, Each Company or Country With More physical Assets and more tangible Financial Capital Would Produce More Wealth. Over Time and with Fading of Fixed assets, the age of intangible Assets Began. With the passage of Time, Manager Found that Not Only Fixed Assets produced Value For Companies, But Also There were intangible Assets Involved in Determining Company's Value and returns. In Word Economy, Financial and physical Capitals are Replaced By Knowledge as the Most Important Capital. Business Environment Based on Knowledge Requires an Approach Which includes New Intangible Organizational Assets Such as Manpower's Knowledge, Qualifications, and Innovations, Customer Relationship, Organizational Culture, Systems, Organizational Structure, and so on. Meanwhile, Theory of Intellectual Capital Has

Attracted Increased Attention of Academic researchers and Managers. In 21th Century, Economy is Based on Knowledge. As (STARAMAN ETAL, 2002) Quoting (KENDRIC) _ One Of American Economists _ States that in 1925 the Ratio of Intangible assets to Tangible assets Was %30 to %70, While in 1990s, it Increased By %63 to %37.

STWART (1997) considers human capital as Most Important Assets of an Organization. There Fore, it is Expected That Companies With higher Intellectual and Human Capital, have Higher Efficiency. Intellectual Capital is a Capital More Than physical and Tangible Assets. Nowadays, the Contribution of intellectual Capital can Play an Important Role in Creating Added Value and gross Domestic Production Due to the Production of Knowledge and Information, and as a Result, Wealth Production in Knowledge _Based Economy. Based on What We Said, Now the Question That Arises is That Whether The Efficiency of Intellectual Capital Elements is effective on Returns of Companies Listed on Tehran Stock Exchange ? To Answer, This Study Aims at Investigation of the Impact of efficiency on Each Intellectual Capital Element (Efficiency Physical, and Structural Capital) on Stock Returns of Companies Listed on Tehran Stock Exchange.

***THE STUDY BACKGROUND:**

Chen et (2005) Investigated the Relationship Between Intellectual Capital and Market Value, and Financial Performance of Companies Listed on Taiwan Stock Exchange During a Time Period Between 1992 to 2002 Empirically. Results of Hypothesis Testing Showed That Intellectual Capital Has a positive Impact on Market Value and Financial Performance, and It May be Considered as a Benchmark For future Performance. Further, the Evidence indicated that Development and research Costs, Presents More information on Structural Capital, and have a Positive Relationship With Profitability and Firm's Market Value.

Chang (2007) Using intellectual Added Value Coefficient and Adjusted Intellectual Added Value Coefficient, Investigated the Impact of Intellectual Capital on Market Value (Market Value to Book Value Ratio, and Price to Profit Ratio) and Profitability, and Profit Margin) in Taiwan's Information Technology (IT) industry the Years 2001 to 2005. His Results Showed That in the Whole Related Industry, Intellectual Capital and its Components Only Have a Positive Significant Relationship With Profitability and Market Value.(Chen tai, and Tong Chen, 2008) on a Study, Investigated New Model of Intellectual Capital Measurement Based on Linguistic and Presented a New Model to asses the Performance of Intellectual Capital By Combining Phase Approach With a Multivariate Decision Technique, That Was Tested For Companies With Advanced Technology in Taiwan. Results Indicated a Significant Association Between the Components of Intellectual Capital and Performance.

Yang and Kang (2008) in a Study in Taiwan Investigated the association Between Innovation Capitals and Customer Capital, as Well as their Interactive Relation ship With Companies' Financial Performance Considering Companies' Technology. Findings of This Study Shows That There is a Significant Association Between Innovation Capital, Performance and Also Between Customer Capital and Performance. Intensity of Relationship Between Customer Capital and Performance in Companies High_ Level Technology is Less Than Those With Low_ Level Technology, and Significant Interactive Relation only exists in Manufacturing Companies With High Technology.(Tan Et al, 2007) in a Study, Investigated The relationship Between intellectual Capital and Financial Returns of 150 Companies Listed on SINGAPOUR Stock Exchange During 200 to 2002. To Do So, They Considered There EFFICIRNY Ratios Including Equities, Earning Per Share, and Annual Return Per Share as an Indicator of financial Return, and There Components of Pulic's Intellectual Added Value Coefficient (1997) as an

indicator of Intellectual Capital. Results of the Study Indicated That there is a Positive Relationship Between Intellectual Capital and a Company's Performance, and Also There is a Positive Relationship Between Intellectual Capital and future Performance of the Company also, There is a Positive Relationship Between Intellectual Capital Growth Rate and Future Performance of the Company,and Intellectual Capital Role is Different in Various Industries' Performance.

Helena RODEZ and TANJA Mihalik (2007) in His Study,Investigated the Impact of Intellectual Components on Financial Performance in Hospitality Industry in Slovenia. Results of this Study Showed that First, There is a Positive Significant Relationship Between the Intellectual Capital Components and Financial Performance in This Industry. Second Communicative Capital Has a Very High Impact on Companies' Financial Performance Compared to Other Components of Intellectual Capital. ABBASI and SADOUGHI (1389) in a Study, Investigated the Impact of Efficiency of Each of the Intellectual Capital Elements on financial Indicators of Companies Listed on Tehran Stock Exchange. In This Study,The Impact of Intellectual Capital Elements (the efficiency of Human, Physical, and Structural Capital) on Financial Performance Has Been Investigated For 99 Companies During the Years 1379_1382. Results of this Study Showed That Efficiency of Each of Intellectual Capital Elements Had Positive and Significant Influences on Return on Equities (ROE) The Impact of Physical and Human Capital Efficiency on Earnings Per Share Was Positive, However the Effect of Structural Capital Efficiency Was Negative and Significant. NAMAZI and EBRAHIMI (1388) Investigated the Impact of Intellectual Capital on Current and Future Financial Performance of Companies Listed on Tehran Stock Exchange, Time Period of the Study Case Was Between 1383 to 1385, and Selected Sample Consisted of 120 Companies. Results of This Study Indicated That, Regardless of Company's Size, Debt Structure, and Post Financial Performance, There is a Positive Significant Relationship Between Intellectual Capital and Company's Current and Future Financial Performance Both at the Level of all Companies and at Industry Level. HEMATI and MEHRABI (1390) Investigated the Relationship Between Intellectual Capital and Financial Return of Companies Listed on Tehran Stock Exchange, in Their Study, They Investigated the Relationship Between Intellectual Capital, Financial Performance,Intellectual Capital Growth Rate, and Future Performance. Time Period of the Study Was From 1388 to 1387 and the Study Sample Consisted of 146 Companies. RESULTS of Hypothesis Testing Showed That There is a Positive Correlation Between Intellectual, Financial Capital.

And future Performance of the Firm. in Addition, Contribution of Intellectual Capital in Firm's Future Performance is Different in Various Industries. (REZAEI et al, 1388) Investigated intellectual Capital and Performance Based on Value, and Intellectual Capital of Companies Listed in Tehran Stock Exchange. Time Period of the Study Was From 1378 to 1387 and Study Sample Consisted of 70 Companies. Results of the Study Indicate That There is a Significant Association Between Value _ Based Performance Measurement Metrics and Intellectual Capital in all Studied Companies _However, in This Study They Found that Eva (Economic Value Added) Model is Better Than Other Models to Fit Intellectual Capital Based on (AIC) Test. Also, This Association Has Been Studied and Confirmed in all Industries Except For Some. (MADHOUSHI and AMIRI, 1388) in a Study, Investigated the Measurement of Intellectual Capital and its Relationship With Firms' Financial Returns. The Study Period Was From 1380 to 1385. Pulic's Value a Added Coefficient is Used as Main Model For Measuring Intellectual Capital. Results of This Study Showed That There is a Positive and Significant relationship Between Intellectual Capital and Financial Returns, Intellectual Capital and Future Financial Returns, Intellectual Capital Growth Rate and Future Financial Returns Growth Rate.

***Study Models and Variables:**

Variables Investigated in This Study of Intellectual Capital Elements Efficiency Include Added Value of Physical Capital, Added Value of Human Capital, and Added Value of Structural Capital as Independent Variables and Stock Returns as Dependent Variable. Table (1) Shows the Variables For Separate Hypotheses. All Data Related to the Variables From Financial Statements of Companies Listed on Tehran Stock Exchange. Next, We Will Discuss Method of Measuring These Variables.

*Table(1): Independent and Dependent Variables of the Study

Hypotheses	Independent Variable	Dependent Variable
Hypothesis (1)	Value Added of Physical Capital	Stock Returns
Hypothesis(2)	Value Added of Human Capital	Stock Returns
Hypothesis (3)	Value Added of Structural Capital	Stock Returns

To Test the Study Hypotheses That Investigate the Relationship Between intellectual Capital elements and Stock Returns, the Model Introduced by PULIC (1998) is Used as: Follows:

$$SR_{it} = \alpha_i + \beta_1 VAPC_{it} + \beta_2 VAHC_{it} + \beta_3 VASC_{it} + \varepsilon_{it} \quad (1)$$

The Variables of This Model are Described as Follows:

*SR= (Dependent Variable) indicates Annual Stock return (ASR);

I* a_i = Intercept of the Model; ***=

*VAPC= (Independent Variable) Represents Value added of Physical Capital;

*VAHC=(Independent Variable) Represents Value Added of Human Capital;

*VASC= (Independent Variable) Indicates Value added of Structural

Capital; *E= Error Component of the Model.

In This Section The Way of Measuring Each of the Dependent and Independent Variables is Described as Follows:

A_ Stock Returns

In Holding Stocks For One Year, the Benefits INCLUDE Cash Dividends That are Paid During the Year, PLUS any Change in Market Price or Capital Gains at the End of the Year. To Measure it, Historical Data are Used and We Are Sure of its OCCURANCE. Stock Returns are Calculated as Follows (DASTGIR 1384; and DAVARZADAH, 1386)

$$Returns_t = \frac{p_{1+d}-p_0}{p_0} \quad (2), \text{Where:}$$

= Return per Share (I) in Year (T); p_1 = Share Price at the End of the $Returns_t$

Year (T); Share Price at the Beginning of the Year (T); D= Cash Dividends.

B_ Value Added of Physical Capital This Independent Variable Indicates Value Added Resulting From the Application of Tangible Physical Assets. That is, For One RIAL of Tangible Physical Assets, Several RIALS of Value Added is Gained. This Coefficient is Obtained From the Following Relation:

$$*PC = \text{Total Assets} - \text{Intangible assets} = \text{Tangible Assets} \quad (3)$$

$$*VAPC = VA/PC = \text{Value Added/ Tangible Physical Assets} \quad (4)$$

$$* \text{Value Added} = \text{Operating Profit} + \text{Payroll Costs} + \text{DEPRICIATION Costs} \quad (5)$$

C_ Value Added of Human Capital

Second Variable of the Study is Value Added of Human Capital This Variable indicates Value Added By Employees, Which is Obtained from Value Added DIRIVIDED By Payroll Costs, and it Means that For One RIAL of Payroll Costs Payable, Several RIALS of Value Added are Gained. This Variable is Obtained From Relation (6):

$$*VAHC = VA/HC = \text{Value Added / Human Costs} \quad (6)$$

D_ Value added of Structural Capital

This Variable Indicates Value Added Resulting From Existing Processes and Structures in the Firm. This Means That Several Percentage of the Firm's Value Added is Structural Capital. Structural Capital and Structural Capital Efficiency are Calculated By Relation (7)

*Structural Capital (SC)= Value Added _ Payroll Costs (7)

* VASC=SC/VA=Structural Capital/Value Added (8)

Therefore, Structural Capital Efficiency is

Calculated From the Sum of the Above Coefficients:

*Intellectual Capital = Structural Capital Efficiency + Human Capital Efficiency+ Physical Capital Efficiency.

* VAIC=VAFC+VAHC+VASC (9)

***Study Hypotheses**

As Stated, in This Study we Seek to Investigate the Impact of Intellectual Capital Elements Efficiency on Stock Returns. To Do So, the Following Hypotheses are Developed * First Hypothesis: There is a Significant Relationship Between Value Added of Physical Capital (AVPC) and Stock Returns.* Second Hypothesis: There is a Significant Relationship Between Value Added of Human Capital and Stock Returns.

*Third Hypothesis: There is a Significant Relationship Between Value Added of Structural Capital and Stock Returns.

***Statistical Population and Sample**

Statistical Population of This Study is Companies Listed on Tehran Stock Exchange for Five

Years, From 1385 to the End of 1389. Also, the Statistical Population Method: 1_ the Sample Should Not be Consisted of Companies, Investment Companies, and Insurance Companies 2 _ Sample Companies Should Have Financial Year ended By (Persian Date) ESFAND 29.

3_ the Accessibility of Data Required by the Study for the Companies.

By applying the Above Conditions, a Total of 60 Companies (Equivalent to 300 Years_ Company) Selected to Estimate Models and Test the Study Hypotheses.

*Results of the Study: Descriptive Statistics of the Study in This Study, First By Using Raw Data, The Values of the Study Variables Were Calculated and Then the Study's Descriptive Statistics Including Average, Median, Maximum, Minimum, and Standard Deviation of the Study Data Were Calculated and Presented in Table (2). The Values Only Present an Over View of the Distribution Status of the Study's Data.

Results Show that the Average (median) of Stock Returns, Value added of Physical Capital, Value Added of Human Capital, and Added Value of Structural Capital are(-0/1314), %455, %8498, %7678, 1/5030, 1/3064, %2643, %2345, Respectively.

Table(2): Descriptive Statistics of the Study Variables

Variables	Symbol	Average	Median	Max	Min	Standard Deviation
Stock Returns	SR	-/.1314	0.0455	8.8389	-13.6610	1.2628
Value Added of Physical Capital	VAPC	0.8498	0.7678	9.7235	0.0562	0.6737
Value Added of Human Capital	VAHC	1.5030	1.3064	10.7124	1.0189	0.8030
Value Added of Structural Capital	VASC	0.2643	0.2345	0.9067	0.0185	0.1691

*Source: Calculations By the Investigator *

* Hypothesis Analysis By Using Combined Data:

Testing to Identify Appropriate Model of Combined Data:

In This Study, the Number of Observations For Each Cross_ Section is 60 Observations (Number of Companies) and it Includes a Five _ Year Period.

In Other Words, the Relationships of the Study's Dependent and Independent Variables are Tested Among 60 Different Companies on One Hand, and During 1385 to 1389, on the Other Hand. So to Obtain Better Results, Combined Data Method is Used, and in Order to Estimate the Regression Methods, Data Associated With 60 Companies During a Five_ Year Period Were Combined, That Based on Which These Estimations Were Made. As We Mentioned in Chapter (3), in Applying Combined data, Various Models are Used for Hypothesis Testing. These Models Include Methods Such as Fixed Effect Model, Random Effect Model, and Pooled data Model. More, There are Various Tests to Determine a Model Type Appropriate to the Study data, Such as Shaw

Test, and Houseman Test. The Study Model Was Described in Chapter (3). To Investigate the Type of Model Testing in Cross_ Sections and Different Periods of Combined Data, (Chaw's) Bound (f) Was Used. If the Statistic (f) Resulting From the Test is Significant, the Null Hypothesis Will be Rejecting and Fixed Effect Model Will be Accepted. When the Statistic (f) is Not Significant, Pooled Data Method is Used For Hypothesis Testing. Results of Chaw Test are Presented in Table (3).

Table (3): Results of Chaw Test (Bound (f))

Model's Dependent Variable	Chaw Test Statistic	p-value
SR	2/3007	0/0688
$SR_{it} = \alpha_i + \beta_1 VAPC_{it} + \beta_2 VAHC_{it} + \beta_3 VASC_{it} + \epsilon_{it}$		

Source: Calculations BY the Investigator

As You See in Table (3), Results of Chaw Test Confirmed (HO) of the test That Intercept is the Same in all Periods, and Rejected the Null Hypothesis

Method of Pooled Data is a Better Choice For Estimating Test Models of the Study Hypotheses. According to This Method, all Data are Pooled (Integrated) and Estimated By Ordinary Least Square Regressions (OLS).

***Testing the Significance of the Study Model**

Results of Testing the Significance of the Study Model for the Years 1385_1389 are Described in the Form of Total Pooled Data Analysis in Table (4) As You See in This table, Statistic (f) is Significant at %99 Confidence Level. there Fore, Study Model is Generally Significant and Independent Variables are Able to Explain the Dependent Variable. In Addition, Adjusted Coefficient of Determination Resulting From

Model Testing is (0/3477). This figure Shows that About %35 of Changes in Dependent Variables_ in Other Words, Stock Returns Resulting From Existing independent Variables_ Existed in the Model and the Remained %65 of its Changes is Due to Other Factors. Statistic of DORBIN _ Watson Test is 2/2011. This Test is Used to Investigate Self_ Correlation of Errors. Its Optimal Value for Non_ Correlation is (2). if the Value of this Statistic is Between 1/5 to 2/5, then Self_ Correlation in Error Values of the model is Rejected. Given that the Value of DORBIN _ Watson Statistic is 2/2011, Self_ Correlation in Error Value of the model is rejected.

*Table (4): Results of Study model testing at pooled Data Level *

Description	Coefficient	t-static p-value	R-squared	Adjusted R-squared	F-static	p-value	D-W
Intercept	-0/2651	-1/3149 0/0895	0/3523	0/3477	6/2291	0/0000	2/2011
VAPC	0.0337	9.2993 0/000					
VAHC	0.1503	8.3835 0.0003					
VASC	0.0680	4.0942 0/0249					

***Source: Calculation by the Investigator**

Significance Testing of Coefficients is What a Researcher is Looking for. in Fact, This Determines the Significance of Coefficients, as Well as Direction of the Impact of Those Coefficients on Dependent Variable. The Associated Statistic the Significance of Coefficients is t_ Student Statistic. Results of the Study Hypothesis Testing are Described Separately as follows:

***First Hypothesis Testing**

First hypothesis Investigates the Relationship Between Value Added Of Physical Capital. Statistical hypotheses Associated With This Hypothesis are as Follows: *HO: There Isn't a Significant Relationship between Physical Capital and Stock returns. *h₂: there is a Significant Relationship Between Value Added of physical Capital and Stock Returns. In This Hypothesis, Stock Returns is a Dependent Variable, and Value Added of Physical is an Independent Variable. Considering the Results of Table (4), Results of the Study Model Testing and T_ Statistic Related to First Hypothesis Indicate That the Value of P_ Value Statistics For the Variable of First Hypothesis, That is Value Added of Physical Capital and its Significance Level, is 9.2993 and 0/0000 Respectively. Given That Error Level Taken For This Study is 0/05, Thus Variable ((Value, Added of Physical Capital Has a Significant Impact on Stock Returns, and First Hypothesis of the Study is Confirmed With %99 Confidence. Coefficient of First Independent Variables

is Positive. Thus, Type of Relationship Between Value Added of Physical Capital and Stock Returns is a DIRRECT One. in Other Words, as Value Added of Physical Capital Increases, Stock Returns Goes Up as Well. Results of Testing This Hypothesis Are Consistent With Those By Chen ET al (2005), Change (2007), Tan ET all (2007), MEHRABI, HEMATI, and RAHIMIAN (1390), ABBASI and SEDGHI (1389), and NAMAZI and EBRAHIMI (1388).

Second Hypothesis Testing

Second Hypothesis Investigates the Relationship Between Value Added of Human Capital and stock Returns. Statistical hypothesis Associated With This hypothesis are as Follows: *HO: There Isn't a Significant Relationship Between Value Added of Human Capital and Stock Returns.

h₁: There is a Significant Relationship Between Value Added of Human Capital and Stock Returns.

In This Hypothesis, Stock Return is a Dependent Variable, and Value Added of Human Capital is an Independent Variable. Based on Results of Table (4), the Values of (t) and (p) Statistics Related to Second Hypothesis_ That is, Value Added of Human Capital_ are 8/3853 and 0/0003 Respectively. Given That Error Level Taken For This Study is 0/05, So the Variable ((Value added of Human Capital)) as Well Has a Significant Impact on Stock Returns, and Second Hypothesis of the Study is Confirmed With %99 Confidence Level. Coefficient of Second Independent Variable is Also Positive. Results of This Hypothesis are Similar to those by Chen et al (2005),

Tan Et al (2007), MEHRABI, HEMATI, RAHIMIAN(1390), and NAMAZI and EBRAHIMI (1388). However, They are Not Consistent With Study Results By ABBASI and SEDGHI (1389).

*Third Hypothesis Testing

The Purpose of Third Hypothesis is to Investigate The Relationship Between Value Added of Structural Capital and Stock Returns.

Statistical Hypothesis Associated With This Hypothesis are as Follows:

*H₀: There is Not a Significant Relationship Between Value Added of Structural Capital and Stock Returns.

*h₁: there is a Significant relationship Between Value Added of Structural Capital and Stock Returns. In This Hypothesis, Stock Return is a Dependent Variable, and Value Added of Structural Capital is an Independent Variable. Based on RESULTS of Table (4), the Value of (t) and (p) Statistics Associated With Third Hypothesis, That is Value Added of Structural Capital, are 4/ 0943 and 0/0249, Respectively. Given That Error Level Taken for This Study is 0/05, So the Variable ((Value Added of Structural Capital)) Has a Significant Impact on Stock Returns. Thus, Third Hypothesis of the Study is as Well Confirmed With %99 Confidence Level. Given That Regression Coefficient Associated With Third Independent Variable is Positive, Thus the Type of Relationship Between Value Added of Structural Capital and Stock Returns is a Direct One. In Other Works, as Value Added of Structural Capital Increases, Stock Returns Goes Up as Well. Results of This Hypothesis are Consistent With Those By Chen Et al (2005), Tan Et al (2007), MEHRABI, HEMATI, and RAHIMIAN (1388). Considering the Results of the Study Model Testing, The Study Model Coefficients are as the Following Relation: $sr_{it} = -0/2651 + 0/0337 * VAPC_{it} + 0/0579 * VAHC_{it} + 0/0680 * VASC_{it} + \varepsilon_{it}$ According to the Above relation, if Firm's Value Added of Physical Capital Increased By One RIAL, SR (Stock Returns) Would Increase By 0/0337 RIALS on Average: on the Contrary, an Increase in Value Added of Human Capital and Value Added of Structural Capital Leads to an Increase of 0/0579 and 0/0680 RIALS in Stock Returns.

* Conclusion and Suggestions

In Order For Potential and Actual Investors to Determine Their Stocks, and INVESTMENT Value as Well as Deciding When to Sell or Buy Flow. To do so, They Use a Series of Historical Information.

In This Study, the Impact of Intellectual Capital Elements Was Tested Empirically. The Study hypothesis Were Investigated and Tested By Annual and Pooled Data Analysis Method Applying a Sample Consisted of 60 Companies Listed on Tehran Stock Exchange During 1385_ 1389. Results of Pooled Data of the Study Confirmed That Value Added of Physical Capital, Human Capital, and Structural Capital are Significantly Associated With Stock Returns of the Studied Compes.

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