An Empirical Analysis of the Determinants of the P/E Ratio A Case Study of China's Media Industry

Hanxin Zhang

School of Business, University of the Thai Chamber of Commerce
126/1 Vibhavadi Rangsit Rd., Dindang, Bangkok 10400, Thailand
a416147266@gmail.com

Abstract

Purpose: The purpose of this study is to research what aspects of firm fundamentals and macroeconomic factors should be considered when investors use the price-earnings ratio (P/E ratio) indicator to invest in the media industry in China's stock market, and to analyze the seven variables that affect the P/E ratio and its degree of influence on the media industry and its three media sub-sectors.

Design/methodology/approach: The paper examines the determinants of the price-earnings ratio by applying three parts: statistical descriptions, correlation and regression model, which includes the price-earnings ratio and impact factors from the whole media industry and sub-sectors in perspective. Then, the researcher will test the model by sampling 2000-2015 data in order to get a more reasonable and effective regression model. The paper will use the statistically significant level of 0.10.

Findings: Using quarterly data of China A-DS media, China A-DS media agencies, China A-DS publishing and China A-DS broadcast & entertainment over the period of 2000-2015, the current paper produces new empirical evidence that dividend yield, P/B ratio, ROE and D/E ratio significantly affects the price-earnings ratio in the whole industry. This result is robust with the inclusion of several control variables that have been documented to explain the price-earnings ratio.

Practical implications: The findings have significant implications for investors, corporations and the market. It can guide investors' investment behavior and assist companies to make economic decisions. Furthermore, investors can identify market risk and grasp the investment opportunities depending upon the analysis of the overall market price earnings ratio.

Originality/value: This paper fills in the gap of the study of the price-earnings ratio in China's media industry. The analytical framework of the current paper is differentiated from the conventional analysis in which the determinants consist of sentiment factor which belongs to a part of behavioral finance.

Paper type: Research paper

Introduction

Due to its intuitive appeal and practical simplicity, the price-earnings (P/E) ratio has long been considered as one of the most frequently used measures of stock valuation. The price-earnings ratio was presented by Benjamin Graham and David Dodd (1934); and then Nicolson (1960) finds companies always own higher returns with low P/E ratio. A large number of studies on the determinants of the price-earnings ratio focus on whether the variations of the price-earnings ratio can be explained by macroeconomic factors and firm fundamentals such as risk-free interest rate, inflation, equity risk premium, firm size, leverage ratio, dividend payout ratio, earnings growth, and price volatility (e.g., Anderson and Brooks, 2006; Chen, et al., 2015; Cho, 1994; Chua et al., 2015; Houmes and Chira, 2015; Jitmaneeroj, 2015; Kane et al., 1996; Ramcharran, 2002; Reilly et al., 1983; White, 2000). However, this paper will select dividend yield，P/B ratio，market capitalization，return on equity，sentiment, debt to equity and interest rates as independent variables according to Dividend Discount Model (John Burr Williams, 1938), Gordon Model (Gordon, 1962) and Net Present Value of Growth Opportunity Model.

China's media industry is a typical sunrise industry and its future market space is considerable. The report which is named "2015--2020 China's Media Industry Strategic Planning Market Outlook and Investment Analysis" pointed out that China's media industry output was valued at 1.13618 trillion Yuan and the growth rate remained at a

high level of 15.8% in the whole year of 2014. From the point of view of the stock market, the media industry index has increased from 850 (Jan 03 2013) to 5500 (Nov 22 2015), and annual growth rate has been as high as 274%. (source: Shanghai and Shenzhen "A Share Market" 2015). It is more incredible that the growth rate reached 3.5 times in only 5 months from Jan 15 2015 to Jun 11 2015. The number of media companies grew from about 30 to 57 companies and P/E ratio of the industry grew at a multiple of over 3 times during the three years (2013-2015). Therefore, the media industry is very attractive to investors as a channel of investment and to companies as a source of raising capital.

The Chinese stock market has developed very rapidly in the past twenty years. Investors that increased the stock market online often have much experience and understanding of the stock market, but there is little authoritative technical analysis. Investors realized that purchasing stocks according to their own feelings is not reliable; they are more willing to believe various indicators like the price-earnings ratio to make investment choices. However, not only do macro environmental factors have a significant impact on company performance, but also many types of financial ratios affect the stock price and future earnings. Therefore, the objective of this study is to examine what variables affect the price-earnings ratio and its positive or negative correlation. Therefore, the objective of this study is to examine what variables affect the price-earnings ratio and its positive or negative correlation. The findings will be beneficial to investors who are interested in investing in the media industry in China's stock market.

Literature review

In order to more clearly understand each variable discovery process and mutual relationship, the core three basic theories were first presented.

Theoretical analysis

John Burr Williams (1938) first proposes the dividend discount model in his book "Theory of Investment Value". The main view of the book is that the intrinsic value of the stock should equal the discounted value of the expected dividends; therefore, it is valid to use the DDM as shown in equation (1) to measure the current value of the stock. Assuming that markets are efficient, stock prices should be in equal shares in the value.

$$V = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \cdots + \frac{D_t}{(1+R)^t} + \frac{P_t}{(1+R)^t} \qquad (1)$$

Where V is the intrinsic value of the stock, P is the price of selling shares, D is the dividend payment, t is the year distribution of dividend dividends, and R is the discount rate, the equation (1) only focuses on dividends and ignores another motivation, which is named capital gains, so Gordon (1962) simplifies some assumptions to solve the problem and put forward a fixed dividend growth model which consist of the fixed g ratio stable growth, as follows:

$$D_t = D_0(1+g)^t$$

$$\begin{aligned} P_0 &= \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \cdots + \frac{D_n}{(1+R)^n} \\ &= \frac{D_0(1+g)}{(1+R)^1} + \frac{D_0(1+g)^2}{(1+R)^2} + \frac{D_0(1+g)^3}{(1+R)^3} + \cdots \frac{D_0(1+g)^n}{(1+R)^n} \\ &= \sum_{t=1}^{\infty} \frac{D_0(1+g)^t}{(1+R)^t} \end{aligned} \qquad (2)$$

In this step, we will consider a factor k which is the return on investment (ROI) and k>g, the conclusion is:

$$P_0 = \frac{D_0(1+g)}{k-g} = \frac{D_1}{k-g}$$

$$\frac{P_0}{E_1} = \frac{D_1/E_1}{k-g} = \frac{b}{k-g} \qquad (3)$$

In the (3) equation, P is the buying stock prices; E1 is the earnings per share in the first years after purchasing the stock. Thus, the theoretical calculation model of P/E ratio is derived. After that, we assume that they have the same return between new investment projects and the previous investment projects. That means return on equity (ROE) can be used to estimate the rate of return on retained earnings.

$$\frac{P_0}{E_1} = \frac{b}{k-g} = \frac{b}{k-r(1-b)} = \frac{b}{k-ROE(1-b)} \quad (4)$$

According to the capital asset pricing model (CAPM), the average yield of the stock market should equal the risk-free return plus a risk premium market. In the absence of any risk situation, the required return will be equivalent to the market interest rate. In general, one-year interest rates of the bank will be considered as the market average yield level.

$$k = R_f + \beta(\overline{R_m} - R_f) \quad (5)$$

Where R_f is risk-free return rate, $\overline{R_m}$ is the expected return on the market portfolio, $(\overline{R_m} - R_f)$ is the risk premium and β is the Beta coefficient, combined with equations (3) (4) (5), the final formula will be intuitive, as shown below:

$$\frac{P_0}{E_1} = \frac{b}{R_f + \beta(\overline{R_m} - R_f) - (1-b) \times ROE} \quad (6)$$

NPVGO refers to the per share growth opportunities of the net present value. Firer, C (1993) studied basic theories and deduced other models through easing assumptions, such as supposing a company's dividend stability, with all earnings are paid to investors, to consider a series of growth opportunities.

$$\frac{P_0}{E_1} = \frac{1}{R} + \frac{NPVGO}{E_1} \qquad (7)$$

Combining the above derivation and analysis, the relationship diagram of the main factors that impact the price-earnings ratio is as follows：
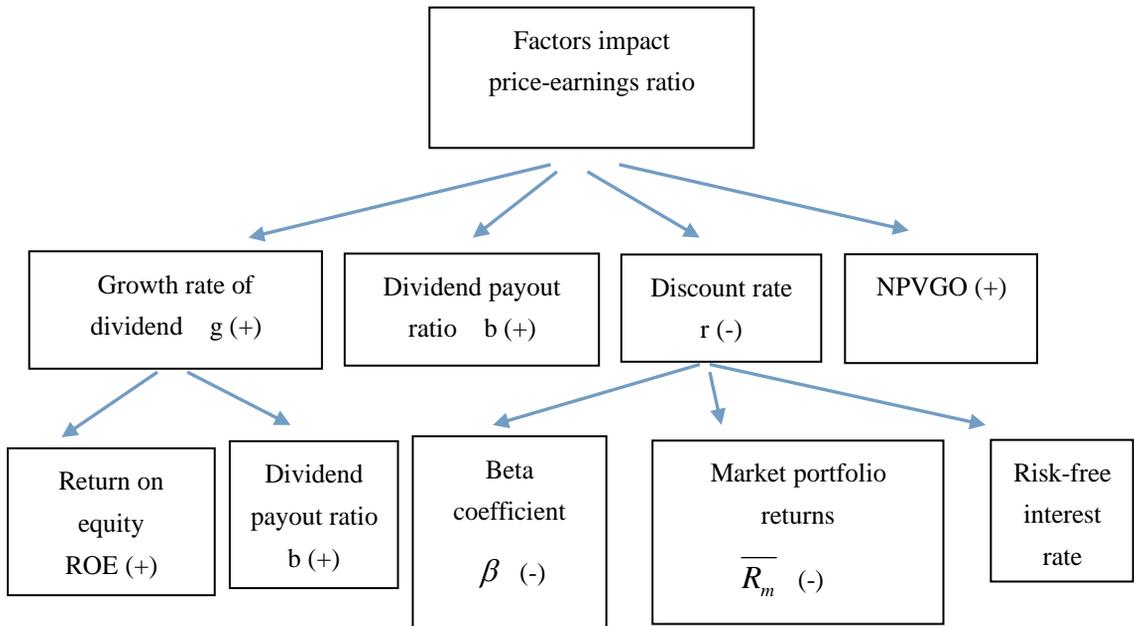

Figure 1

Literature review

There are many research papers worldwide studying the related factors influencing the price-earnings ratio. Earlier research like Nicholson, F.S. (1960) and Basu, D. (1977) focus on the relationship between price-earnings ratio and stock returns. Moreover, Yao Hui (1998), Song Jianfeng (2000) and Yan Qin (2002) who analyze the relationship between price-earnings ratio and other index variables from the empirical point of view or quantitative analysis on the distribution of price-earnings ratio in the stock market by Wu Mingli (2001) and Chen Zhanfeng (2002). However, researches of different time periods, different markets, different industries and different groups will lead to constant improvement of the theory and research methods. For example, Basu (1977) carried out his work and analysis on a sample of 500 firms during the period

1957 to 1971. He discovered that comparatively the stocks with the low price-earnings ratios earned higher returns on a risk-adjusted basis because the prices of stocks may not necessarily exhibit efficient market hypothesis. By comparison with the median price-earnings ratio for each portfolio in the period of study, Beaver and Morse (1978) find that stocks with relatively low earnings growth had a tendency to keep a relatively low price-earnings ratio.

Additionally, there are some studies in the US market. For instance, Whibeck and Kisor (1963) are the earliest American scholars to use regression analysis to calculate 135 elements of stock data which were provided by Bank of New York. They are of the opinion that there are three factors which impact P/E ratio, including dividend payout ratio and the per share earnings and risk. Alford (1992) claims that the type of industry which is a good surrogate for the component of earnings growth and risks related to P/E ratio multiples. Dreman (1994) and Siegel (1995) make a conclusion that low P/E ratio stocks surpass high P/E ratio stocks in the aspect of investment value and the high P/E ratio stock is based on the long-term expected cash flows and not a near-term expectation. Moreover, Loughlin (1996) uses a S&P 500 indexes which from 1968 to 1993 to study the influencing factors of price-earnings ratio. He finds that dividend payout ratio and earning per share growth have a positive correlation on P/E ratio. In order to forecast and determine current stock prices, Li-Wen

Chen, Hsin-Yi Yu, Hsu-Huei Huang (2015) adopt a series of comparative analyses. The conclusion shows that the investor who can predict the future earnings can obtain the larger the risk-adjusted returns.

Furthermore, some studies focusing on the factors affecting price-earnings ratio are emerging. For example, Fisher and Statman (2000) investigate two factors (dividend yields and future returns) and how these factors affect P/E ratios. Using S&P 500 index data for the period of 1926-1997, White (2000) adopts a multiple regression model which showed dividend yield, dividend payout, earnings growth, GDP growth, Inflation, standard deviation of returns, and T-bill rates as the significant determinants of P/E ratio. Yang Jianxia (2009) shows that there are several micro factors which have significant influence and explanatory powers on P/E ratio, including ROE, P/B ratio, expense ratio and Tobin's Q ratio. The report by Kasilingam, R., & Ramasundaram, G. (2011) shows that the expected return and the expected growth rate are the main influencing factors of P/E ratio, and market capitalization of the companies has a great impact over P/E ratio. Furthermore, it is widely used in the literature on market sentiment. Jansen and Nahuis (2003), Brown and Cliff (2004, 2005), Lemmon and Portniaguina (2006), Schmeling (2009), Zouaoui, Nouyrigat, and Beer (2011), Chang, Faff, and Hwang (2012) and Antoniou, Doukas, and Subrahmanyam (2013) and P. Corredor, E. Ferrer, R. Santamaria (2015) study the effect of

investor sentiment linked to stock characteristics. Moreover, Kulling Karl Johan and Lundberg Filip (2007) adopt a regression analysis to compare several dependent variables, like dividend yield, interest rate, risk, growth, debt to equity, market value, and market to book. The finding is that different factors affect different industries and the significance is also not the same.

Therefore, the findings of this study "An Empirical Analysis of the determinants of the P/E Ratio--A Case Study of China's Media Industry" are not only important to fulfill the literature in this area but also essential for other researchers as a reference.

Framework and hypotheses

With the objective of investigating the level of media industry in China's stock market and its relationship with their financial factors, the relevant conceptual framework and research hypotheses are shown below:
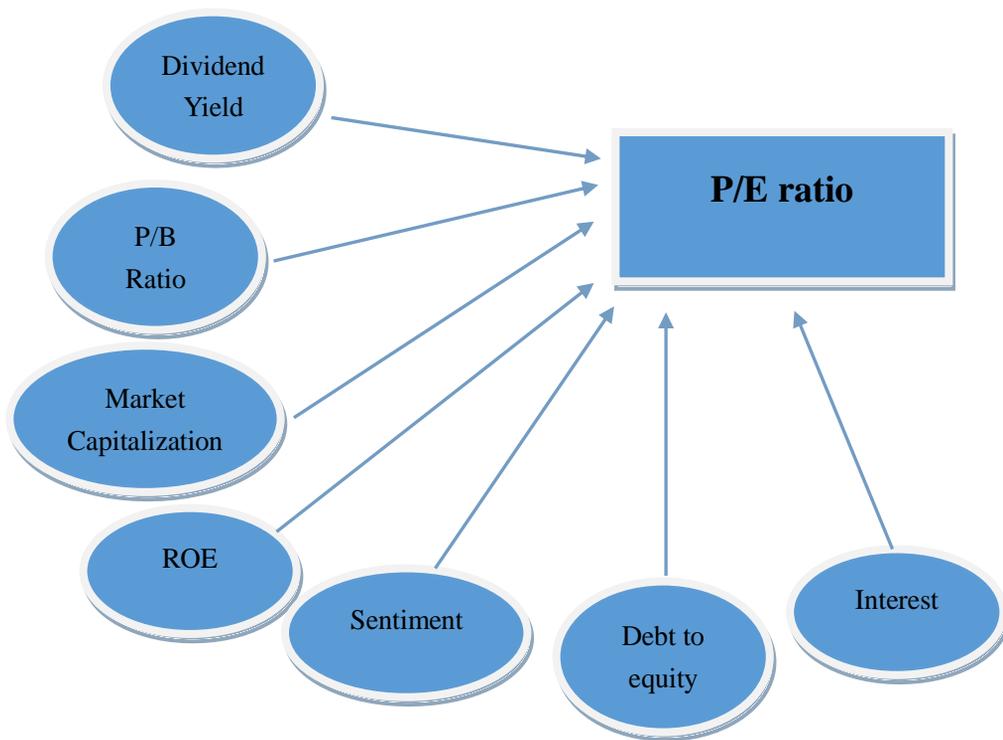

Figure 2

H 1: Dividend yield has significant negative impact on P/E ratio.

H 2: P/B ratio has a positive impact on P/E ratio.

H 3: Market capitalization has a negative relationship on P/E ratio.

H 4: ROE has a positive relationship on P/E ratio.

H 5: Sentiment has a positive relationship on P/E ratio.

H 6: Debt to equity has significant positive impact on P/E ratio.

H 7: Interest rates have a negative impact on P/E ratio.

Methodology

Research sample

The sample for this study is based on the media industry using quarterly data from 1 January 2000 to 31 September 2015. This industry has experienced significant fluctuation in 2015 as more and more media companies are listed in the Chinese stock market. The price earnings ratios of the media industry are extremely volatile, particularly from the first quarter of 2015 to third quarter of 2015. The index starts at the 2000 point and goes to 6701 at its highest point. It is quite incredible that the growth rate reached 235.05 percent during only these three quarters. In addition, we will divide the media industry into three sub-sectors. These are media agencies, publishing, and broadcast & entertainment, to segment the industry.

Research instruments

This paper gets six main factors affecting P/E ratio by analyzing the classic stock valuation model and the results of previous studies. Based on the Shanghai and Shenzhen A share index, the influence factors of P/E ratio have been empirically researched making use of descriptive statistics, correlation analysis and regression analysis methods.

Before constructing models, the paper uses scatter plot to analyze different curve relations between the variables and P/E. Through the intuitive understanding of graphics, the relationship between P/E ratio and various variables is largely follows a linear relationship. Therefore, the paper will use the linear regression model to perform regression.

In addition, from the fitting coefficients and test results, the regression model established by industry is better than the overall regression model, indicating that it is important for investors to forecast P/E ratio from the perspective of industry.

Moreover, multiple regression analysis is employed for the media industry. The equation is as follows.

$$\ln P/E = \alpha + \beta_1 DY + \beta_2 P/B + \beta_3 \ln MC + \beta_4 ROE + \beta_5 Se + \beta_6 D/E + \beta_7 IR + \mu_i$$

Where：
DY= Dividend yield
P/B = Price to book ratio
Ln MC = Natural logarithm of market capitalization
ROE= Return on equity
Se= Sentiment
D/E= Debt to equity
IR= Interest Rate

Since this study uses time-series data, the problems of multicollinearity, heteroscedasticity and autocorrelation are tested and solved before obtaining the final equation for the whole media industry, media agencies, media publishing and media broadcast & entertainment.

Results

The paper consists of the descriptive statistics of all 61 observations overall this time period (September 2000 - December 2015) to evaluate the performance of each variables and compare to the one main industry and its three sub-sectors.

Results for the whole media industry

For descriptive statistics, the P/E ratio of the whole media industry has a mean of 50.0869 points with a maximum of 131.3 points, a minimum of 13.3 points and a standard deviation of 21.8245 points. For dividend yield, the mean is 0.6697 and the standard deviation is 0.373. The highest is 1.56 and the lowest is 0. The average of both P/B and D/E ratio are 4.021 and -0.0836. Their standard deviations are 1.6769 and 0.1485. The maximum and minimum are 9.56 and 0.2634, 2.1 and -0.2885. For ROE, the mean is 7.7954. The highest is 12.56 and the lowest is 0.15; the standard deviation is 2.5609. The average of sentiment and interest rate are 1.0713 and 3.4744 and their standard deviations are 0.2224 and 0.3481. The highest values are 1.5263 and 4.41 respectively, and the lowest are 0.6542 and 2.97 respectively. The average of market capitalization is 97805.15. The highest and the lowest are 700199 and 12498; the standard deviation is 152369.3.

For multiple regression analysis, all variables are stationary by performing ADF testing before estimating the models. Since none of the absolutes of correlations among independent variables is greater than 0.8, there is no multicollinearity problem. Based on White test, the result is 34.0508 and the probability of lnP/E media is 0.6193 which is greater than limit level $\alpha=0.1$, which means that there is no heteroscedasticity. All seven independent variables are eligible to be used in the multiple regression analysis. However, an autocorrelation problem is found in this case, so the Newey-West method is employed to remedy those problems. The final equations are exhibited below.

$$\ln(P/E)_t = 4.41 - 0.34(DY)_t + 0.09\Delta(P/B)_t - 0.06\Delta\ln(MC)_t + 0.04(ROE)_t \qquad (8)$$

$$(0.0686^*) \qquad (0.0916^*) \qquad (0.7879) \qquad (0.0367^{**})$$

$$+ 0.10(SE)_t - 1.49(D/E)_t - 0.12(IR)_t$$

$$(0.77) \qquad (0.0248^{**}) \qquad (0.3203)$$

F-Statistic = 2.9466

Prob.(F-Stat) = 0.0112

** = statistical significance at the 0.05 level

*= statistical significance at the 0.1 level

From equation 8, Prob. (F-Stat) is statistically significant at the 0.05 level, indicating that overall 7 independent variables produce the probability of error. A significant influence is 0.0112 on the dependent variable. All the seven independent variables help explain the change in P/E media industry 18.76%. According to the statistical significance of the coefficients of the independent variables, D(P/B), ROE, SE and D/E have a positive effect on lnP/E media industry; DY, D(lnMC) and IR have a negative effect on lnP/E media industry. Meanwhile, variables DY and D(P/B) effect on lnP/E at 10% level, ROE and D/E impact on lnP/E very significantly

at a 5% level. The remaining variables D(lnMC), SE and IR do not have significant effect on the dependent variable from the above result.

Results for the media agencies, media publishing and media broadcast & entertainment

Through implementing the ADF unit root test, multicollinearity test, heteroscedasticity test and autocorrelation test, the final regression results will adopt the Newey-West fixed model to remove problems are as follows:

Media agencies:

$$\ln(P/E)_t = 16.1 - 0.13\Delta(DY)_t + 0.09(P/B)_t - 0.62\Delta\ln(MC)_t + 2.27(SE)_t \qquad (9)$$

$$(0.8951) \quad (0.5781) \quad (0.4305) \qquad (0.0595^*)$$

$$-1.16(D/E)_t - 4.34(IR)_t$$

$$(0.2987) \quad (0.0058^{***})$$

F-Statistic = 6.4450

Prob.(F-Stat) = 0.0020

Adjusted R2 = 0.6203

*** = statistical significance at the 0.01 level

*= statistical significance at the 0.1 level

Based on the equation 9, it can be seen that the probability in the final model is equal to 0.0020 and the F-statistic is 6.4450 which means the six independent variables can be used to determine their influence on the dependent variable ln(P/E) at significant statistic 1%. Further, the adjusted R-squared is equal to 0.6203 which means the model can explain the change of dependent variable (lnP/E) by 62.03%. It can be recognized that the regression equation is highly significant. Particularly, only SE and IR have effects on lnP/E at the 10% and 1% levels; the other four variables have no significant effect on the dependent variable, as the table 4.9 shows. D(DY), P/B, SE and D/E have a positive effect on lnP/E media agencies; D(lnMC) and IR have a negative effect on lnP/E media agencies.

Media publishing:

$$\ln(P/E)_t = 1.6 - 18.46(DY)_t + 16.95(P/B)_t - 8.44\Delta\ln(MC)_t + 1.61\Delta(ROE)_t \quad (10)$$

$$(0.0684^*) \quad (0.0408^{**}) \quad (0.2899) \quad (0.4956)$$

$$-2.67(SE)_t - 49.86\Delta(D/E)_t + 1.19(IR)_t$$

$$(0.8607) \quad (0.2648) \quad (0.8555)$$

F-Statistic = 9.4511

Prob.(F-Stat) = 0.0000

Adjusted R2 = 0.5007

** = statistical significance at the 0.05 level

*= statistical significance at the 0.1 level

From the final model above, it can be seen that the probability in the equation is equal to 0 which means the seven variables are able to determine their impact on the dependent variable at significant statistic 1%. It also illustrates that the possibility of generating error of a significant influence is 0 between the independent and dependent variables. Meanwhile, adjusted R-squared is

0.5007, which represents that the goodness of fit of the model is high and the explanatory power of economic meaning is strong. Referring to the coefficient of the regression equation, P/B, D(ROE) and IR have a positive effect on lnP/E media publishing, DY, D(lnMC), SE and D(D/E) have a negative effect on lnP/E media publishing. Also, variables DY and P/B effect on lnP/E at the 0.1 level and 0.05 level. Variables D(lnMC), D(ROE), SE, D(D/E) and IR have no significant effect on the dependent variable.

Media broadcast & entertainment:

$$\ln(P/E)_t = 3.37 - 0.05(DY)_t + 0.06\Delta(P/B)_t - 0.07\Delta\ln(MC)_t + 0.02\Delta(ROE)_t \quad (11)$$

$$(0.6341) \quad (0.0230^{**}) \quad (0.6278) \quad (0.1214)$$

$$+0.2(SE)_t - 0.97\Delta(D/E)_t - 0.03(IR)_t$$

$$(0.3001) \quad (0.2493) \quad (0.7306)$$

F-Statistic = 2.0600

Prob.(F-Stat) = 0.0600

Adjusted R2 = 0.1153

*** = statistical significance at the 0.05 level*

From the equation 11, it can be seen that it is possible to adopt all seven independent variables in the model to determine lnP/E media broadcast & entertainment at a significant statistic of 10%, because the significant P value is equal to 0.0600 and F-statistic is 2.0600. R-squared =0.220300 and adjusted R-squared =0.115340, which means the estimate equation can explain the change of lnP/E media broadcast & entertainment for only 11.53%. The coefficient of regression equation expresses the relationship between variables.

Conclusions and discussions

Table 1: Summary of the statistical significance of the overall results

	P/E Media Industry	P/E Media Agencies:	P/E Media Publishing:	P/E Media Broadcast & Entertainment:
Dividend yield (DY)	-*		-*	
Price to book ratio (P/B)	+*		+**	+**
Market capitalization (MC)				
ROE	+**			
Sentiment (SE)		+*		
Debt to equity (D/E)	+**			
Interest rate (IR)		-***		

Note: ***, ** and * represent 1%, 5% and 10% level of significance respectively

+ represent positive relationship and – represent negative relationship

Table 1 shows that different variables have different influences on the P/E ratio, where the price to book ratio, return on equity, sentiment and debt to equity have a positive effect. It means that when these variables increase, the P/E ratio of China's stock market also increases. The variables that are under a negative relationship with the P/E ratio of China's stock market are dividend yield market capitalization and interest rate. In the other part of the study, the sub-sectors in which P/E ratio are strongly positively affected by the P/B ratio were media publishing and media broadcast & entertainment. The result shows that media agencies have interest rate as their main force. There is also had sentiment as an explanatory variable of P/E ratio. This indicates that they are positively connected to P/E of media agencies. P/E of media publishing had their strong force in dividend yield; it is a negative relation. However, market capitalization has no effect on P/E ratio. These sub-industries are quite special, since they have a unique structure of their income.

Dividend yield has a negative correlation to P/E of China's media industry and media publishing, which is consistent with Fisher and Statman (2000) and Bhargava, V., Dania, A., & Malhotra, D. K. (2011). The same result is seen with Marco Taliento (2013) and Kulling Karl Johan and Lundberg Filip (2007), who support that when P/E ratio for media industry has a positive development, the market may not have generated greater earnings, and therefore dividend yield has not increased.

$$\text{Dividend Yeild} = \frac{\text{annual dividends per share}}{\text{price per share}}$$

The P/B ratio has a positive effect on P/E of China's media industry, media publishing and media broadcast & entertainment. This result is consistent with the previous literature, such as Danielson and Dowdell (2001). The P/B ratio is determined by the current closing price of the stock and the net assets per share. If the company's operating performance is better, the faster the value of its assets, the higher the value of the stock, and shareholders will get the more earnings from the company.

$$\text{P/B ratio} = \text{Stock Price / Book Value per share}$$

ROE has a significant positive effect on P/E on the whole media industry. This result is seemingly in line with theories and existing literature such as the Gordon model and Net Present Value of Growth Opportunity model. In general, if a corporation's business performance is good, investors should have appropriate expectations for the company and will invest in the company, which will cause a rise in stock prices, and ultimately lead to improving the price earnings ratio. So, the higher corporate profitability indicators are, the higher P/E ratio will be.

$$\text{ROE} = \frac{\text{Net income}}{\text{Common stockholders' equity}}$$

Sentiment has a positive relationship with P/E on media agencies. This is further consistent with the modern theory in behavioral finance in earlier literature by Baker and Wurgler's (2007). Several studies find a relation between investor sentiment (Leite, T., 2005) and stock return (e.g. Chortareas et al., 2012; Da, et al., 2015; Dergiades, 2012; Huang et al., 2014; Jitmaneeroj and Wood, 2013; Piccione and Spiegler, 2014; Peon et al.,2015). The higher the sentiment ratio, the higher the expectation of investors for stocks, resulting in the stock price increases.

$$\text{Sentiment} = \frac{\text{No of rise companies}}{\text{No of fall companies}}$$

Debt to equity has a strong positive correlation with price-earnings ratio on the whole media industry, which is consistent with Miller and Modigliani (1958). The higher the debt to equity ratio, the higher debt financing the firm uses, resulting in the higher risk perceptions of investors. Since the risk is often directly proportional to earnings, so the price-earnings ratio decreases.

$$\text{Debt to equity} = \frac{\text{Total debts}}{\text{Total assets - Total debts}}$$

Interest rate is the amount charged, expressed as a percentage of principal, by a lender to a borrower for the use of assets. Interest rates are normally expressed as a percentage of the principal for a period of one year. In addition, interest rate is under a strong significant negative influence only for media agencies. The result seemingly in accordance with theories and earlier literature, such as the Gordon model, which shows that price-earnings ratio is the reciprocal of market interest rate and analysis by Ben Amoako-Adu and Brian Smith (2002). The decline in interest rates will reduce enterprises' cost of borrowing. Enterprise production funds will be more abundant, which is conducive to the expansion of business and production, and improve enterprise income. Then, superior operating results of the enterprise will increase investor's investment expectations. They will be more inclined to pay a higher price to purchase stocks, promoting the rise of stock prices and price-earnings ratio.

There are four recommendations about price-earnings ratio. At first, managers or investors should profound understand the universality and particularity of P/E ratio. Secondly, it is very necessary to deal with unique circumstances of each country's stock market to make reasonable decisions. Thirdly, to strengthen the information disclosure of media enterprises. Investors can use the model to predict P/E ratio of listed media companies and the average P/E of the media industry. In addition, researchers need to distinguish between the main industry and individual sectors in the process of analyzing the industry P/E ratio.

In conclusion, based on the results of the factors which can affect price-earnings ratio in the media industry, this study, can guide investor's investment behavior and help companies to conduct an economic decision. In addition, investors can identify market risk and grasp the investment opportunities dependent upon the analysis of the overall market price earnings ratio, with access to higher investment income. Management, through the analysis of price-earnings ratio, can understand the strength of the stock market so as to ensure that reasonable regulation measures guarantee the stock market's healthy operation. Additionally, to overcome the limitation of this study, the next research should identify determinants of price-earnings ratio for other sectors of China's stock market. Therefore, investors can use the regression model to forecast the trend of other industries.

References

Alford, A. W. (1992). The effect of the set of comparable firms on the accuracy of the price-earnings valuation method. *Journal of Accounting Research,* 94-108.

Amoako-Adu, B., & Smith, B. (2002). Analysis of P/E ratios and interest rates. *Managerial Finance,* 28(4), 48-59.

Anderson, K. and Brooks, C. (2006), "Decomposing the price-earnings ratio", *Journal of Asset Management,* Vol. 6, pp. 456-469.

Antoniou, C., Doukas, J. A., & Subrahmanyam, A. (2013). *Investor Sentiment and Beta Pricing* (No. wpn13-05).

Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market. *The Journal of Economic Perspectives,* 21(2), 129-151.

Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The journal of Finance,* 32(3), 663-682.

Beaver, W., & Morse, D. (1978). What determines price-earnings ratios?. *Financial Analysts Journal,* 34(4), 65-76.

Bhargava, V., Dania, A., & Malhotra, D. K. (2011). The Relationship Between Price-Earnings Ratios, Dividend Yield, and Stock Prices: Evidence from BRIC Countries. *Journal of Emerging Markets,* 16(1), 31.

Brown, G. W., & Cliff, M. T. (2005). Investor sentiment and asset valuation. *The Journal of Business,* 78(2), 405-440.

Ceng Xiaojie, He Xiaofeng (2002). The potential growth potential of the company in terms of price earnings ratio: An Empirical Analysis of China's stock price earnings ratio. *Economic Science* (3), 50-61.

Chang, C., Faff, R. W., & Hwang, C. Y. (2012). Local and global sentiment effects, and the role of legal, information and trading environments. *Available at SSRN 1800550.*

Chen Zhanfeng (2002). A stock bubble problem in Shanghai stock market: price - earnings ratio measurement and comprehensive explanation. *The world economy.* 2002 (7) .63-70

Chen, L. W., Yu, H. Y. and Huang, H. H. (2015), "Revisiting the earnings–price effect: The importance of future earnings", *Finance Research Letters,* Vol. 13, pp. 90-96.

Chen, L. W., Yu, H. Y., & Huang, H. H. (2015). Revisiting the earnings–price effect: The importance of future earnings. *Finance Research Letters,* 13, 90-96.

Cho, Y. J. (1994), "Determinants of earnings-price ratios: a reexamination", *Review of Financial Economics,* Vol. 3, pp. 105-120.

Chortareas, G., Jitmaneeroj, B. and Wood, A. (2012), "Forecast rationality and monetary policy frameworks: Evidence from UK interest rate forecasts", *Journal of International Financial Markets, Institutions and Money,* Vol. 22, pp. 209-231.

Chua, A., DeLisle, R. J., Feng, S. S. and Lee, B. S. (2015), "Price-to-earnings ratios and option prices", *Journal of Future Markets,* Vol. 35, pp. 738-752.

Corredor, P., Ferrer, E., & Santamaria, R. (2015). The impact of investor sentiment on stock returns in emerging markets: The case of Central European Markets. *Eastern European Economics,* 53(4), 328-355.

Danielson, M. G., & Dowdell, T. D. (2001). The return-stages valuation model and the expectations within a firm's P/B and P/E ratios. *Financial Management,* 93-124.

Dergiades, T. (2012), "Do investors' sentiment dynamics affect stock returns? Evidence from the US economy", *Economics Letters,* Vol. 116, pp. 404-407.

Dreman, D. (1994). Emotion versus logic. *Forbes,* 7, 351.

Firer, C. (1993). The P/E ratio and the cost of equity capital. *Investment Analysts Journal,* 22(38), 43-47.

Fisher, K. L., & Statman, M. (2000). Investor sentiment and stock returns. *Financial Analysts Journal,* 16-23.

Gordon, M. J. (1962). *The investment, financing, and valuation of the corporation.* RD Irwin.

Graham, B., & Dodd, D. L. (1934). *Security analysis: Principles and technique.* McGraw-Hill.

Houmes, R. and Chira, I. (2015), "The effect of ownership structure on the price earnings ratio - returns anomaly", *International Review of Financial Analysis,* Vol. 37, pp. 140-147.

Jansen, W. J., & Nahuis, N. J. (2003). The stock market and consumer confidence: European evidence. *Economics Letters,* 79(1), 89-98.

Jitmaneeroj, B. (2015), "The impact of dividend payout policy on the price-earnings ratio: The role of conditional and nonlinear relationship", Working paper, University of The Thai Chamber of Commerce, 10 Jan 2015.

Jitmaneeroj, B. and Wood, A. (2013), "The expectations hypothesis: New hope or illusory support?", *Journal of Banking & Finance,* Vol. 37, pp. 1084-1092.

Kane, A., Marcus, A. and Noh, J. (1996), "The P/E multiple and market volatility", *Financial Analyst Journal,* Vol. 52, pp. 16-24.

Kasilingam, R., & Ramasundaram, G. (2011). Price Earnings Multiples: Actual Determinants. *SCMS Journal of Indian Management,* 8(3), 108.

Kulling, K. J., & Lundberg, F. (2007). A quantitative study of the P/E ratio on the Swedish market.

Leite, T. (2005), "Returns to sentiment investors in IPOs", *Economics Letters,* Vol. 89, pp. 222-226.

Lemmon, M., & Portniaguina, E. (2006). Consumer confidence and asset prices: Some empirical evidence. *Review of Financial Studies,* 19(4), 1499-1529.

Loughlin, J. J. (1996). *Determinants of the Price-earnings Multiple for the Standard & Poor's 500 Composite Stock Index and the Effects of Determinant Volatility.*

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American economic review,* 261-297.

Nicholson, S. F. (1960). Price-earnings ratios. *Financial Analysts Journal,* 16(4), 43-45.

Peon, D., Calvo, A. and Antelo, M. (2015), "On informational efficiency of the banking sector: A behavioral model of the credit boom", *Studies in Economics and Finance,* Vol. 32, pp. 158-180.

Piccione, M. and Spiegler, R. (2014), "Manipulating market sentiment", *Economics Letters,* Vol. 122, pp. 370-373.

Ramcharran, H. (2002), "An empirical analysis of the determinants of the P/E ratio in emerging markets", *Emerging Market Review,* Vol. 3, pp. 165-178.

Reilly, F. K., Griggs, F. T. and Wong, W. (1983), "Determinants of the aggregate stock market earning multiple", *Journal of Portfolio Management,* Vol. 1, pp. 36-45.

Schmeling, M. (2009). Investor sentiment and stock returns: Some international evidence. *Journal of empirical finance,* 16(3), 394-408.

Siegel, J. (1995). The nifty-fifty revisited: Do growth stocks ultimately justify their price? *The Journal of Portfolio Management,* 21(4), 8–20.

Song Jianfeng (2000). The ratio of net assets, the price-earnings ratio and the growth of the company. *Economic Research.*2000 (8).36-45

Taliento, M. (2013). Determinants of price to earnings multiple around the world. Recent findings. *International Review of Business Research Papers,* 9(4), 1-21.

Whitbeck, V. S., & Manown Kisor, J. (1963). A new tool in investment decision-making. *Financial Analysts Journal,* 55-62.

White, C. B. (2000), "What P/E ratio will the U.S. stock market support?", *Financial Analysts Journal,* Vol. 56, pp. 30-38.

White, C. B. (2000). What P/E will the US stock market support?. *Financial Analysts Journal,* 30-38.

Williams, J. B. (1938). *The theory of investment value* (Vol. 36). Cambridge, MA: Harvard university press.

Wu Mingli (2001). The structure and distribution of the P / E ratio in China's stock market. *Quantitative economics and technical economic research.* 2001 (8).99-102

Yang Jianxia. (2009) Research on the Influencing Factors of A - share P / E Ratio in Shanghai and Shenzhen Stock Markets. *Doctoral dissertation, University of Suzhou，China*

Yao Hui. (1998). Stock price-earnings ratios and investment value. *Forecast* (2), 54-55.

Zouaoui, M., Nouyrigat, G., & Beer, F. (2011). How does investor sentiment affect stock market crises? Evidence from panel data. *Financial Review,* 46(4), 723-747.