

A Test of the Value Relevance of Financial Indicators and Macroeconomic Factors to the
Performance of Chinese Stock Market

By
Xuerong. Zhou

A Research Project Submitted to
Saint Mary's University, Halifax, Nova Scotia
in Partial Fulfillment of the Requirements for
the Degree of Master of Finance

December, 2015, Halifax, Nova Scotia

Copyright Xuerong. Zhou, 2015

:

Approved: Dr. Collin Dodds
MFIN Director

Approved: Dr. Geroge Ye
Faculty Advisor

Date: December 4, 2015

A Test of Value Relevance of Financial Indicators and Macroeconomic Factors to the
Performance of Chinese Stock markets

by Xuerong.Zhou

Abstract

This paper firstly aims to investigate how certain essential financial indicators, such as P/E ratio, P/B ratio, earning per share (EPS), and book value per share (BVPS) are associated with the Chinese stocks' performance measured by abnormal return and price. I used two models (the P/E-P/B model and the Ohlson (1995) model) to estimate the relationship between abnormal returns and financial indicators, amidst which the first model uses the abnormal return as a dependent variable and the other uses the price as an explained variable. Secondly, the study of this paper will move from firm-specific factors to macroeconomic factors to discuss how Chinese stock prices have been affected by macroeconomic variables using a linear multi-variables model. For the analysis, five macroeconomic variables, namely the inflation rate, the M2 supply, the long-term interest rate, the exchange rate, and the expected GDP growth rate were taken into consideration. Regarding the contribution of this paper, it measures the value relevance of accounting information by testing the efficiency of the strategy that investors, with the expectation of earning abnormal return and beating the market, purchase undervalued stocks identified by low P/E and P/B ratios. Besides, this paper simultaneously considered firm specific information and macroeconomic variables and found out what kind of indicators (firm-specific indicators or macroeconomic indicators) are more influential on the performance of Chinese stock market, while previous studies solely focus on either decisive issues. Chinese investors, therefore, can get an insight from this research in whether firm-specific factors or macroeconomic factors are more reliable for decision- making.

December 4th, 2015

Table of Contents

Abstract	II
Table of Contents	III
List of Tables	IV
Chapter 1 Introduction	1
1.1 Purpose	1
1.2 Background	1
1.3 Data source	3
1.4 Contribution	3
1.5 Paper structure	4
Chapter 2 Literature review	5
2.1 Firm-specific factors	5
2.2 Macroeconomic factors	13
Chapter 3 Data and Methodology	16
3.1 Procedural Outline	16
3.2 Assumptions	18
3.3 Models	19
3.4 Hypothesis Testing	23
Chapter 4 Analysis and results	26
4.1 Data	26
4.2 Basic Performance	26
4.3 Empirical results for Topic 1	28
4.4 Empirical results for Topic 2	32
Chapter 5 Conclusions and Limitations	34
5.1 Conclusions	34
5.2 Limitations	35
References	38

List of Tables

Table 4.1 Descriptive statistics of variables for topic 1	26
Table 4.2 Descriptive statistics of variables for topic 2.....	27
Table 4.3 Descriptive statistics of variables for topic 2.....	29
Table 4.4 Results of regression for P/E-P/ Model for sample 1	29
Table 4.5 Results of regression for the Ohlson Model (1995).....	30
Table 4.6 Results of the Cochrane-Orcutt estimation for the linear multi-variables model	32

Chapter 1 Introduction

1.1 Purpose

This study seeks to test whether the firm-specific indicators (financial information) or macroeconomic factors are value relevant with the abnormal return of Chinese stocks, and whether the systematic risks (macroeconomic factors) have been playing a vital role in determining Chinese stock prices.

1.2 Background

The Chinese stock market is well known for its substantial volatility and high restriction in the floating of states owned enterprises (SOE), and is featured by the following five aspects. First, the Central Government has intervened with the Chinese stock market to a great extent. Second, Chinese stocks are organized into three sectors: 1) A-Shares, which are completely for domestic investors; 2) B-Shares, which are primarily for foreign investors, and 3) H-shares, which are for Hong Kong and foreign investors. Third, retail investors are dominating domestic stock markets in China, while institutional and professional investors are taking up a significant share of the trading of stocks. According to the Shanghai Stock Exchange Statistical Yearbook 2014, the trading volume generated by Chinese retail investors in 2014 was 82.24%. On the basis of the statistics from the Fed Reserve, however, there was only 39% of the market value of stocks that were held by American retail investors in 2012. In the UK, according to the Office for National Statistics, retail investors have taken up an even smaller percentage of the stock market by around 11% in 2012.

While professional investors consider financial indicators as a key source in making investment decisions, retail investors generally are viewed to build their trades on intuition

and conformity. Since Chinese stock markets are dominated by retail investors, whether the performance of stocks is relevant with underlying corporate financial reportings come across as an increasingly important concern. Although previous studies began with analyzing stock markets in developed countries such as the US and the UK, and have subsequently been extended to emerging regions and countries such as Africa and India, the research on Chinese stock markets, however, is limited so far. Therefore, it should be meaningful to analyze the value relevance of financial indicators to the performance of Chinese stock markets by using models developed in previous studies such as the Ohlson model (1995) and applying my own model (the P/E-P/B model) as well.

Furthermore, the performance of the Chinese stock market has probably been related to macroeconomic factors and this paper will investigate whether the relationship between the Chinese aggregate stock price measured by the index levels and several macroeconomic variables exists. In the first place, the observed drastic volatility in the Chinese aggregate stock price might mirror Chinese mercurial nationwide policies such as the M2 supply policy and the interest rate policy which determines the discount rate and the expected nominal cash inflows in the equity valuation models. In the second place, as Chinese economy has experienced a fast growth since the domestic reform and opening-up in 1978, Chinese stock markets have appealed to more and more investors. However, the development of the Chinese stock markets does not seem to be in line with the fast-growing economy. While the Indian expanding economy has contributed significantly to its stock market (Mishra *et al.*, 2012), the Chinese stock market has been developed by a much smaller degree as a result of its less sensitive relationship with certain financial indicators (Liu, and Shrestha, 2008). Hence, it will be valuable for this paper to investigate whether

the evolution of the Chinese real economy succeeds in booming up domestic stock markets. In the third place, it is known that the exchange rate directly affects exports and imports and a relatively stable exchange rate can fortify the certainty of the international trading and will benefit Chinese exporting trades. The Chinese Central Bank has adopted the Managed Floating Rate System since 2005 and the exchange rate, as a result, has slightly fluctuated in recent years. So how the Chinese exchange rate has determined the Chinese aggregate stock price containing the performance of imports or exports oriented companies will be researched in this paper. Finally, to reach the empirical results, a linear multi-variables model will be constructed and applied to test whether Chinese public concerns have affected the Chinese aggregate stock price and how it reacts to its macroeconomic determinants.

1.3 Data source

I will access all data from Bloomberg.

1.4 Contribution

1. This paper will extend the literature on analysis of Chinese stock market behaviors and help Chinese investors better understand which aspects they should focus on when making investment decisions: firm-specific factors or macroeconomic factors.
2. This paper introduces the P/E-P/B model to test whether undervalued stocks that are identified by low P/E and P/B ratios can provide investors with pleasant abnormal returns.
3. This paper simultaneously considers two kinds of decisive factors: firm-specific factors and macroeconomic factors, and figures out which one has been more

influential. Chinese investors therefore can gain an insight in whether firm-specific factors or macroeconomic factors are more reliable for decision-making.

1.5 Paper structure

The remainder of the paper is organized as follows. Chapter 2 reviews previous studies on value relevance of accounting information and the role of macroeconomic factors on worldwide stock markets. Section 3 discusses the data and methodology used in my paper. Section 4 analyzes the empirical result of my models. Finally, section 5 provides the conclusion and limitations of my investigation.

Chapter 2 Literature review

2.1 Firm-specific factors

Empirical research conducted in developed countries show that accounting information are significant factors in determining share prices. Put it another way, various studies show that both balance sheet (book value) and income statement (earnings) have significant impact on share prices.

2.1.1 Studies using the Ohlson (1995) model

Amidst a number of models used for analysis, the Ohlson model (1995) is an early and commonly used one. The Ohlson model (1995), contributed by Ohlson in the year of 1995, is a earning model of stock valuation and introduces an idea that the earnings reflected on the income statement and the net asset value reflected on the balance sheet can be considered as the indicators as priori of the firm value, and these accounting indicators will determine the market value of shares at the end of the day. I will illustrate various studies involving the Ohlson model (1995) in details as follow.

By using the Ohlson model (1995) and analyzing 115,154 American publicly traded companies during the period from 1953 to 1993, Collin *et al.* (1997) concluded that the value relevance of American accounting information has increased over past 40 years since the year of 1953. Furthermore, they found that book value appears to be more relevant in determining American share prices than so does earnings over time because the study shows that the incremental value-relevance of earnings has declined while the value-relevance of book value has played an increasingly important role for the observed period.

Bepari *et al.* (2012) found that in Australia, earnings and book value are jointly relevant in determining market value of companies, wherein earnings have a greater relative value relevance and incremental information content than does cash flow from operation.

Davalle *et al.* (2010) performed a study to analyze whether the more restrictive standard of financial reporting has contributed to higher quality corporate financial reports after the implementation of IFRS. They found that in Western Europe, the value relevance of accounting information has increased after countries set IFRS as the mandatory regulation for preparing consolidated financial statements. The result shows that Germany, France, and the UK have witnessed an increasing influence of earnings on share prices, but a decreasing impact of the book value on share prices in all analyzed countries except in the UK.

Apart from early and dedicated research on developed stock markets, an ever-increasing attention has recently been paid to emerging and less developed stock markets, such as Eastern South European, African, and Asian capital markets. I will illustrate them as below.

Ali and Hwang (2000) found that, compared to market-oriented countries which are dominated by developed countries, bank-oriented countries which are mostly composed of developing countries have witnessed a smaller association between the accounting information and stock returns. They attribute this phenomenon to the difference in ways to finance. In market-oriented countries, channels of raising capitals are diversified and are not constricted to bank lending. In bank-oriented financial, on the contrary, most of capital needs rely on banks which are supporting the operation of businesses after privately accessing and examining their indicators and information. Therefore, that the lion share of

capital lending through banks makes the demand for publicly known financial indicators by external investors little and less necessary. Besides, they found that the value relevance is even lower for countries where private sectors are not able to be involved in the standard setting process.

From the sample of 97 companies over the period from 2005 to 2010, Pervan and Bartulovic (2014) found that both earnings and book values are value relevant in South Eastern European countries. Specifically, the book value has a higher explanatory power in share prices than does the earning over time, implying that investors there have relied more on the balance sheet (book value) than on the income statement (earnings). However, opposite to the expectation that the more restricted regulation in financial reporting should lead the accounting information to be more determinative of stock prices after its widespread implementation, the explanatory power of both the book value and the earning for stock prices has, in reality, dwindled for the observed period there.

Asian capital markets have also been analyzed since the beginning of this century. For example, Chaudhry and Sam (2014) studied the value relevance of accounting information for Pakistan stocks and tested whether the popular hypothesis is authentic that the growth in KSE is only driven by the trade-based manipulation and is completely unrelated to fundamental information. By applying the Ohlson model (1995) and the Easton and Harris return model (1991) to the collected 100 firms listed in KSE over the period from 1999 to 2011 and, they rejected this commonly accepted hypothesis and consequently concluded that in Pakistan, accounting information such as the book value and the earning is an important determinant of stock prices. Furthermore, they also observed that companies with negative earnings and a reverse relationship between the size of companies and their stock

returns rely more on accounting information on balance sheet (book value) than on income statement (earnings) in terms of the value relevance of accounting indicators to the performance of stocks.

Liu and Liu (2007) studied the value relevance of accounting information for Chinese publicly traded firms in different segments individually based on the modified Ohlson model (1996). They drew a conclusion that the accounting information is related to prices in all the Chinese A-, B-, and H-shares markets. As expected, returns of B-shares and H-shares which are primarily traded by foreign and Hong Kong shareholders present a stronger association with the accounting information than do A-shares. However, AB and AH dual-listing stocks that are tradable by Hong Kong and foreign investors as well as domestic investors fail to realize a stronger association between reporting information and stock prices than single-listing stocks which are only accessed by Chinese investors. This finding is inconsistent with the expectation that Hong Kong and foreign investors refer more to financial information in bidding prices. Of many concerns, their study took the floating rate into consideration but found that the floating rate has no impact on the result.

2.1.2 Expansion of the Ohlson(1996) model

(1) Expansion in accounting information

Since Johnson and Soenen published their work on the analysis of American stocks in 2003, the investigation in the topic on the value relevance of financial indicators has expanded to include more accounting information, such as P/E ratio, firm size, and assets turnover

By collecting and using monthly data for 478 American companies covering the period of 1982-1998 and applying the binary logit model, Johnson and Soenen tried to

figure out factors that can distinguish successful companies from less successful companies. They defined successful companies as having better Sharpe ratios, Jensen's alphas, and economic value added (EVA) relative to total assets. They started with testing 10 possible factors, 4 of them chosen to be critical success factors: the total asset, the asset turnover, the cash conversion cycle, and the ratio of advertising expense to sales. They then arrived to the conclusion that American companies characterized by being large, profitable, efficient in managing working capital (measured by cash conversion cycle), and unique in performance (measured by advertising expense relative to sales) tend to outperform companies that fail to simultaneously possess those four advantages.

However, the Johnson and Soenen (2003) findings are not consistent with African stock markets. De Wet and Erasmus (2011) observed that drivers for American stock returns such as the company size, the profitability, the working capital management and the degree of company uniqueness become inefficiently in African stock markets where only corporate the economic value added (EVA) is value relevant with some financial indicators neither of which have determined all other factors of success at all. They hence concluded that it is essential to be cautious when applying models developed in other countries and it is necessary to conduct further studies to figure out drivers adapted for African stock markets.

In previous studies stated above, a number of scholars such as Collins *et al.* (1997) and Brown *et al.* (1998) used stock price as a dependent variable based on the assumption that the stock price reflects the fundamental value of securities with less noise than alternative measures (Ohlson, 1995). However, Dontoh *et al.* (2007) cast doubts to this assumption because they observed an increasing number of non-information based trades.

They performed a research to test whether the stock price well measures the value-relevance of earnings or not. They concluded that the information content of stock prices had declined over time and that stock prices no longer well reflected the future performance of companies. Since then, the stock return has been attached more importance to and started to serve as a dependent variable measuring the stock performance.

For instance, Martani and Khairurizka (2009) collected data of Indonesia 39 manufacturing companies listed on BEI over the period from 2001 to 2006, and then analyzed the relationship between the company stock return and the accounting information whose proxies are the net profit margin, the return on equity, the net working capitals, the capital structure, the asset turnover, the P/E ratio, the total assets, and the cash flow from operation. For analysis, two models were constructed and applied to test the relationship of the accounting information with the market adjusted return or the excess return. They found that based on the regression results, the net profit margin, the return on equity, and the P/E ratio affect stock returns in both models, while the asset turnover is only statistically significant in the first model. Furthermore, the empirical result tells that neither model is good at predicting Indonesian stock returns since R^2 in both models is less than 50%. Exogenous variables, therefore, must have greater power in explaining the movement of stock prices.

Apergis *et al.* (2012) performed a research on the correlation of book value of equity, earning per share, and total earning and P/E ratio with the cost of capital and the excess return of stocks of 330 US manufacturing companies from 1990 to 2009, respectively. With the methodology of panel cointegration which was first applied to the research in their paper, they observed that a high level of the book value of equity, the earning per share, the

total earnings, and the P/E ratio will help reduce the required cost by stakeholders and is thus beneficial in raising the stock excess return.

Moghaddam *et al.* (2014) found a linear positive relationship between stock returns and various factors such as the cash value added, the earnings, and the Tobin's Q during the period from 2005 to 2012, but did not find any impact of the free cash flow on stock returns.

(2) Expansion in dynamic changes in value relevance

Several previous studies observed that value relevance did not remain unchanged during financial crises and that the shift from earnings to book value or vice versa occurred. For example, Bepari *et al.* (2012) found that the value relevance of earnings increased while value relevance of CFO decreased during the global financial crisis which happened during 2008 to 2009, indicating that earnings has superiority in determining stock prices during the financial shock.

Beisland (2013) studied the Norway capital market during the 2008 financial crisis and found that book value can explain most of the variation in stock prices during the crisis when the response coefficient of the book value increased significantly. Moreover, the study suggests that it is necessary to analyze the value relevance of earnings and book values separately during crisis periods because the book value is the most highly relevant proxy of the liquidation value of companies while the earnings capture more information about the future profitability and capacity of companies.

Nevertheless, Ho *et al.* (2001) concluded that, opposite to the 2008 financial crisis when both Australian and Norway stock markets have experienced an increasing value relevance of earnings to the performance of the stock markets, the 1997 Asian financial

crisis witnessed the South Korean stock market to experience a decline in the value relevance of earnings to the performance of the stock market. During the crisis, the decrease in the value relevance of earnings, however, is not replaced by an increase in the value relevance of the book value of equity. The result remains unchanged even after factoring into the sharp depreciation in Korean currency occurred during the crisis period. However, the 2008 global financial shock led the cash flow from operation to be less informative while the 1997 Asian financial crisis resulted in an ever-increasing reliance on cash flow from operation in Korean companies because it was viewed as closer to company actual operation at that time.

Similar with the Korean capital market, the Thai capital market experienced a decrease in the value relevance of both earnings and book values during the Asian financial crisis. A study performed by Graham *et al.* (2000) suggests that, as a result of exchange rate up and down, the volatile amount of foreign exchange gain or loss derived from the initial realization of foreign exchange losses and the subsequent realization of foreign exchange gains contribute to reducing the value relevance of the accounting information.

(3) Expansion in including corporate governance into account

Corporate governance has over time been applied to mitigate conflict of interests between management and shareholders (Fama, and Jensen, 1983). Using financial accounting data from manufacturing firms in 16 countries for 1986-1995, Jensen and Meckling (1976) stated the importance of corporate governance on company stock prices. By running a linear regression of panel data of all non-financial companies listed on the Ghana Stock Exchange from 1997 to 2006, Fiador (2013) ascertained how the stock price of the Ghanaian stock market was affected by the corporate governance measured by the

percentage of external directors on the board, the total number of directors on the board, and whether CEO doubles as a board chair. In estimating, they also used interaction terms to capture the influence of corporate governance on the value relevance of earnings and book values. They found that the earnings and the book value are value relevant in determining the equity value and a good perception of the corporate governance helps motivate the bidding price for shares from buyers.

2.2 Macroeconomic factors

Besides the potential importance of accounting reports, previous studies keep showing that the aggregate stocks performance has always been affected by macroeconomic factors. This idea is derived from the capital market theory in which stocks in general will compensate investors for bearing systematic risks, while only securities affected by microeconomic risks will compensate investors for bearing non-diversifiable risks (Ross, 1976).

Nevertheless, different from the accounting information which serves as the direct source for investors to make judgment, macroeconomic factors are not easy to be figured out, because they firstly play an indirect role in affecting perception of future stocks performance, and secondly effects of their changes on individual stocks are not uniform and will cause an empirical aggregate result.

Since the accuracy in estimating the relationship between economic variables and the performance of stock-market will provide investors with an efficient reference in making effective investment decisions, it is necessary to identify which factors can best capture the systematic components and how those chosen factors affect the stock return variation (Mishra, and Harminder, 2012).

In previous studies, the appropriate number of variables as proxies of macro-economic riskiness differ from one study to another one. Trzcinka (1986) used only one factor, and Roll *et al.* (1980) and Kim *et al.* (1987) used 5 factors, while Korajczyk and Viallet (1989) used 15 factors, and Claire *et al.* (1994) used 18 factors. Moreover, the way to identify relevant macro-economic factors also varies: Aquino (2004) applied the structural equation modelling framework, while Liu and Liu (2008) and Fazli *et al.* (2014) just intuitively selected relevant factors, such as the interest rate, the exchange rate, and the industrial production.

Looking at the analysis in more detail, Mishra *et al.* (2012) used data from the Indian two major stock indices (Sensex and Nifty) over the period from November 1998 to July 2008. They found that the Industrial production (IP) and the amount of foreign investment inflow (FII) are positively correlated with the volatility in stock prices. Plus, when the interest rate goes beyond 6 per cent, the predicted value of the volatility will go up. When the inflation rate goes beyond 10 per cent, the stock return volatility will also suddenly go up. Moreover, the explanatory power of relevant macro-economic variables is higher for Sensex volatility than for Nifty, although Sensex and Nifty were highly correlated in terms of stock returns.

Under the background that the stock market capitalizing and the foreign direct investment (FDI) in emerging countries grew fast since 1990s, Gay (2008) investigated whether the exchange rate affecting the FDI and several oil price shocks have had impacts on stock markets in BRICK countries. The result of the time series regression of stock returns on the exchange rate and the oil price shocks does not show any meaningful relationship from 1999 to 2006, implying that the Chinese stock return is independent of

both the exchange rate and the oil price shocks. Similarly, a study performed to test whether the oil price shocks have influence on Chinese stock market by Cong *et al* (2008) shows an insignificant relationship between the oil price shocks and most of Chinese stocks except for those in manufacturing and oil industries.

Liu and Shrestha (2008) investigated the relationship between the Chinese stock markets and Chinese macroeconomic factors such as interest rate, exchange rate, and industrial production. By employing heteroscedastic cointegration analysis and running data from 1992 to 2001, they found that the industrial production is positively associated with Chinese stocks price, which is consistent with the findings in the Indian market. In addition, an increase in the monetary supply can boost up the Chinese stock price which, however, is negatively associated with the inflation rate, the interest rate, and the currency value.

Chapter 3 Data and Methodology

3.1 Procedural Outline

This paper has two topics, the first one is to investigate how Chinese financial indicators determine the Chinese stocks performance such as abnormal returns and prices. The second topic is to find out the extent to which certain macroeconomic variables, such as monetary policies, the exchange rate, and expected GDP growth rates contribute to the pattern of Chinese stocks price.

To fulfill the objective of this paper, the following steps will be followed:

1. Collect two samples of quarterly data of companies listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange. Sample 1 will represent stocks listed on the Shanghai Stock Exchange and Sample 2 will represent stocks listed on the Shenzhen Stock Exchange. The analysis of Sample 1 and Sample 2 will cover the whole population of Chinese stock markets. The data include closing prices, the P/E ratios, and P/B ratios and covers the past decade from April 31st, 2005 to March 31st, 2015. Regarding the size of samples, Sample 1 contains 762 companies and Sample 2 contains 421 companies. The pre-determined criterion for both samples is that companies have completely reported both earnings and book value of equity on the per share basis throughout the past decade.
2. Collect data of macroeconomic factors such as the inflation rate, the exchange rate, the M2 supply, the 5-years interest rate representing the long term interest rate, and the Bloomberg expected GDP growth rate. All data are on a quarterly basis and spans from January 31st, 2006 to December 31st, 2014.

3. Calculate P/E ratio and P/B ratio by dividing the closing share price of each firm by its quarterly earnings per share or quarterly book value per share, respectively. The closing price is snapshotted on the issue date of lastly reported earnings and book values.
4. Construct the PE-PB model and apply the Ohlson model (1995) to test the influence of financial indicators on the Chinese stock performance measured by the abnormal return and the price.
 - (1) The constructed model which is called the P/E-P/B model is to discuss whether investors can succeed in earning positive abnormal returns by purchasing undervalued stocks characterized of the low P/E ratio and the P/B ratios. Put it another way, if the P/B and P/E ratios are jointly significant in explaining abnormal returns, financial indicators reflecting the future performance of companies which are represented by the P/E ratio and the P/B ratio in the model will be viewed to have the value relevance to the performance of the Chinese stock markets.
 - (2) The applied Ohlson Model (1995) which is aimed to find how earning and book value determine the market value of Chinese stocks.
 - (3) Because panel data are used to estimate the models for the first topic, firm specific characters across time will be taken into account with the help of the fixed or random effect. The fixed effect assumes that firm-specific characters can be captured by the difference in the constant coefficient of each company, and the random effect assumes that varying features of companies perform as erratically as error terms. Therefore, to incorporate the fixed or the random effect in the analysis, *Hausman Test*, a methodology to choose between the fixed effect and the random effect, will be applied to determine the way as the firm-specific features are dealt with.

5. Set up the linear multi-variables model to test the sensitivity of Chinese stock prices to certain essential macroeconomic factors. I chose the SHNCOM Index level representing Shanghai Stock Exchange performance and the SHCOM Index level representing the Shenzhen Stock Exchange performance as dependent variables and five macroeconomic factors as independent variables: the inflation rate, the change in M2 supply, the exchange rate, the long term interest rate, and the Bloomberg expected GDP growth rate. All data are on a quarterly basis. Moreover, in order to improve the accuracy of the statistics inference, the *Cochrane-Orcutt* estimate was applied to remove the autocorrelation which is highly likely to exist in time series macroeconomic factors. The *Cochrane-Orcutt* estimate, usually applied to time serial data, is a methodology to obtain the estimated coefficients of the generalized least square (GLS) estimators for the purpose of minimizing the variance of results and of improving the accuracy the resulting statistics inference of the time series regression.

3.2 Assumptions

1. The past 10 years are considered long enough to capture features of the performance of the Chinese stock markets.
2. If Chinese shareholders are able to earn abnormal returns by investing into undervalued stocks identified as the low P/E and P/B ratios, the performance of Chinese stock markets will be concluded to be value relevant with the P/E and P/B ratios (forecasting financial indicators). Otherwise, the performance of Chinese stock markets will be considered independent of the P/E and P/B ratios, and the forecasting financial indicators are viewed to fail to efficiently play its role in instructing Chinese shareholders of the future performance of stocks.

2. On a yearly basis, the issue date of accounting information for Q1 is assumed to be on April 30st, the issue date of accounting information for Q2 is assumed to be on August 31st, the issue date of earnings per share for Q3 is assumed to be on October 31st, and the issue date of accounting information for Q4 is assumed to be on March 31st next year. In fact, investors keep buying and selling stocks frequently in order to earn abnormal return. However, due to the availability of data, the model associated with my first topic simply assume that investors buy and sell stocks exactly at the issue date.
3. The expected return which is used to calculate abnormal returns is the cost of equity component of the weighted average cost of capital in the equity valuation models developed by the Bloomberg.

3.3 Models

For the first topic, two models will be applied. One is to test the correlation between P/E and P/B ratio and stock price for each firm in the sample. Another model is the Ohlson Model (1995) which is to test the relationship between stock prices, the earning per share and the book value per share. For the second topic, a linear multi-variables model will be applied to estimate the value relevance of macroeconomic factors. I will unfold my discussion of these two topics one by one.

1. The first topic: value relevance of financial indicators

1.1 The logic behind models

When trading stocks, profit-oriented investors tend to look at some financial indicators to select appropriate stocks worth investing. Financial indicators are basically categorized into 2 types: 1) reflect the market *forecast* of one particular stock such as P/E ratio and P/B

ratios; 2) show companies *historical* operation and performance such as earnings per share and book value per share.

In the first place, in an efficient market, the share price should reflect a firm's future value creation potential whereas the earning per share reflects the corporate current profitability and the book value of equity reflects the accumulation of past share issues and past retained earnings. So when investors are optimistic about companies' future operation and financial performance, they will be willing to pay a relatively higher price for each unit of the profit or the book value of equities. As a result, the P/E ratio and the P/B ratio will be relatively higher than companies that are averagely or pessimistically anticipate. In this paper, the P/E-P/B model will be applied to test whether overvalued stocks identified as being with the low P/E and P/B ratio can positively contribute to earning abnormal returns over the expected return, and whether the commonly perceived statement that the important forecasting indicators, namely P/E and P/B ratios, fail to reasonably instruct Chinese shareholders of the future performance of stocks is true or not.

In the second place, the accounting information such as earnings and book value of equities plays an essential role in objectively and consistently telling the company historical operation and the financial performance, reliably helping investors anticipate the companies' future cash flows and estimate the present value. By applying the Ohlson Model (1995) which bridges the current stock market value with the lastly reported earnings and book values of equity, this paper will investigate how the accounting information, in reality, is relied on by Chinese investors in offering prices.

1.2 Models

1.2.1 The P/E-P/B model (Equation 3.1)

$$Abnormal\ Return_{it} = \alpha_0 + \beta_1 PE_{it} + \beta_2 PB_{it} + \varepsilon_{it} \dots \dots \dots 3.1$$

(1) This model is applied to the Sample 1 representing Shanghai Stock Exchange and the Sample 2 representing Shenzhen Stock Exchange individually.

(2) The abnormal return is the actual return over the expected return, i.e.

$$Abnormal\ Return_{it} = Actual\ Return - Expected\ Return$$

(3) PE_{it} = the closing share price of firm i divided by its quarterly earnings per share published at the issue date t.

(4) PB_{it} = the closing share price of firm i divided by its quarterly book value of equity per share published at the issue date t.

(5) ε_{it} = the error term

1.2.2 The Ohlson Model (1995) (Equation 3.2)

$$P_{it} = \alpha_0 + \beta_1 EPS_{it} + \beta_2 BVPS_{it} + \varepsilon_{it} \dots \dots \dots 3.2$$

(1) P_{it} = the closing share price of firm i at the time of t when quarterly earnings Per share and quarterly book value of equity Per share are issued.

(2) EPS_{it} = earnings per share of firm i known at time of t

(3) $BVPS_{it}$ = book value per share of firm i known at time of t

(4) ε_{it} = the error term

2. The second topic: value relevance of macroeconomic factors

2.1 The Logic behind my model

The pattern of Chinese stock prices has changed drastically and has seemed to be extremely sensitive to such government issues as monetary policies and interest rate adjustment. This paper will investigate the extent to which Chinese stocks prices have responded to certain macroeconomic factors.

The inflation rate determines prices through two opposite channels. On the one hand, an increase in the inflation rate will raise the nominal risk-free rate which is included in the discount rate in equity valuation models, therefore a reverse relationship between the inflation rate and the price is reasonably expected. On the other hand, a higher CPI impels Chinese citizens to fight against the inflation by transferring their wealth from banking deposits into higher-yields instruments such as stocks. For this reason, it is possible to expect a positive relationship between the inflation rate and the stock price (Liu, and Shrestha, 2008). On the whole, the effect of the exchange rate on the price of stocks is empirical.

Likewise, the exchange rate has double-edged effects on stock price: export-oriented companies benefit from currency depreciation which is, however, not favourable for import-reliant companies. Hence, there is no deterministic trend for the stock price when currency depreciates or appreciates.

Additionally, it is a heated debate whether monetary policy is neutral in economists' minds (Liu, and Shrestha, 2008). An increase in the M2 supply will raise the inflation rate and might decrease the present value of stocks through the same mechanism as how the inflation rate influences the stock price, but it will also probably push the present value of stocks up as a result that the incremental M2 supply can improve expected nominal cash inflows in the future.

However, a negative relationship between the long term interest rate and the stock price should be expected because: 1) an increasing interest rate will add burdens to companies with debts whose periodic repayment obligations will be augmented, and 2) a

higher interest rate will raise the equity return rate required by shareholders (Liu, and Shrestha, 2008).

At last, the aggregate stock price is ultimately determined by the real economy development be measured by the GDP growth rate. Therefore, a positive relationship between the stock price and the expected GDP growth rate is reasonably anticipated.

2.2 Model (Equation 3.3)

$$P_t = \alpha_0 + \beta_1 INF_{t-1} + \beta_2 EX_t + \beta_3 LN(M2_{t-1}) + \beta_4 LIR_t + \beta_5 GDPgrowth_t^e + \varepsilon_t \quad 3.3$$

(1) P_t = the closing price of SHNCOMP Index and SZCOMP Index at the time of t at the end of every month from January 2005 to December 2014.

(2) INF_{t-1} = inflation rate $t-1$. Because the inflation rate in the current month will not be known until the next month, I use the inflation rate one period before in determining the present price.

(3) EX_t = exchange rate $t-1$, the exchange rate is expressed in USD per unit of CNY.

(4) $\Delta M2_{t-1}$ = the percentage change in the M2 supply over one period. Because the change in the M2 supply in the current month will not be known until the next month, I use the percentage change in the M2 supply one period before in determining the present price.

(5) LIR_t = the long-term interest rate represented by the Canadian 5-years interest rate.

(6) $GDPgrowth_t^e$ = Bloomberg Expected GDP growth rate.

3.4 Hypothesis Testing

3.4.1 F-test

F statistics can test the effectiveness of the model by jointly testing whether the parameters are significantly different from zero.

Assuming two populations are normally distributed, we can use F-test to determine whether the null hypothesis should be rejected. The F statistics is as:

$$\frac{R^2/(K - 1)}{(1 - R^2)/(N - K)}$$

N = sample size

K = the number of parameters in the model

The prosper test procedure is:

$$H_o: \forall \beta_i = 0$$

$$H_A: \exists b_i \neq 0$$

The decision rule is that we reject H_o if F statistics is greater than + F critical value.

Rejection of the null means that the model we used is able to explain the dependent variable.

3.4.2 T test

T test can be applied to test the hypothesis that whether the slope coefficient is statistically significant.

$$t = \frac{b_i - \beta_i}{sb}$$

β_i = slope coefficient

b_i = point estimate of the sloP/E coefficient

sb = the standard error of the sample

The prosper test procedure is:

$$H_o: \beta_i = 0$$

$$H_A: b_i \neq 0$$

The decision rule is that we reject H_o if t statistics is greater than +t critical value or less than -t critical value.

Rejection of the null means that the slope coefficient is significantly different from zero and its associated independent variable plays an important role in determining the dependent variable.

Chapter 4 Analysis and results

4.1 Data

4.1.1 Data pre-determined criteria

- (1) For Sample 1 and Sample 2 determined for the first topic, the selected companies need to completely publish financial reports throughout the past 10 years from 2005 Q1 to 2014 Q4.
- (2) For the second topic on the value relevance of macroeconomic factors, the time length of samples spans 9 years from January 31st, 2006 to December 31st. Due to the data unavailability, the year of 2005 is not covered.
- (3) In all samples, prices for the analysis are adjusted to reflect spins-off, stocks split or consolidation, and stocks dividends.

4.1.2 Data process

Prices, EPS, BVPS, P/E ratio, and P/B ratios are winsorized at 5% level in order to keep outliers of data from influencing the analyzed result.

4.2 Basic Performance

Before going to the empirical analysis of this paper, this Chapter will present the descriptive statistics of each variable used in two models for my topic 1 in Table 4.1. Table 2 will present descriptive statistics of each variable used in the linear multi-variables model for Topic 2.

Table 4.1 Descriptive statistics of variables for Topic 1

Variable	Mean is (Sample 1)	Std. Dev (Sample 1)	Mean (Sample 2)	Std. Dev. (Sample 2)
Abnormal Return	0.01	0.2238	0.01	0.2223

P/E	232.28	501.27	199.79	438.58
P/B	4.41	4.18	3.99	2.97
Price	7.81	4.83	7.69	4.65
EPS	0.05	0.08	0.05	0.08
BVPS	2.42	1.48	2.38	1.40

Note: Abnormal Return = excess return over expected return;

Table 4.2 Descriptive statistics of variables for Topic 2

Variables	Mean	Std. Dev
SHNCOM Index	2236.532	747.43
SZCOM Index	966.87	288.74
Inflation rate	0.00	0.01
% Change in M2 supply	0.01	0.01
Exchange rate	0.15	0.01
Long term interest rate	0.07	0.01
Bloomberg Expected GDP growth rate	0.09	0.02

4.2.1 Description of Table 4.1

According to Table 4.1, the mean and standard deviation of the abnormal return over the anticipated rate of Sample 1 are as same as those for Sample 2, implying that investors should hold an indifferent attitude towards both stock exchanges in terms of a next quarterly realized abnormal return of stocks and how probably they will deviate from the anticipated level. Next, both P/E and P/B ratio for Sample 1 are larger than those for Sample 2, suggesting that medium-and-small-sized public corporates and technology companies

dominating Shenzhen Stock Exchange have lower P/E and P/B ratios than large and mature companies dominating Shanghai Stock Exchange. Such surprise might be derived from the fact that the percentage of the number of stocks in Sample 2 to the total number of stocks listed in Shenzhen Stock Exchange is so small (25%) that Sample 2 is not representative enough. This problem will be illustrated in details in the section of 3.5.3. In addition, earnings and book value of equity per share of both samples behave similarly in terms of mean and variation, indicating that neither profitability nor net asset size of publicly traded companies varies from one stock exchange to another one.

4.2.2 Description of Table 4.2

According to Table 2, the SHNCOMP Index has a larger standard error than does SZCOMP Index. However, regarding the coefficient of variation (CV) which is a standardized measure of dispersion of a sample, SHNCOMP Index obviously behaves more stably than does SZCOMP Index. The CV for SH Stock Exchange is 2.99, and the CV for SZ Stock Exchange is 3.35. Moreover, it is observed from the descriptive statistics that all of these five studied macroeconomic variables seem to stay stable because the dispersal is only around 1% over the past 10 years.

4.3 Empirical results for Topic 1

4.3.1 The P/E-P/B Model

Table 4.3 reports the result of the P/E-P/B Model, the t Stat columns provide t statistics, and the P-value columns give an insight that whether the parameter is statistically significant at different confidence levels. Besides, it is important to note that the *fixed effect* model is adopted for both Shanghai Stock Exchange and Shenzhen Stock Exchange suggested by the *Hausman* test.

Table 4.3 Descriptive statistics of variables for Topic 2

Variables	Abnormal return		
	Coefficients	t Stat	P value
Constant	0.06485***	26.88565	0.00000
P/E	-0.0000137***	-4.74238	0.00050
P/B	-0.01182***	-25.93958	0.00000
N	29173		
R ²	0.0257		
F-statistic	347.47		
Prob (F-statistic)	0.00000***		

Note: * significant 10% ** significant 5% *** significant 1%

Abnormal Return = excess return over expected return

Table 4.4 Results of regression for the P/E-P/B Model

Variables	Sample 1 SH Stock Exchange			Sample 2 SZ Stock Exchange		
	Coefficients	t Stat	P value	Coefficients	t Stat	P value
Constant	0.0648515***	26.89	0.000	0.1023039***	23.39	0.007
P/E	-0.0000137***	-4.74	0.000	-0.000014***	-2.68	0.000
P/B	-0.0118191***	-25.94	0.000	-0.0213474***	-22.49	0.000
N	29173			16013		
R ²	0.0257			0.0330		
F-statistic	374.47			265.64		

Prob(F-statistic)	0.00000***	0.00000***
-------------------	------------	------------

Note: * significant 10% ** significant 5% *** significant 1%

Abnormal Return = excess return over expected return

In Table 4.3 and 4.4, it is observed by the low R^2 that the P/E-P/B model is not good enough to explain the abnormal return. Chinese shareholders cannot solely rely on the strategy involving P/E ratios and P/B ratios when making investment decision to acquire excess return over the anticipated rate. Yet, the P/E ratio and the P/B ratio are jointly efficient in explaining abnormal returns for two stocks exchange based on the F test. Furthermore, the t test indicates that both P/E ratio and P/B ratio have played important roles in determining abnormal returns of Chinese stocks, wherein the negative signs of both the P/E ratio and the P/B ratio are consistent with our expectation that undervalued stocks assist in obtaining abnormal returns albeit in a small extent. Put it another way, the P/E ratio and the P/B ratio are value relevant for abnormal returns oriented shareholders, but the degree of such value is not obvious.

4.3.2 The Ohlson Model (1995)

Similarly, Table 4.5 reports the result of the Ohlson Model (1995) with the *fixed effect* for both stock exchanges.

Table 4.5 Results of regression for the Ohlson Model (1995)

Variables	Sample 1 SH Stock Exchange			Sample 2 SZ Stock Exchange		
	Coefficients	t Stat	P value	Coefficients	t Stat	P value
Constant	5.52075***	91.12	0.000	4.60005***	62.44	0.000
EPS	4.10966***	12.30	0.000	11.71917***	28.528	0.000

BVPS	0.88778***	35.97	0.000	33.58612***	33.59	0.000
N	29989			16494		
R^2	0.0601			0.1519		
F-statistic	934.57			1439.39		
Prob(F-statistic)	0.00000***			0.00000***		

Note: * significant 10% ** significant 5% *** significant 1%

On the one hand, it is shown by Table 4.5 that R^2 tells that returns of stocks listed in Shanghai Stock Exchange cannot be thoroughly explained by the Ohlson Model (1995) which, however, fits better into the Shenzhen Stock Exchange. On the other hand, what is observed in the Shanghai Stock Exchange is consistent with Shenzhen Stock Exchange: EPS and BVPS are jointly associated with stock prices, and both EPS and BVPS are significantly positive. Therefore, my empirical result is consistent with my expectation: the higher the EPS and BVPS are, the higher will be prices of stocks.

Besides, the price of stocks listed in the Shanghai Stock Exchange have relied more on EPS, while BVPS has weighed more in the Shenzhen Stock Exchange. Such difference might be attributed to the phenomenon that the dispersal of EPS in the Shanghai Stock Exchange is relatively smaller because while the dispersal of BVPS in Shenzhen Stock Exchange is relatively smaller. This observation can be caused by the fact that the SH Stock Exchange is dominated by large and mature companies with stable earnings, while SZ Stock Exchange is dominated by start-ups and technical companies with volatile profits. Therefore, it is reasonable to conclude that Chinese stocks investors have rationally referred

to such financial indicators as EPS and BVPS when offering prices providing the logic that the smaller the standard error of indicators, the more reliable they are viewed as.

4.4 Empirical results for Topic 2

Table 4.6 Results of the Cochrane-Orcutt estimation for the linear multi-variables model

Variables	SHNCOMP Index Level			SZNCOMP Index Level		
	Coefficients	t Stat	P value	Coefficients	t Stat	P value
INF	-3241.199	-0.92078	0.3596	796.8512	0.58673	0.55884
Ln(m2)	946.7343**	2.43412	0.0169	322.3873**	1.99293	0.04926
EX	-70512.5**	-2.55757	0.0122	-20881.42*	-1.80119	0.07498
LIR	31925.24**	2.06505	0.0418	7271.959	1.18430	0.23938
GDPgrowth _t ^e	2305.951	0.56448	0.5738	1279.369	0.80527	0.42276
N	96			96		
R ²	0.4776			0.4039		
F-statistic	16.64			12.33		
Prob(F-statistic)	0.00000***			0.00000***		

Note: * significant 10% ** significant 5% *** significant 1%

INF = Inflation rate, Ln (m2) = Ln (M2 supply), EX = Exchange rate, LIR = Long term interest rate, GDPgrowth_t^e = Bloomberg expected GDP growth rate

Table 4.6 tells that both the SHNCOMP Index and the SZCOMP Index are insensitive to the inflation rate and the Bloomberg expected GDP growth rate. So the inflation rate has not been considered into decisions making by Chinese stock investors even if it is decisive of stock price in terms of both the discount rate and the amount of money that is willing to

be ejected into stock markets as a higher inflation rate encourages investors to trade in stock markets where a higher return can be expected than anywhere else. Besides, the result of the independence of index level on the prospect of Chinese GDP shows that Chinese stock markets have been isolated from its real economy and the way that the Chinese real economy influences stock markets is not deterministic.

Additionally, the empirical result that the slope coefficient of the long-run interest rate is positive for SHNCOMP Index is different from the expectation that a significantly negative relationship should come out. This might be explained by that a higher interest rate will make long term fixed income instruments more attractive and will consequently lower the demand and the price for domestic stocks.

Finally, both changes in the M2 supply and the exchange rate have a positive relationship between two indexes levels, which is as same as the findings of Liu and Shrestha (2008).

Chapter 5 Conclusions and Limitations

5.1 Conclusions

5.1.1 The value relevance of financial indicators

From the empirical results, it is observed that financial indicators are relevant with the performance of stocks listed on both stock exchanges, wherein P/E ratio and P/B ratio are negatively associated with stocks abnormal returns, and EPS and BVPS are positively associated with their stocks prices.

However, compared to the P/E-P/B model, the Ohlson Model (1995) gives a more completed story of the performance of Chinese stocks compared to the P/E-P/B model. Firstly, while the P/E-P/B model is indifferent to Shanghai Stock Exchange and Shenzhen Stock Exchange in terms of R^2 , the Ohlson Model (1995) fits better into stocks listed in Shenzhen Stock Exchange than those listed in Shanghai Stock Exchange. Chinese investors, therefore, have relied more on earning per share and book value per share in Shenzhen Stock Exchange than in Shanghai Stock Exchange. It is inconsistent with my expectation that for Chinese investors, financial information of large and mature companies dominating Shanghai Stock Exchange is more reliable than small, private-owned corporates, and technology companies dominating Shenzhen Stock Exchange. One possible reason is that a number of large and mature companies listed in Shanghai Stock Exchange are state-owned, and their financial reports are, hence, attached less value than national plans and policies of which they are viewed to be heavily dependent of. Generally speaking, alternative information other than accounting information should be viewed more valuable when Chinese investors trade in large and mature companies, while firm-specific financial

indicators have played a more important role in determining the market price for small, private-owned, and technical companies.

Secondly, the estimate of the Ohlson model (1995) tells that, compared to Shenzhen Stock Exchange, Shanghai Stock Exchange has a larger response coefficient of EPS which is involved with a smaller variation, while a totally different story presents when it comes to BVPS.

Finally, Since the fitness (measured by R^2) of both models is very small, there should exist other factors apart from these studied indicators which jointly take a far more important role in determining the historical performance of stocks.

5.1.2 The value relevance of macroeconomic factors

All the M2 supply changes and the exchange rate have shed light on the change of index level for both stock exchanges, while the long term interest rate is only related to Shanghai Stock Exchange. Yet, the inflation rate and the Bloomberg expected GDP growth rate are not value relevant at with stock markets at all over time.

5.1.3 Conclusion for Topic 1 and 2

Comparing to two models involving firm-specific information such as P/E and P/B ratios, much better the linear multi-variables model involving macroeconomic variables explain the change in stock prices where its R^2 is nearly 50% in all stock exchanges even after the problem of autocorrelation has been gotten rid of. This finding is consistent with my expectation that Chinese stocks generally tend to be far more sensitive to public issues and policies than to accounting information.

5.2 Limitations

In the last part of my paper, it is worth noting that there are several limitations that are expected to be tackled by other research.

- (1) The assumption of the P/E-P/B model is over simplified. Chinese investors expect to earn abnormal return by investing in undervalued stocks for both the long and short perspective. However, in fact, investors can enter the stock market anytime and realize abnormal returns by selling stocks whenever they want. Nevertheless, my P/E-P/B model simply assumes the holding period is the time between two quarterly reports go public. That is, investors are assumed to purchase undervalued stocks which are identified by low P/E and P/B ratio exactly when the reports are released, and sell them exactly when next reports are published. Such simplification deviates from the reality where investors trade stocks flexibly instead of behaving as a Swiss clock.
- (2) It should have been more meaningful if my P/E-P/B model took corporate governance into account which reflects both creditability of accounting reports and the prospect of company efficiency and profitability. Moreover, the analysis of corporate governance becomes increasing heated nowadays when Jensen and Meckling (1976) and Fiodar (2013) discussed the importance of corporate governance on company stock price. Unfortunately, my paper fails to consider measures of corporate governance because certain key data such as the size of the board of directors and the number of external auditors are not accessible.
- (3) For the Topic 1, Sample 2 might not be wise to represent stocks listed in Shenzhen Stock Exchange. As everyone knows, Shenzhen Stock Exchange are dominated by starts-up and non-large sized companies, so most companies there have not been

listed there for a long time. Because it is for the long-run that my first topic focuses on, only companies that have completely reported financial statements throughout the past 10 years were selected in Sample 2 and hence bring a problem of the unrepresentativeness by only taking up around 25% of the whole population of stocks listed in Shenzhen Stock Exchange.

References

- Ali, A., & Hwang, L. S. (2000). Country-Specific Factors related to financial reporting and value relevance of accounting data. *Journal of Accounting Research*, 38, 1-21.
- Apergis, N., & Artikis, G., & Eleftheriou, S., & Sorros, J. (2012). Accounting information and excess stock returns: the role of the cost of capital – new evidence from US firm-level data. *Applied Financial Economics*, 22, 321-329.
- I, R. Q. (2004). A multifactor model of Philippine stock returns using latent macro risk factors. *Applied Economic Letters*, 11, 961-968.
- Beisland, L. F. (2013). The value relevance of accounting information during the global financial crisis: evidence from Norway. *Inderscience Journals*, 4, 249-263.
- Bepari, M. K., & Rahman, S. F., & Mollik, A. T. (2012). Value relevance of earnings and cash flows during the global financial crisis. *Review of Accounting and Finance*, 12, 226-251.
- Brown, S., & Lo, K., & Lys, T. (1999). Use of R² in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting and Economics*, 28, 83-115.
- Chaudhry, M. I., & Sam, A. G. (2014). The information content of accounting earnings, book values, losses and firm size vis-à-vis stocks: empirical evidence from an emerging stock market. *Applied Financial Economics*, 24(23), 1515-1527.
- Collins, D.W. & Maydew, E. L., & Weiss I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics*, 24, 39-67.

Cong, R. G. & Wei, Y. M. & Jiao, J. L. & Fan, Y. (2008). Relationship between oil price shocks and stock market: An empirical analysis from China. *Energy Policy*, 36, 3544-3553.

De Wet, J. H. Vh., & Erasmus, Y. (2011). Indicators of corporate financial success: similar studies in South Africa and the USA, different results. *African Electronic Journals*, 11, 147-170.

Devalle, A., & Onali, E., & Mgarini, R. (2010). Assessing the value relevance of accounting data after the introduction of IFRS in Europe. *Journal of International Financial Management and Accounting*, 21:2, 85-119.

Dontoh, A., & Radhakrishnan, S., & Ronen, J. (2007). Is stock price a good measure for assessing value-relevance of earnings? An empirical test. Springer-Verlag, 1, 3-45.

Easton, P. D., & Harris, T. S. (1991). Earnings as an explanatory variables for returns. *Journal of Accounting Research*, 29, 19-36.

Fama, E., Jensen. M. C. (1983). Agency problems and residual claims. *J. Law and Economics*, 26, 325-344.

Fazli, S., & Shlan, S. S., & Radsar, S., & Radsar, M. (2014). An investigation on the relationship between arbitrage and macroeconomic factors: A case study of Tehran Stock. *Directory of OP/En Access Journals (DOAJ)*, 4, 635-640.

Feltham, G. A., Ohlson, J. A. (1996). Uncertainty resolution and the theory of depreciation measurement *Journal of Accounting Research*, 34(2), 209-234.

Feltham, G.A., & Ohlson, J. A. (1995). Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research*, 11, 689-731.

- Fiador, V. O. (2013). Corporate governance and value relevance of financial information: evidence from the Ghana Stock Exchange. *The International Journal of Business in Society*, 13, 208-217.
- Gay, R.D. (2008). Effect of macroeconomic variables on stock market returns for four emerging economies: Brazil, Russia, India and China. *International Business and Economics Research Journal*, 7(3), 1–8.
- Graham, R., & King, R., & Bailes, J. (2000). The value relevance of accounting information during a financial crisis: Thailand and the 1997 decline in the value of Baht. *Journal of International Financial Management and Accounting*, 11:2, 84-107.
- Ho, L. C. J., & Liu, C. S. Sohn, P. S. (2001). The value relevance of accounting information around the 1997 Asian financial crisis—the case of South Korea. *Asia-Pacific Journal of Accounting & Economics*, 8(2), 83-107.
- Jensen, M.C., & Meckling, W.H. (1976). Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics*, 3, 305-360.
- Johnson, R., & Soenen, L. (2003). Indicators of successful companies. *European Management Journal*, 21, 364-369.
- Korajczyk, R.A. and Viallet, C.J. (1989). An empirical investigation of the international asset pricing. *Review of Financial Studies*, 2, 55.
- Liu, J. W., & liu, C. J. (2007). Value relevance of accounting information in different stock market segments: the case of Chinese A-, B-, and H-Shares. *Journal of International Accounting Research*, 6, 55-81.

- Liu, M. H., & Shrestha, K. M. (2008). Analysis of the long-term relationship between macroeconomic variables and the Chinese stock market using heteroscedastic cointegration. *Managerial Finance*, 34, 744-755.
- Martani, D., & Khairurizka, R. (2009). The effect of financial ratios, firm size, and cash flow from operating activities in the interim report to the stock return. *Chinese Business Review*, 8, 44-55.
- Mishra, S., & Singh, H. (2012). Do macro-economic variables explain stock-market returns? Evidence using a semi-parametric approach. *Journal of Asset Management*, 13, 115-127.
- Moghaddam, S. S., & Talebbeydokhti, A. (2014). A study on relationship between the information of cash value added and return of stocks: an empirical investigation on accounting profit, free cash flow and Tobin's Q. *Management Science Letter*, 4, 117-122.
- Pervan, I., & Bartulović, M. (2014). Value relevance of accounting information: evidence from South Eastern European countries. *Economic Research*, 27:1, 181-190.
- Roll, R. and Ross, S.A. (1980). An empirical investigation of the arbitrage pricing theory. *Journal of Finance*, 35, 1073-1103.
- Ross, S.A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory* 13, 341-360.
- Ross, S.A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory*, 13, 341-360.
- Trzcinka, C. (1986). On the number of factors in the arbitrage pricing model. *Journal of Finance*, 4, 347-368.