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The qualitative aspects of financial markets in Korea: Price informativeness and Intangible capitalization

한국 주식시장에 대한 질적 연구: 주가 정보력과 무형자산

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이 논문을 경영학석사 학위논문으로 제출함

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Abstract

The qualitative aspects of financial markets in Korea: Price informativeness and Intangible capitalization

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Financial markets in Korea have grown drastically. However, the qualitative aspects of the markets have yet been broadly studied. Following the spirit of Bai et al. (2016), this paper analyzes on price informativeness: the predicted variation of future cash flows from current market prices. While price infomativeness on combined market(KRX and KOSDAQ) remains unchanged, KRX firms present positive trends and KOSDAQ firms present negative trends over time. The opposite trends are related to price informativeness on Intangibles that KOSDAQ firms show decreasing trends due to aggressive intangibles capitalization. The capitalized intangibles tend to have less probable future cash flows eventually yielding lower price informativeness.

Keywords: *Price informativeness, Intangibles intensity, Intangibles capitalization, Economic growth, Revelatory price efficiency, Forecasting price efficiency*

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Table of Contents

1. Introduction

According to Korea Exchange, KOSPI has arrived at 2500 in 2017 from the standard index, 100, in 1980 roughly 23% annual growth rate on average. In terms of the nominal growth rate, it is remarkable compared to any other financial market in the world. Then, the question arises "the qualitative aspects of financial markets in Korea have been progressing with the rapid growth?" or just simply "is it available for the investors to extract more useful information from the market prices?" To answer the question, this paper analyzes the trends on price informativeness over time quantifying the lesson on the efficient market that the stock prices always contain and fully reflect the all available information (Fama, 1970).

Following price informativeness model (Bai et al, 2016), this paper presents the trends on price informativeness in financial markets in Korea and proposes a compelling explanation. Using Korea stock market data from 1985 to 2015, the empirical results show that price informativeness remains unchanged at every horizon(one to five years) in overall market(KRX and KOSDAQ firms combined). However, in a separate market basis, KRX firms display increasing trends at longer horizons(three to five years) and KOSDAQ firms display decreasing trend at the longest horizon(five year). The opposite directions become severe with the inclusion of the missing

values on price informativeness.

There is the compelling causation for the opposite trends on price informativeness in two financial markets. Srivastava (2014) notes that a newly listed and technology-oriented firm exhibits relatively lower earnings quality due to higher intangible intensity. Similar to previous finding, KRX and KOSDAQ firms present the opposite trends on price informativeness on Intangibles. Particularly, KOSDAQ firms display decreasing trends because they aggressively capitalize intangibles. These capitalized intangibles tend to have less probable future cash flows eventually yielding lower price informativeness.

Compared to the original paper, there are several periods with the negative coefficients. It possibly causes a severe problem on tracking the trends. Because I take the square root on the negative coefficients to have meaningful comparison between the variables, it turns into the missing values on price informativeness. It implies that market prices lost their entire power to predict variance of future cash flows from operations. While KRX firms display only a few missing values, KOSDAQ firms display more than a half of the sample periods. This distinction is partially explainable since the firms in two different financial markets in Korea share significantly different characteristics on many aspects (Cho and Ko, 2015).

The periods with the negative coefficients are concentrated nearly on 1998(Asia financial crisis) and 2008(Global crisis). The existence of the negative coefficients becomes indirect evidence on the impacts of financial crisis toward financial markets in Korea. There is a research on how this East Asia crisis had influenced on the characteristics of the corporations such as ownership structures and disclosure quality (Mitton, 2002). However, there is no empirical measurement on the impacts of financial crisis toward the information contents of market prices. Having the trends on price informativeness, this paper also delivers the message on how Korea financial markets severely had been damaged.

Theoretically, the original model tracts FPE(Forecasting price efficiency) where it includes both disclosed information and RPE(Revelatory price efficiency). RPE is the information that investors possess reflected in the market prices through their investment activities. This paper focuses on tracking FPE as well because it serves as the minimum capacity on aggregate efficiency which represents the entire information set exists. This research is comparable to prior analysis on RPE through price nonsynchronicity (Roll, 1988) and PIN measures (Easley, Kiefer, ara, and Paperman, 1996). More specifically, this paper analyzes how price informativeness(FPE) has evolved over time.

The rest of this paper proceeds as follows. Section 2 presents literature reviews, Section 3 shows hypothesis developments, Section 4 describes the data and summary statistics, Section 5 shows empirical results, Section 6 explains the limitations, and Section 7 with concluding remarks.

2. Literature Review

Levine (2005) classifies several economic roles of financial markets. Among the classification, this paper focuses on information production role that providing investors better investment opportunities and allocation of resources. Dating back to Schumpeter (1912) and Hayek (1945) where they underlie the information production literature, the roles of financial markets have largely been studied over time. Greenwood and Jovanovic (1990) analyze the relationship between information production in financial markets and the level of efficient investments through endogenous growth models. The most recently, Bai et al. (2016) developed the model that testifying a welfare-based measure of price informativeness with publically available data.

Financial markets in Korea have grown drastically in the last few decades. The situation incentivizes the qualitative analysis on markets` prices

and the trading environments. There are several findings on value relevance of accounting information, market efficiencies, and valuation. Chung and Cho (2004), and Ahn and Kwon (2006) analyze the impact of accounting rules for intangible assets and deferred tax assets. Moreover, Na and Shin (2014) find that structural variables have better predictabilities when the systematic logic underlies on them. To my knowledge, however, there is no empirical research on how much information content we can induce from the market prices on the future earnings in Korea financial markets.

Furthermore, this paper indirectly predicts the trends on RPE(Revelatory price efficiency) from the evidences that disclosed information presents increasing trends over time. The evidences include firms` voluntary disclosures (Sohn and Cheon, 2000) and sales forecast disclosures of large business groups (Bae, Cheon, and Jeong, 2000) enhance PER(Price-Earnings Ratio), trade volume, and variance. Moreover, the value relevance perspective presents that accounting information increased after Fair Disclosure regulation in Korea (Lee and Roh, 2011). Accordingly, when net revaluation amount is realized on financial statements rather than put in footnotes, the value relevance on the accounting information improves (Kim, Yang and Cho, 2012).

Therefore, it is possible to conclude that information production

from disclosure has increased over time eventually indicating that RPE has decreased within the markets. Both FPE and RPE analysis are particularly important because Korea financial markets have experienced one of the most drastic expansions in the last few decades. As a result, the financial sectors call in a large numbers of highly educated and skilled human capital (Philippon and Reshef, 2012). It means that the analysis on financial markets become a matter of common interest which is not restricted to financial sectors but expanded toward the business of entire nations and overall manufacturing markets.

This paper extends to the financial crisis literature by having the negative coefficients on price informativeness. Asia financial crisis in 1998 and Global crisis in 2008 influenced financial markets in Korea in a similar way that the dotcom bust in 2000 and the financial crisis in 2008 from the United States. While Asia financial crises have not been broadly studied, the situations are applicable on the U.S. markets. These include the obscure benefits on the developments of financial markets (Zingales, 2015) and the behavioral finance that explains the price distortions from the irrational investors` behaviors (Shiller, 2000; Kahneman, 1979). Having this understanding, this paper can better predict possible causations on the opposite trends on price informativeness in two different financial

markets(KRX and KOSDAQ).

The most compelling explanation on the opposite trends lies on intangibles related literature. Collins, Maydew and Weiss (1997) find that the value relevance of earnings on the fundamental value of the firms has moved toward book values. Moreover, Givoly (2000) presents the alteration on time-series properties of earnings, cash flows from the operations and accruals. Recently, Srivatava (2014) finds that higher intangible intensity brings lower earnings quality on a newly listed and technology-oriented firm. Knowing that the firms in two different financial markets in Korea exhibit different level on intangible intensity, this paper analyzes the predictability of market prices on Intangibles.

In sum, this paper shows the trends on price informativeness in Korea financial markets at the intersection of the literature on information production and intangibles related literature. I believe that measuring price informativeness and discovering the firms` capitalizing behavior on intangibles will enhance the economic value of the entire nation.

3. Hypothesis Development

Bai et al. (2016) presents the process of generating a welfare-based

measure on price informativeness. This measurement is especially important because it serves as the minimum value for aggregate efficiency which represents entire information sets within a corporation. Splendid theoretical framework from the prior research constructs the information environments for both insiders and investors that share distinctive information sets. Following the measurement, this paper analyzes the trends on price informativeness.

3.1. Price informativeness on financial markets in Korea

Financial markets in Korea have experienced drastic growth over time. However, the qualitative aspects of these markets have been lacked in empirical research. Therefore, this paper fills the vacancies on price informativeness by answering the question: "Whether the market prices become more or less informative?" Combing two representative financial markets, KRX and KOSDAQ, I measure the trends on price informativeness.

Jeon and Jang (2004) find that US stock market serves as a leading role in financial markets in Korea at every level of aggregation. It may not explain the exact relationship between financial markets in two different nations but they find positive influences from U.S. to Korea financial

markets. Moreover, there are findings that disclosed information become more informative (Sohn and Cheon, 2000; Lee and Roh, 2011). Having Bai et al. (2016) that find the increasing trends on price informativeness in U.S. stock market and more informative disclosed information in Koreat, I expect that there will be increasing trends on price informativeness. Thus, this paper hypothesizes the following:

H1. The trends on price informativeness in the overall markets have increased over time.

3.2. Price informativeness on a separate market basis

While the aggregate level analysis represents the genuine interest of investors, it is required to have a separate market basis approach. It is because KRX firms and KOSDAQ firms share different characteristics such as the level of returns on equity(ROE), costs of equity(COE), price multiples, the accuracy of the analyst reports (Cho and Ko, 2015). Moreover, the firms with a new style called venture companies usually are listed in KOSDAQ while chaebol and traditional firms are listed in KRX (Lee and Kim, 2000). Therefore, I expect that KRX firms and KOSDAQ firms likely to present different trends on price informativeness over time. This discussion induces

the hypothesis:

H2. Price informativeness in KRX and KOSDAQ firms present different trends over time.

3.3 Intangibles capitalization

The previous results show that the different characteristics of the markets affect the trends which display the opposite directions throughout the sample periods. As price informativeness is described as predicted variance of future cash flows from the current market prices, this section focuses on discovering the factors that impede the growth on price informativeness. O`Hara (2003) propose that we should reflect the liquidity costs and spending on price discovery in asset-pricing model which implies these factors are not fully appreciated in the markets. However, there is no evidence that KRX and KOSDAQ firms have different levels on liquidity costs and spending on price discovery. My main consideration is to find the factors that draw fine distinction on financial markets.

Srivastava (2014) argues the measure of earnings quality decrease over time because a newly listed and technology-intensive firm tends to have the higher level on intangible intensity. Moreover, Lev (2016) points out that

the value relevance of accounting has drastically deteriorated compared to 1950s after the birth of intangibles in many firms. The nature that the intangibles are subject to expense or capitalize mismatches concurrent expenses, revenues and eventually the future probable earnings (Canibano, Garcia-Ayuso and Sanchez, 2000). With these findings, I believe that aggressive capitalization on intangibles that future cash flows are not probable likely to affect price informativeness. Because KOSDAQ firms have higher levels on intangible intensity compared to KRX firms on average, this paper hypothesizes the following:

H3. The trends on price informativeness on Intangibles present different directions in KRX and KOSDAQ firms

4. Data and Summary statistics

This section presents the dataset and the process of structuring the variables in the analysis.

4.1 Sample and variables

The main samples are annual from 1985 to 2015 for KRX firms and 1996 to 2015 for KOSDAQ firms. The different sample periods in two

financial markets are due to the data availability where KOSDAQ opened in 1996. I pursue to have the longest sample periods possible to tract the plausible trends over time. All accounting variables are from DATAGUIDE and it includes market capitalization. I used GDP deflator with the base year of 2010 to adjust inflation that is from Bank of Korea.

Bai et al. (2016) design the model with the flow concept variables. Therefore, I construct the variables in accordance to the original paper`s intention except for market capitalization. I take the average values for market capitalization throughout the year because it seems to be more conservative with high variability in stock prices. As of Intangibles, I apply the change concept variable which is the difference between this year and prior year in values. However, the application of the average values of intangibles in untabulated analysis seems to have almost identical results.

I take the main cash flows measure as EBIT(earnings before interest and taxes). This variable serves as operating profits throughout the sample periods so that many analysts and investors evaluate this measure in terms of the firms` performances. There are robust checks on alternative definitions of earnings to test if the empirical results are influenced by the choice of accounting variables. The applications include EBITDA(earnings before interest, taxes, depreciation and amortization), net income, and cash flows

from the operations for the earnings measure. Earning measures and equity valuation measures are all adjusted with the average values for total assets. Particularly, I use the log-ratio of market capitalization M to total assets A to have logM/A. Lastly, I apply future earnings on the left-hand side in a forecasting regression with horizon h years, $E_{i,t+h}/A_{i,t}$. I winsorize all the measures at 1% level.

In comparison to the prior research which focuses on S&P 500 firms with relatively stable and conventional characteristics over time, I do not limit my attention to KRX firms. Rather, I analyze on KRX and KOSDAQ firms on a separate market basis and derive the compelling evidence on the different trends on price informativeness. While KOSDAQ consists with the firms where the characteristics on many aspects have heavily changed over time, the antithetic results arouse the call for the possible explanations on the phenomenon.

GDP deflator is used to adjust the inflation with the base year of 2010. This is essential part on analyzing price informativeness because real term matters for investors` welfare. Because the sample periods are longer than several decades, the trends on price informativeness can to be distorted by the level of the inflation. Moreover, delisted firms arise as the concern due to the survivorship bias. The reliable dataset that prevents the selection bias

is not available until early 1980s in Korea. Therefore, this paper selects the sample periods after the resolution of delisted firms` data availability.

4.2. Summary statistics

Table 1 presents descriptive statistics for the main samples of the combined market, KRX and KOSDAQ. Two financial markets have the different sample periods because of the market-open dates. The standard deviation on the size of the firms in terms of market capitalization is much greater in KRX(right-skewed). That is because KOSDAQ consists with the newly listed and technology-oriented firms that the sizes are inevitably smaller in the beginning stage of the business. However, the profitability of the firms in both financial markets seems to be similar in light of the earnings after the adjustment with total assets, E/A.

In accordance to the conventional wisdom, the firms listed in Korea financial markets experience the severe discounts on market capitalization. KRX firms with 32% and KOSDAQ firms with 66% compared to their total assets on average. It is comparable to U.S. stock markets where S&P 500 firms present 82% on the same value throughout the past 50 years. Recently, S&P 500 firms are highly regarded in the financial market that market

capitalization is greater than total assets on average during the past 25 years (Bai et al, 2016).

Intangibles intensity shows that KOSDAQ consists with the newly listed and technology-oriented firms with higher intangible intensity (Srivastava, 2014). While KRX firms contain about 0.25% of intangibles within total assets on average, KOSDAQ firms have five times greater percentage in the same value on average, I/A. Lastly, the number of observations does not include loss firms where their market capitalization seem to have less correlation with the current earnings.

(TABLE 1. Here)

5. Empirical Results

This section presents the empirical findings on price informativeness over time.

5.1 Estimation Methodology

Following Bai et al. (2016), this paper replicates price informativeness(FPE) by measuring cross-sectional regressions of future

earnings on current market prices. On the right-hand side, the current earnings is included as a control variable because it serves as a good measure for the next year earnings. In each year t = 1985 to 2015 and every horizon h = 1 to 5, this paper runs

(1) $$E_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$$

I do not include a sector indicator because there are not enough observations on each industry. The regressions above provide a set of coefficients indexed by year t and horizon h.

Bai et al. (2016) define Price informativeness(FPE) as the predicted variance of future cash flows from market prices. The measure is constructed by having the coefficient, $b_{t,h}$, from the equation above and multiplying it by the cross-sectional standard deviation of the forecasting variable log M/A in year t at horizon h. Taking the square root of the final value, it is possible to have meaningful comparison over the variables(dollars of future cash flows per dollar of current total assets).

(2) $$\left(\sqrt{\mathcal{V}_{FPE}}\right)_{t,h} = b_{t,h} \times \sigma_t(\log(M/A))$$

I analyze the trends on this measure over the sample periods.

5.2 The trends on price informativeness(combined market)

(Fig. 1. Here)

Fig. 1 provides overall trends on both the coefficients, $b_{t,h,}$ and price informativeness in combined market(KRX and KOSDAQ). This analysis includes all firms in two financial markets without considering the different open dates of each market. That is because the overall trends represent the welfare of the investors whose investment strategies are not restricted to the certain types. Specifically, Fig. 1a presents the trends on the coefficient, $b_{t,h}$. There are several periods with the negative coefficients which turn into the missing values on price informativeness. Fig. 1b presents the trends on price informativeness. At every horizon(h = 1, 3, 5), price informativeness has not changed over time.

Theoretically, the negative sign on the coefficients indicates that market prices contradict to the predictions on firms` future cash flows. Because the future cash flows determine the fundamental value of the firms (Ohlson, 1995), the interpretation can be extended toward the predictions on the firm value. The presence of the negative sign is comparable to the

original paper where the coefficients, $b_{t,h}$, and price informativeness are always positive. Particularly, the missing values in price informativeness exist near 1998(Asia financial crisis) and 2008(Global Crisis). During those periods, many firms turned out to be overly valued in financial markets even with low levels of future earnings.

(Fig. 2. Here)

Fig. 2 shows that the trends on price informativeness are not affected by the choices of accounting variables. Specifically, Panel A – C use alternative measures of firms` current and future earnings. While price informativeness using EBITDA and cash flow from operations has not changed over time, I find decreasing trends on NI(Net Income) as earnings proxy. It is possibly because NI is more exposed to the distortion than EBIT or CFO (Sloan, 1996). However, the decreasing trends are statistically insignificant. Therefore, I conclude that the choices of accounting variables do not affect the trends on price informativeness.

(TABLE 2. Here)

Table 2 presents statistical approach on price informativeness in combined market with the alternative earnings measures. I find statistically insignificant coefficients on price informativeness at every horizon(h = 1, 3, 5) with all type of earnings definitions. Adjusted R^2 which indicates the predicted variance of future cash flows has no certain direction as well. Moreover, the several missing values impede the tracking on price informativeness. As opposed to the **H1**, this paper concludes that the trends on price informativeness in combined market have not changed at every horizon(h = 1, 3, 5) over time.

5.3 The trends on price informativeness(a separate market basis)

After I have the conclusion on the overall market base research, the next step is to find the impacts of each financial market on the trends. In this section, I focus on the trends on price informativeness in a separate market basis to see whether KRX and KOSDAQ firms share similar or contradicting trends over time.

(Fig. 3. and Fig. 4. Here)

Fig. 3a, 4a provide the trends on the coefficients, $b_{t,h}$ and Fig. 3b, 4b provide the trends on price informativeness in two financial markets. In accordance to the **H2**, I find that the opposing trends. KRX firms display the increasing trends at longer horizon(three to five years), and KOSDAQ firms display the decreasing trends at the longest horizon(five year).

(TABLE 3. Here)

It becomes more obvious in terms of the statistical approach. KRX firms present the significant increase at 5% for horizon = 3 and at 10% increase for horizon = 5 from 1985 to 2015. Therefore, I conclude the market prices become more informative in KRX even against the several financial crises. In addition to increasing trends, the number of observations seems to be reliable at every horizon(h = 1, 3, 5) which indicates that the prices tend not to lose their predictability on firms` performance. Compared to KRX

firms, KOSDAQ firms present decreasing trends on price informativeness. Moreover, the majority of the periods display the missing values. This means that the market prices in KOSDAQ barely had the informative messages on firms` future cash flows. Therefore, I do not reject the **H2**.

5.4 Price informativeness(A separate market basis) on intangibles

Having the opposite trends in two financial markets, this section analyzes the possible factor that influences price informativeness. Theoretical framework suggests that prices become more or less informative as they predict investment in Intangibles strongly. To test this prediction in empirical research, I analyze the predicted variation of changes in Intangibles from the market prices. Similar to the process of generating price informativeness(the predicted variation of earnings from prices), I run the forecasting regression (1) but with the changes in Intangibles on the left-hand side in place of earnings. Following Bai et al. (2016), I add the changes in Intangibles of current year as an additional control. To be precise, I run

$$\textbf{(3)} \quad INT_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + d_{t,h}(INT_{i,t}/A_{i,t}) + \epsilon_{i,t+h}.$$

(Fig. 5., Fig. 6. And TABLE 4 Here)

Fig. 5, 6 present the trends on price informativness on Intangibles and Table 4 presents statistical approach. Again, KRX and KOSDAQ firms display opposite trends that while KRX firms show increasing trends KOSDAQ firms show decreasing trends over time. Having the fact that intangible intensity is higher in KOSDAQ firms with decreasing trends on price informativenss in intangibles and earnings, I do not reject the **H3.** In conclusion, KOSDAQ firms more aggressively capitalize intangibles that future cash flows are not probable, eventually lowering price informativeness.

6. Limitations

Bai et al. (2016) price informativeness model provides the opportunity to measure the qualitative aspects of financial markets in Korea. However, there are some limitations on interpreting the empirical results. The comparison between KRX firms and KOSDAQ firms fundamentally assumes that the investors take identical reactions on two different markets

from same information. Each investor tends to make highly correlated decisions among two markets but it does not guarantee that the decisions have to be identical. Therefore, the empirical analysis does not compare the absolute level of price informativeness between two markets because it does not consider the different characteristics of KRX firms and KOSDAQ firms (Cho and Ko, 2015). Rather, I analyze the trends on price informativeness in each market and how this measure has evolved over time.

The second limitation is that there are several periods with negative coefficients on price informativeness, $b_{t,h}$. The model takes the square root on this value to produce meaningful comparison between dollars of future cash flows and dollars of current total assets. Therefore, the negative coefficients turn into the missing values for price informativeness. The missing values impede the trends being measured. While the coefficients themselves(before I take the square root) present almost identical trends with the original model at every horizon, it does not deliver the meaningful interpretations on the variables. However, it is not severely damaging the empirical findings because the results become more conservative if the negative coefficients are somehow included in the trends on price informativeness.

Lastly, this paper has no extensions on direct research toward RPE(revelatory price efficiency). In the past, the research primarily focuses

on price informativeness as RPE through price nonsynchronicity (Roll, 1988) and PIN measures (Easley, Kiefer, ara, and Paperman, 1996). While price informativeness as FPE(forecasting price efficiency) already includes RPE, it is not able to assure that RPE trends are similar to FPE trends. However, there is the indirect evidence on RPE driven by the fact that the trends on disclosure information become more informative (Sohn and Cheon, 2000; Lee and Roh, 2011). Having this finding, further research down the road would enrich the literature of price informativeness in Korea. The works could be done by separating the groups in accordance to the expectation level of RPE and analyze if there are clear differences between the groups upon the trends on price informativeness.

7. Conclusion

The financial markets in Korea have grown and changed drastically in the past few decades. Institutional investors have become overwhelming, the number of investors has increased deepening liquidity and information producing costs have declined with the evolution of the Internet. Moreover, KOSPI has arrived at 2500 in 2017 from the standard index, 100, in 1980. As a result, the analysis on financial markets becomes a matter of common

interest of entire nations and overall manufacturing markets. Against this backdrop, I ask “the qualitative aspects of the financial markets have been progressing with the rapid growth and changes?”

Following the spirit of Bai et al (2016), this paper analyzes on price informativeness: the predicted variance of future cash flows from current market prices. While price infomativeness on combined market(KRX and KOSDAQ) remain unchanged, KRX firms present positive trends and KOSDAQ firms present negative trends over time. The opposite trends are related to price informativeness on Intangibles that KOSDAQ firms show decreasing trends due to aggressive intangibles capitalization. The capitalized intangibles that are future cash flows are not probable eventually bring price informativeness downward.

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FIGURE 1
The trends on Price informativeness
(Combined Market Basis)

Figure 1a

Coefficients $b_{t,h}$

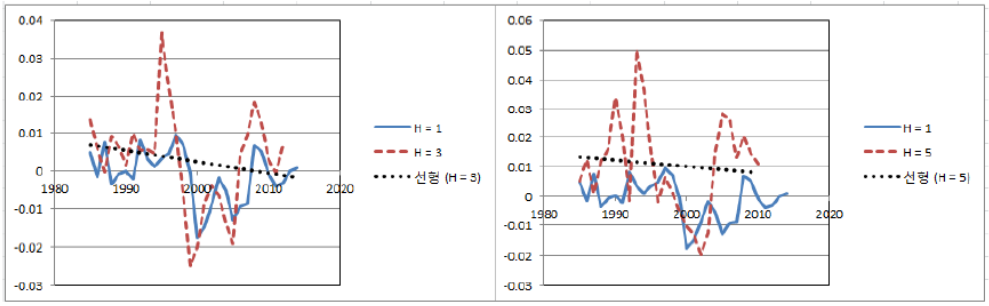

Figure 1b

Price informativeness $b_{t,h} \times \sigma_t$(Log M/A)

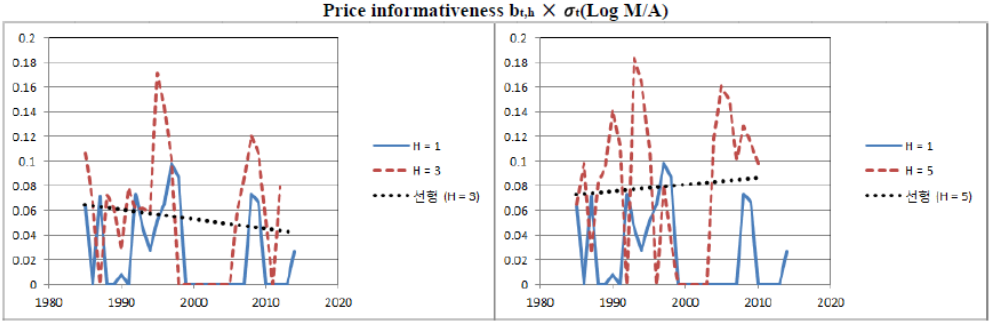

Fig. 1. This figure presents Price informativeness over time. Following Bai et al. (2016), results from the cross sectional forecasting regression (1): $E_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$, where M is market capitalization, A is average total assets, E is earnings before interest and taxes (EBIT). H indicates each horizon h = 1, 3, 5(the last available data is 2010 for h = 5).The black dots lines indicate the trends on longer horizon in each figure(H = 3 and 5). The sample contains all the firms in KRX and KOSDAQ from 1985 to 2015.

FIGURE 2
Alternative definitions of earnings

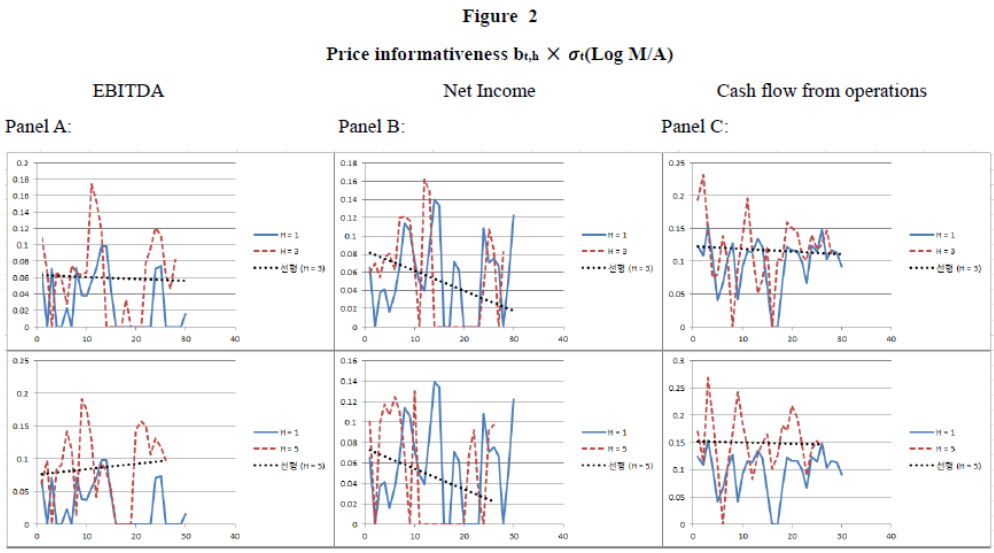

Fig. 2. Price informativeness with the alternative definitions of earnings over time. Following Bai et al. (2016), results from the cross sectional forecasting regression (1): $E_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$, where all the variables are defined identically except for the earnings. Panel A, B and C apply the definitions of earnings as: EBITDA, Net Income and Cash flow from operations. EBITDA is calculated by EBIT + DA and all other variables are directly from DATAGUIDE. The black dots lines indicate the trends on longer horizon in each figure(H = 3 and 5). The sample contains all the firms in KRX and KOSDAQ from 1985 to 2015.

FIGURE 3
The trends on Price informativeness
(A Separate Market Basis - KRX)

Figure 3a

Coefficients $b_{t,h}$

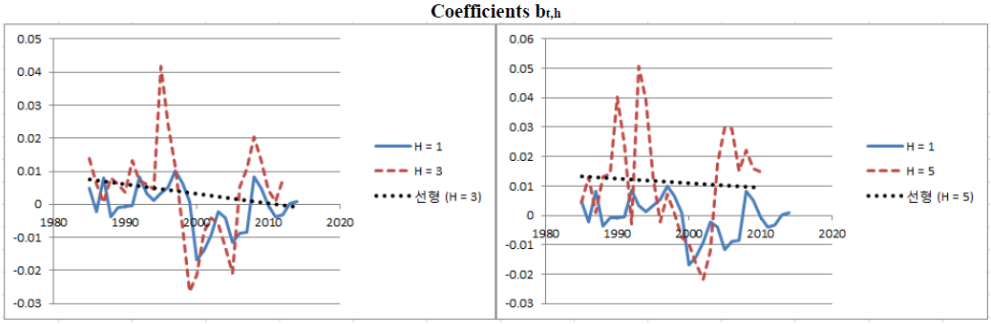

Figure 3b

Price informativeness $b_{t,h} \times \sigma_t$(Log M/A)

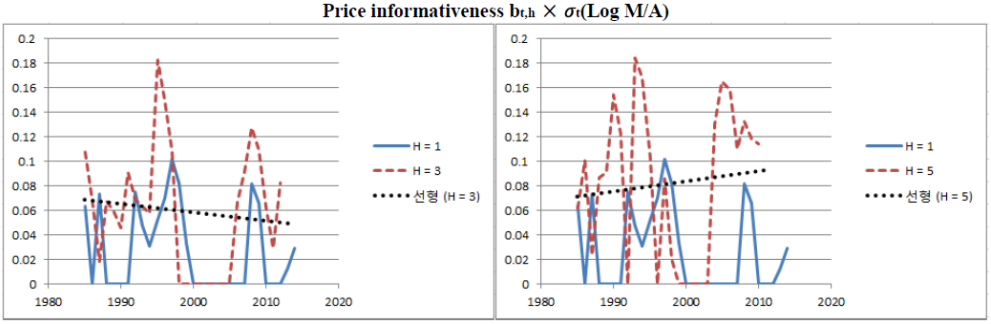

Fig. 3. This figure shows Price informativeness over time for KRX firms. Following Bai et al. (2016), results from the cross sectional forecasting regression (1): $E_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$, where M is market capitalization, A is average total assets, E is earnings before interest and taxes (EBIT). H indicates each horizon h = 1, 3, 5(the last available data is 2010 for h = 5). The black dots lines indicate the trends on longer horizon in each figure(H = 3 and 5). The sample contains only the firms in KRX 1985 to 2015.

FIGURE 4
The trends on Price informativeness
(A Separate Market Basis - KOSDAQ)

Figure 4a

Coefficients $b_{t,h}$

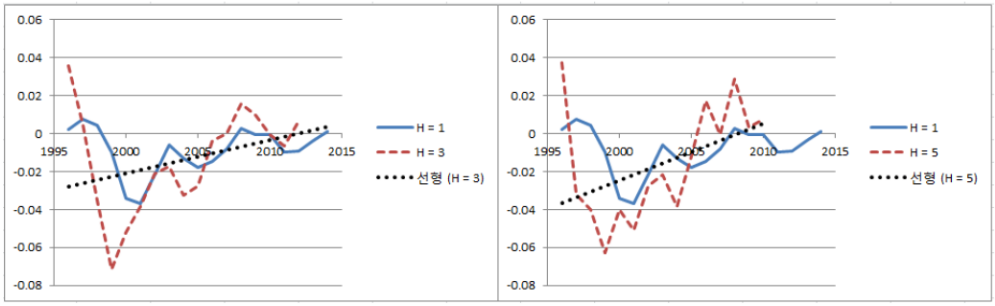

Figure 4b

Price informativeness $b_{t,h} \times \sigma_t$(Log M/A)

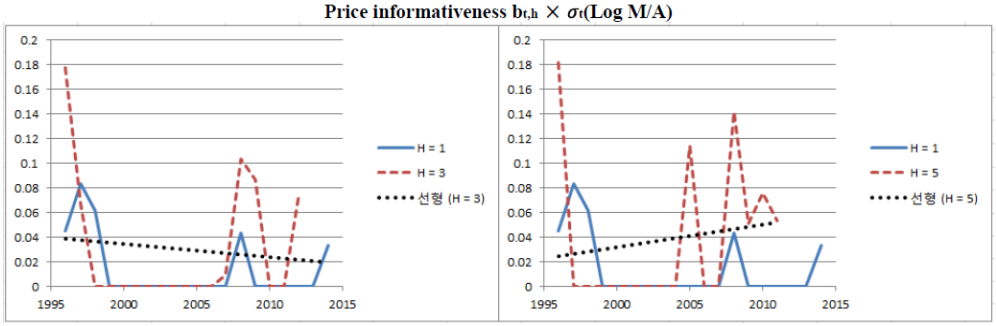

Fig. 4. This figure shows Price informativeness over time for KOSDAQ firms. Following Bai et al. (2016), results from the cross sectional forecasting regression (1): $E_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$, where M is market capitalization, A is average total assets, E is earnings before interest and taxes (EBIT). H indicates each horizon h = 1, 3, 5(the last available data is 2010 for h = 5). The black dots lines indicate the trends on longer horizon in each figure(H = 3 and 5). The sample contains only the firms in KOSDAQ 1996 to 2015.

FIGURE 5
Price informativeness on Intangibles
(A Separate Market Basis - KRX)

Figure 5a

Coefficients $b_{t,h}$

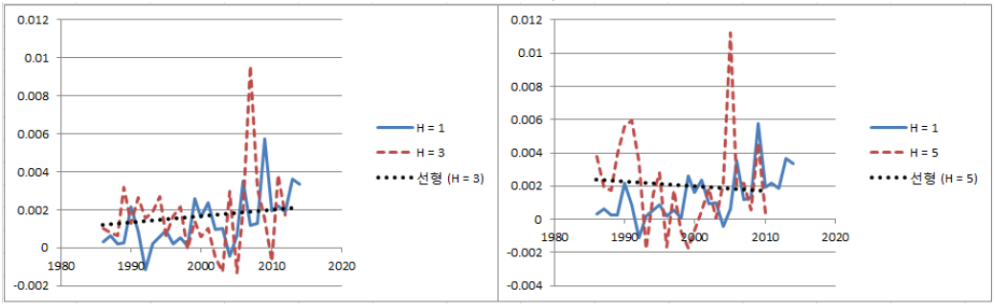

Figure 5b

Price informativeness $b_{t,h} \times \sigma_t$(Log M/A)

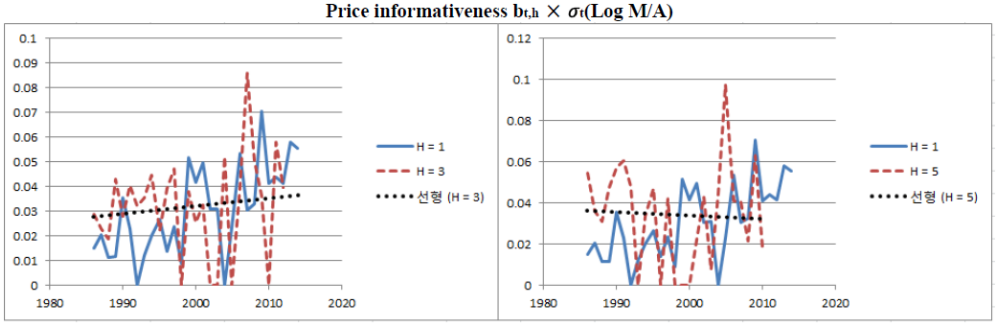

Fig. 5. This figure shows Price informativeness on Intangibles in KRX firms. Following Bai et al. (2016), the results from the cross sectional forecasting regression: $INT_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + d_{t,h}(INT_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$, where INT is the changes in Intangibles(Current year – prior year in values), M is market capitalization, A is average total assets, E is earnings before interest and taxes (EBIT). H indicates each horizon h = 1, 3, 5. The sample contains only the firms in KRX from 1986 to 2015.

.

FIGURE 6
Price informativeness on Intangibles
(A Separate Market Basis - KOSDAQ)

Figure 6a

Coefficients $b_{t,h}$

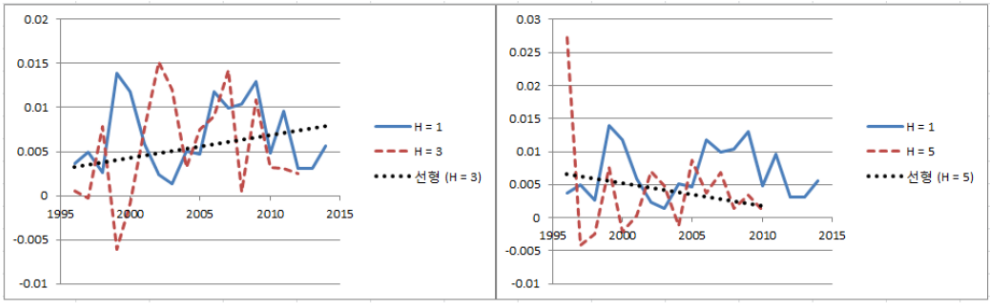

Figure 6b

Price informativeness $b_{t,h} \times \sigma_t$(Log M/A)

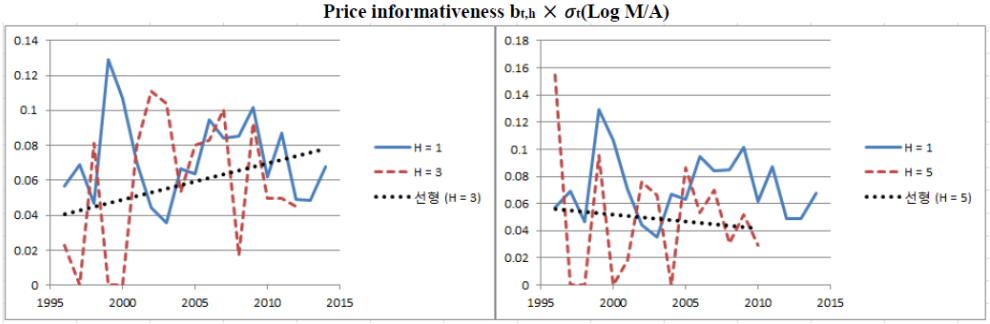

Fig. 6. This figure shows Price informativeness on Intangibles. Following Bai et al. (2016), the results from the cross sectional forecasting regression: $INT_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + d_{t,h}(INT_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$, where where INT is the changes in Intangibles(Current year – prior year in values), M is market capitalization, A is average total assets, E is earnings before interest and taxes (EBIT). H indicates each horizon h = 1, 3, 5. The sample contains only the firms in KOSDAQ from 1997 to 2015.

TABLE 1
Descriptive Statistics: Main Variables

	Full sample (KRX/KOSDAQ)			Subsample (KRX)			Subsample (KOSDAQ)		
Variable	Mean	Median	St.Dev.	Mean	Median	St.Dev.	Mean	Median	St.Dev.
Inflation unadjusted									
Market Capitalization	355,822	54,314	1202387	573,339	70,677	1,798,552	84,010	41,748	125,993
Total Assets	1,169,820	122,699	4272666	2,106,322	235,878	7,082,612	115,105	62,507	166,949
Earnings	48,531	7,425	160179	83,273	12,462	258,729	8,187	3,981	12,564
Intangibles	21,758	797	98844	39,558	631	175,109	3,952	961	9,008
Net book values	314,449	54113	1017861	535,919	87,566	1,653,551	56,666	34,998	70,445
Log(M/A)	-0.9129	-0.8729	0.9939	-1.2296	-1.1494	0.9359	-0.4189	-0.4173	0.8807
E/A	0.0730	0.0601	0.0579	0.0668	0.0574	0.0505	0.0827	0.0660	0.0675
I/A	0.0248	0.0055	0.0462	0.0138	0.0029	0.0286	0.0396	0.0134	0.0634
BV/A	0.4658	0.4604	0.2297	0.3937	0.3855	0.2226	0.5726	0.5783	0.2032
Inflation adjusted									
Market Capitalization	329,861	46,264	1149855	528,835	54,167	1,721,966	81,776	39261	126,446
Total Assets	1047,608	102,935	3963724	1,866,192	185,276	6,435,308	111,040	58920	163,000
Earnings	43,815	6,033	150990	74,348	9,238	239,176	7,885	3675	12,390
Intangibles	20,665	676	95534	37,929	476	172,419	3,906	914	9,083
Net book values	288,621	46,380	959068	497,550	69,884	1,606,957	55,293	33001	71,750
Log(M/A)	-0.8952	-0.8456	1.0636	-1.2296	-1.1494	0.9359	-0.4189	-0.4172	0.8806
E/A	0.0484	0.0508	0.1214	0.0668	0.0574	0.0505	0.0827	0.0660	0.0675
I/A	0.0309	0.0055	0.0716	0.0143	0.0029	0.0358	0.0396	0.0134	0.0634
BV/A	0.3952	0.4387	2.2039	0.3906	0.3821	0.2347	0.5726	0.5783	0.2032
Number of Observations		27774			16885			10889	

Descriptive Statistics. This table presents means, medians, and standard deviations of the variables used for the firms in KRX and KOSDAQ. All variables are in millions of won. All the variables are from the DATAGUIDE. Inflation is adjusted with the gross domestic product (GDP) deflator (= 100 in 2010) from Bank of Korea. Market capitalization and Total Assets are applied as the average values throughout the year. Detailed explanations on the variables are as follow: log(M/A) is the log-ratio of market capitalization to total assets, E/A is EBIT over total assets, I/A is intangibles over total assets, and BV/A is book values over total assets. All ratios are winsorized at the 1% level. The sample period for KRX firms is from 1985 to 2015 and KOSDAQ is from 1996 to 2015 due to the data availability.

TABLE 2
Main Regression Analysis: Price informativeness
(Combined Market Basis)

Panel A: Price informativeness

	EBIT			EBITDA		
Variables	H = 1	H = 3	H = 5	H = 1	H = 3	H = 5
Intercept	0.0732 **	0.0780 ***	0.0903 ***	0.0638 **	0.0810 **	0.0892 ***
Log(M/A) X 100	-0.0204	-0.0301	0.0211	-0.0190	-0.0192	-0.0100
Informativeness X 100	-0.101	0.047508	0.1430	-0.0311	0.0221	0.1430
Adjusted R^2	0.0608	-0.0470	0.0354	-0.0718	-0.525	0.0161
Number of obs.	14/30	18/28	19/26	14/30	20/28	21/26

Panel B: Price informativeness

	NI			CFO		
Variables	H = 1	H = 3	H = 5	H = 1	H = 3	H = 5
Intercept	0.0593 **	0.08820 **	0.1055 ***	0.0989 **	0.1371 **	0.1695 ***
Log(M/A)	-0.0203	-0.1030	-0.1180	-0.0115	-0.0581	-0.0796
Informativeness	0.0532	-0.0209	-0.1190	0.0332	-0.0765	-0.1010
Adjusted R^2	-0.0292	-0.0676	0.0927	-0.0271	-0.0157	0.0229
Number of obs.	22/30	16/28	12/26	28/30	26/28	25/26

Regressions on Price informativeness. This table presents the coefficients on the cross-sectional forecasting regression (1): $E_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$. I apply the alternative definitions of earnings including EBIT, EBITDA, NI and CFO to have robustness check. All other variables remain identical. Time horizon includes h = 1, 3, 5(the last available data is 2010 for h = 5). The coefficients on Log(M/A) and the trends on Informativeness are multiplied by 100. The sample contains all the firms in KRX and KOSDAQ from 1985 to 2015.

TABLE 3
Main Regression Analysis: Price informativeness
(A Separate Market Basis)

Panel A: Price informativeness

	KRX			KOSDAQ		
Variables	H = 1	H = 3	H = 5	H = 1	H = 3	H = 5
Intercept	0.0572 **	0.0714 ***	0.0583 ***	0.0665 **	0.1240 **	0.1973 ***
Log(M/A) X 100	0.0102	0.0308 *	0.0471 *	0.0335	0.1740	0.2880 *
Informativeness X 100	0.0383	0.1660 **	0.3080 ***	-0.1700	-0.3860	-0.8070 **
Adjusted R^2	-0.0292	0.1253	0.2981	0.3226	0.0247	0.6482
Number of obs.	23/30	27/28	26/26	5/19	6/17	6/15

Descriptions on price informativeness in two financial markets. This table presents the coefficients on the cross-sectional forecasting regression (1): $E_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$. All the variables remain identical. Time horizon includes h = 1, 3, 5(the last available data is 2010 for h = 5). The coefficients on Log(M/A) and the trends on Informativeness are multiplied by 100. The sample period for KRX firms is 1985 to 2015 and for KOSDAQ firms 1996 to 2015.

TABLE 4
Main Regression Analysis: Price informativeness on Intangibles
(A Separate Market Basis)

Panel A: Price informativeness

	KRX			KOSDAQ		
Variables	H = 1	H = 3	H = 5	H = 1	H = 3	H = 5
Intercept	0.0115 **	0.0262 ***	0.0471 ***	0.07476 **	0.0063 **	0.1215 ***
Log(M/A) X 100	0.0102 **	0.0033	-0.0027	0.0036	0.0256	0.0256
Informativeness X 100	0.1390 **	0.0995 ***	-0.0321	-0.0267	-0.0863	-0.5990 **
Adjusted R^2	0.4999	0.2846	-0.0363	-0.0548	-0.0624	0.4218
Number of obs.	27/29	22/27	20/25	19/19	14/17	11/15

Regressions on price informativeness on Intangibles in two financial markets. This table presents the coefficients on the cross-sectional forecasting regression (1): $INT_{i,t+h}/A_{i,t} = a_{t,h} + b_{t,h}\log(M_{i,t}/A_{i,t}) + c_{t,h}(E_{i,t}/A_{i,t}) + d_{t,h}(INT_{i,t}/A_{i,t}) + \epsilon_{i,t+h}$. All the variables remain identical. Time horizon includes h = 1, 3, 5(the last available data is 2010 for h = 5). The coefficients on Log(M/A) and the trends on Informativeness are multiplied by 100. The sample period for KRX firms is 1986 to 2015 and for KOSDAQ firms 1997 to 2015.

국문초록

한국 주식시장에 대한 질적 연구: 주가 정보력과 무형자산

서울대학교 대학원

경영학과 회계학전공

고현산

지난 30년간 한국의 주식시장은 급격한 외형적 성장을 이룩하였다. 그러나, 가파른 성장에 걸맞는 질적인 연구는 충분히 이루어 지지 못 하였다. 이러한 상황에서 본 연구는 Bai et al. (2016)에서 제시된 주가 정보력을 한국 시장에 적용해 봄으로써 주가가 가지고 있는 정보의 양에 대한 추세를 실증적으로 규명하였다. 주가 정보력이란 현재 주가가 기업의 미래 현금흐름을 얼마나 잘 예측하는지 보여주는 지표이다. KRX와 KOSDAQ 기업을 모두 포함한 한국 금융시장을 실증분석한 결과, 주가 정보량은 지난 30년간 통계적으로 변화하지 않았다. 각각의 시장을 나누어 살펴보면, KRX 기업들의 경우 시간이 지남에 따라 주가가 더 많은 정보를 전달하는 반면 KOSDAQ 기업들의 주가는 전달하는 정보의 양이 줄어들었다. 본 연구는 무형자산에 대한 주가 정보력이 이러한 상반되는 추세를 부분적으로 설명하고 있음을 밝혔다. 즉, KOSDAQ 기업들은 KRX 기업들에 비해 비용처리가 아닌 공격적인 무형자산화를 하는 행태를 보였고 이는 미래 현금흐름의 유입의 불확실성을 키웠다. 결과적으로 기업들의 이러한 행태는 주가 정보력의 하락을 가져왔음을 분석하였다.

주요어: 주가 정보력, 무형자산 집약도, 비용처리와 자산화, 경제 성장, 투자자 정보망, 공시자료

학번: 2016