

# How Can We Measure Stock Market Returns? An International Comparison

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## Abstract

The aim of our empirical work is to identify how we can measure stock returns. Stocks returns are approximated as the growth rate of market share price. We use two measures of stocks returns; return on assets, ROA, and return on equity, ROE. As a control variable, we use firm age. Our samples consists of 186 firms from United Kingdom and 186 firms from Ukraine studied over a period of 4 years from 2007 to 2010. To this end, we estimate three models. Using the data panels methodology, we conclude that return on equity approximates better socks returns for United kingdom and Ukraine. We could not however find evidence on a significant association between return on assets and stock returns.

**Keywords:** stock return, firm performance, return on assets, return on equity

## 1. Introduction

Many studies tried to identify the determinants of stocks market return (Saadet, Gülin and Gökçe, 2011; Xinyi, Dimitris and Peiming, 2012). In this paper we identify what explains better stock returns; return on assets, ROA, or return on equity, ROE. To this end we examined a sample of two countries; United Kingdom and Ukraine. The next section will expose some studies explaining firm performance. In Section 3, we present our sample, the tested models and our variables. Section 4 interprets the descriptive statistics and our empirical results. A sensitivity analysis of our results by sector is made in section 5. The last section exposes our interpretations.

## 2. The Literature Review

Like Barth (1994), Barth et al. (1995), Barth et al. (1996), Eccher et al. (1996), and Nelson (1996), the article of Dan, Subramanyam, Robert (1999) tried to test the factors explaining market returns. The authors tests whether the net incomes estimate future cash flows of a firm. Examining a sample of 11425 firms, the authors found that the net income reflect better firm performance.

Similar to Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1999), Staikouras and Wood (2004), Goddard, Molyneux, and Wilson (2004), Micco et al. (2007), PasiourasKosmidou (2007), and Flamini et al. (2009), Andreas and Gabrielle (2014) studied the factors explaining banks' profitability. As a measure of bank productivity, the authors use three ratios: return on average assets (ROAA), the return on average equity (ROAE) and the net interest margin (NIM). Examining a sample of 10 165 banks in 118 countries over a period of 15 years from 1998 to 2012, the authors conclude that the economic level of each country affects the factors explaining profitability of banks.

Like Athanasoglou, Brissimis& Delis (2008), Kosmidou (2008), Pervan, Pervan&Guadagnino (2010), and Kořak&Čok (2008),Marijuana, Klime and Sandra (2014) tested determinants of profitability of Macedonian banks. Using a sample of 16 banks for a period of 6 years from 2005 to 2010, the authors report that good management of banks means higher performance. Furthermore, liquidity risk and solvability risk affect profitability of banks.

## 3. Data and Methodology

### 3.1 Sample Selection

In order to properly study firm performance, measured by stocks market return, we examine a sample of 186 firms in United Kingdom and 186 in Ukraine over a period of 4 years from 2007 to 2010. Data were used from the « Amadeus » database.

### 3.2 Choice of Variables and Hypotheses

The dependent variables:

- Stock returns: similarly to work Dan et al (1999), we approximate firm performance by the return of the share prices.

The independent variables:

- Return on assets, ROA: we approximate firm performance by the ratio of return on assets identified as the ratio of net profit over total assets. Higher firm performance will increase shareholder wealth, and then, market return.

**Hypothesis 1:** return on assets, ROA, is positively related to stocks market return.

- Return on equity, ROE: Following the work Ben said (2014), we measure firm performance by the ratio of return on equity approximated as the ratio of net profit over shareholders equity. Higher firm performance will increase share price, and then, market return. **Hypothesis 2:** return on equity, ROE, is positively related to stocks market return.

- **Firm age:** as a control variable, we will consider, only, firm age. Firm age is estimated as the number of years between creation year and current year. Generally, older firms are more notoriety. Therefore, shareholders often try to buy more shares from older firms. we assume, then, a higher share price and an enhance in shareholder wealth and market return. **Hypothesis 3:** firm age positively affects market return.

Table 1. Variables and expected signs

Variables	Abbreviation	Formulation	Expected sign
Stock returns	return	growth rate of share price	Dependant variable
Firm performance	ROA	Net income / total assets	+
Firm performance	ROE	Net income / shareholder's equity	+
Firm age	age	Number of years	+

### 3.3 The Models

Following the methodology of Dan, Subramanyam and Robert (1999), we use the following models:

$$\text{Return}_{it} = \alpha_0 + \alpha_1 * \text{ROA}_{it} + \alpha_2 * \text{AGE}_{it} + \varepsilon_{it}$$

$$\text{Return}_{it} = \alpha_0 + \alpha_1 * \text{ROE}_{it} + \alpha_2 * \text{AGE}_{it} + \varepsilon_{it}$$

$$\text{Return}_{it} = \alpha_0 + \alpha_1 * \text{ROA}_{it} + \alpha_3 * \text{ROE}_{it} + \alpha_3 * \text{AGE}_{it} + \varepsilon_{it}$$

## 4. The Empirical Results

### 4.1 Descriptive Statistics

Our sample consists of 186 firms from Ukraine distributed operating in the following sectors: 9 firms from the service sector, 6 firms from the real estate sector, 47 firms from professional activities, 14 firms from mining and agriculture sector and 110 firms from the manufacturing sector. As for the sample of United Kingdom, it contains 186 firms operating in the following sectors: 65 firms from the service sector, 23 firms from the real estate activities, 29 firms from professional activities, 20 firms from mining and agriculture sector and 49 from the manufacturing firms. We can conclude that in United Kingdom, firms are distributed in the service sector and in Ukraine most corporations operate in the manufacturing sector.

Table 2. Distribution of our sample into activity sectors

	Service	Real estates activities	Professionals activities	Mining and agriculture	Manufacturing	Total
Ukraine	9	6	47	14	110	186 firms
UK	65	23	29	20	49	186 firms

Statistics (table 3) show that firms of United kingdom are more profitable than firms in Ukraine. The mean values are equal to 0,0586 and 0,158 for return on assets, ROA, and return on equity, ROE, respectively. However, we conclude to a higher value of return on market share price for firms in Ukraine. In fact, growth rate of share price is equal to 0,239. Furthermore, share price for firms in United kingdom increases, annually, by 12,7%. We conclude that firms in Ukraine are older then firms in United kingdom with a mean value of 51,309 years. The average age of firms in United kingdom is 34,903 years with a minimum of 1 year and a maximum of 125 years. Finally, profitability, estimated by return on assets and return on equity, market return and age for firms in Ukraine are riskier than United kingdom. Standard deviations are equal to 0,121, 0,2070, 3,832 and 37,106, respectively.

Table 3. Descriptive statistics

United King dom					
	OBS	MEAN	STD DEV	MIN	MAX
ROA	718	0,0586	0,0962	-0,785	0,649
ROE	669	0,158	0,205	-0,905	0,977
Return	524	0,127	1,00429	-0,990	14,427
AGE	728	34,903	34,699	1	125
Ukraine					
	OBS	MEAN	STD DEV	MIN	MAX
ROA	736	0,00559	0,121	-0,901	0,600
ROE	681	0,0386	0,270	-0,987	0,975
R	376	0,239	3,832	-0,991	57,836
AGE	736	51,309	37,106	2	161

#### 4.2 What Determines Firm Performance?

The results on the factors explaining market return are presented in table 4. As a dependant variable, we use market return calculated as growth rate of share price. Initially, we use, alternatively, as independent variables, return on assets, ROA, and return on equity, ROE. In the third model, we use these two independents variables. As a control variable, we use, only, firm age. The highest correlation coefficients equal to 15,24% for United kingdom and 5,23% for Ukraine. It seems that the independents variables of the third model explain better market return for United Kingdom and Ukraine. Across all specifications, we could not find affirmation on a positive association between profitability approximated by return on assets, ROA, and market return. All coefficients on this measure are not statistically significant. As for the effect of profitability measured by return on equity ratio the results are mixed. Our hypothesis 2 is checked, only, for Ukraine. Higher return on equity ratio leads to higher growth rate of share price. This result means that investors in Ukraine market try to buy shares of profitable firms. However, we conclude to a negative and a statistically significant effect of return on equity on market return for firms of United kingdom. This result indicates a decrease in share price for profitable firms in United kingdom. Finally, regarding firm age, we conclude to a positive and a statistically significant relationship, for all specifications, between firm age and market return. This findings means that older firms in United kingdom and Ukraine recorded an increase in their share prices.

Table 4. Determinants of stocks market returns

United King dom			
	Specification 1	Specification 2	Specification 3
	<b>Return</b>		
C	-14,550 <sup>***</sup>	-14,0654 <sup>***</sup>	-14,0485 <sup>***</sup>
ROA	0,0632		0,107
ROE		-1,00819 <sup>***</sup>	-1,0267 <sup>**</sup>
Age	0,404 <sup>***</sup>	0,386 <sup>***</sup>	0,385 <sup>***</sup>
OBS	524	485	485
R squared(%)	14,36	15,24	15,24
Prob> F	0	0	0
Ukraine			
	Specification 1	Specification 2	Specification 3
	<b>Return</b>		
C	38,490 <sup>***</sup>	40,412 <sup>***</sup>	-39,336 <sup>***</sup>
ROA	3,547		-5,618
ROE		2,176 <sup>*</sup>	3,818 <sup>*</sup>
Age	0,711 <sup>***</sup>	0,749 <sup>***</sup>	0,731 <sup>***</sup>
OBS	375	351	351
R squared(%)	3,55	4,85	5,23
Prob> F	0,0165	0,0058	0,0113

Note. \*, \*\*, \*\*\* : significance at 10%, 5% and 1% levels respectively.

### 5. Explaining Firm Performance and the Effect of Activity Sectors

We try to determine the effect of activity sectors on explaining stocks market return. We considered five activity sectors; the service sector, the real estate sector, the professional sector, agriculture and mining sector and the manufacturing sector. We tested third model.

Table 5. Role of activity sectors in explaining determinants of stocks market returns

United Kingdom					
	Service	Real estate	Professional	Agriculture mining	Manufacturing
	Return	Return	Return	Return	Return
C	-8,439**	-12,222**	-9,334***	-10,896*	-23,158***
ROA	-7,207*	9,202	-1,739	-8,0760	6,469***
ROE	0,0865	-5,282	0,608	2,408	-1,963***
Age	0,303**	0,317**	0,328***	0,390**	0,446***
OBS	160	62	70	53	140
R squared(%)	9,47	20,25	23,19	18,14	48,96
Prob> F	0,0194	0,0410	0,0120	0,0895	0
Ukraine					
	Service	Real estate	Professional	Agriculture mining	Manufacturing
	Return	Return	Return	Return	Return
C	0,990	9,864	-35,852*	-34,280***	35,609***
ROA	32,250	64,442	-23,490	-8,0974	1,585
ROE	-6,814	-17,915	21,517**	6,572*	-0,224
Age	-0,0320	-0,144	1,574*	0,685***	0,502***
OBS	5	10	102	30	204
R squared(%)	1,04	-42,61	14,47	49,52	23,84
Prob> F	0,6061	0,9549	0,0238	0,0076	0

Note. \*, \*\*, \*\*\*: significance at 10%, 5% and 1% levels respectively.

The highest correlation measures are equal to 48,96% for the manufacturing firms of United kingdom, and 49,52% for agriculture and mining firms of Ukraine (table 5). We could not find affirmation on a positive relationship between profitability, measured by return on assets, ROA, and stocks market return for firms of Ukraine. However, the results for United kingdom are mixed. We conclude to a negative and a statistically significant impact of profitability, measured by ROA, for the corporations belonging to service sector. Furthermore, our hypothesis is retained for the manufacturing firms of United kingdom. Regarding the variable return on equity ratio, ROE, we reported a positive and a statistically significant effect on stocks market return for firms of Ukraine operating in the professional activities and agriculture and mining. However, we found a negative relationship for the manufacturing firms of United kingdom. As of our control variable, our research hypothesis is retained for all specifications, except, for firms of Ukraine operating in the service and real estate sectors.

## 6. Conclusion

Many works attempted to highlight the determinants of firm performance. In our paper, we try to determine how we can measure firm performance. In fact, firm performance was approximated using growth rate of share price. As independent variables that highlight firm performance, we used two ratios; return on assets, ROA, and return on equity, ROE. As control variable, we used, only, firm age. The results report that profitability measured by return on assets does not explain firm performance in United kingdom and Ukraine. However, we concluded to a positive and a statistically significant relationship between return on equity and stocks market return for firms of Ukraine. This finding do not rejects our second hypothesis. Higher profitable firms in United kingdom, measured by return on equity, have lower market return. This result does not accept our second hypothesis. We found, also, a positive interdependence between firm age and stocks market return for United Kingdom and Ukraine. This finding do not rejects our third hypothesis. Finally, we studied the effect of activity sectors on explaining firm performance. The results highlight that our first hypothesis is retained for the manufacturing firms of United kingdom. Our second hypothesis is retained for professional activities and agriculture and mining sector. Finally, we could not find affirmation on a positive relationship between firm age and stocks market return for firms in Ukraine operating in the service and real estate sectors.

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