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Three Essays on the Cost of Equity

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Abstract

Three Essays on the Cost of Equity

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This dissertation consists of three essays which connect accounting information and the cost of equity. Because the cost of equity is critical for firm valuation, this dissertation provides evidence that supports the usefulness of accounting information.

The first essay examines the effect of International Financial Reporting Standards (IFRS) adoption, which was mandated in 2005, on the cost of equity capital in European banks. On average, mandatory IFRS adoption does not affect the cost of equity capital of European banks. I further examine the influence of institutional environments and the extent of changes in accounting standards from mandatory IFRS adoption on the cost of equity. Mandatory IFRS adoption decreases the cost of equity in countries where legal enforcement is strong and the extent of changes in accounting standards by mandatory IFRS is large. On the other hand, mandatory IFRS adoption increases the cost of equity where the power of the bank supervisor is strong and the enhancement of comparability by IFRS adoption is large. This highlights the importance of institutional environments

in the adoption of new accounting standards and in the economic consequences of the adoption.

The second essay reexamines the test on the pricing of accruals quality (AQ) in Ogneva (2012) by using the expected returns estimated by the autoregression model of Vuolteenaho (2002). The method of Ogneva (2012) has two concerns: first, except for a small portion that is captured by earnings surprises, most information shocks are not removed from the proxy for expected returns. Second, the difference in measurement periods of accounting earnings and returns could cause a bias in the estimation of information shocks. By using expected returns estimated by the autoregression model of Vuolteenaho (2002), I find evidence that supports the conjecture that *AQ* is a priced risk factor. In subsample analyses, the pricing of *AQ* is observed only in recession periods. As risk premiums are larger in recession periods, this can be interpreted as additional evidence that supports the main findings.

The third essay investigates the relation between expected returns and financial flexibility. Prior studies on the influence of the two indicators of a firm's financial flexibility in financial statements, cash holdings and financial leverage, on expected returns are generally based on the inaccurate premise that cash holdings are negative debts (Acharya et al. 2007). I reinvestigate this issue by separating cash holdings from leverage. To control the influence of financial flexibility on information shocks, I decompose stock returns to calculate the proxy for expected returns by using a vector autoregression (VAR) method (Vuolteenaho 2002). Empirical analyses find significant and positive relations between expected returns and both cash holdings and leverage. Furthermore, the relations are independent with each other, which imply that cash holdings should not be treated as negative debts in asset pricing tests. I also construct an aggregate financial flexibility measure which is conceptually the inverse of the traditional leverage measure that is calculated from net debts. This aggregate financial

flexibility is found to be positively related to expected returns. Therefore my results imply that the inaccurate proxy of leverage is the reason why prior studies fail to find a positive relation between leverage and returns. The positive relations are stronger in market downturns, which shows that firm risks drive the relation between expected returns and measures of financial flexibility.

Keywords: IFRS adoption; European banks; legal enforcement; banking regulation; vector autoregression; return decomposition; accruals quality; cost of equity; expected return; financial flexibility; cash holdings; leverage; cash flow shocks; discount rate shocks

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Essay 1.

The Impact of Mandatory IFRS Adoption on the Cost of Equity Capital: An Empirical Analysis of European Banks[1]

1 This essay is a revised version of Hwang, Suh, Yim (2012), *KIF Working Paper*.

1. Introduction

Mandatory adoption of International Financial Reporting Standards (IFRS) in the European Union (EU) in 2005 brought extensive changes in disclosure requirements and accounting comparability of European firms. Prior studies examine the impacts of IFRS adoption on earnings quality (Barth et al. 2008; Gebhardt and Novotny-Farkas 2011), information environment (Byard et al. 2011; Yip and Young 2012; Chen et al. 2013), security trading (Daske et al. 2008; DeFond et al. 2011; Florou and Pope 2012), and equity valuation (Daske et al. 2008; Li 2010). However, despite the importance of the banking sector in economic growth and the stability of the financial system, the valuation effect of IFRS adoption in the banking sector has not been studied comprehensively. This study examines the impact of mandatory IFRS adoption on the cost of equity capital of European Banks.

Among prior studies, Li (2010) investigates the impact of IFRS on the cost of equity with non-financial firms. However, the findings of Li (2010) cannot be extrapolated to banks. Unlike non-financial firms, the financial statements of banks are mainly composed of financial assets and liabilities. Thus, the changes in accounting standards for financial instruments would affect the financial reporting of banks more than they affect the accounting information of non-financial firms. On the other hand, changes in accounting standards related to assets with tangible forms, e.g., inventory or plant assets, would have a negligible impact on the banking sector since tangible assets are not the focus of the main operations of banks. Due to these differences in operations and the composition of assets, the impact of mandatory IFRS adoption on the banking sector should be investigated separately from non-financial firms.

In addition to the differences in asset structure, the regulation environment of banks provides unique institutional characteristics. Bank regulation is different from investor protection because bank regulation mainly focuses on the stability of the financial system instead of investor property rights (Barth et al. 2006; Greenbaum and Thakor 2007; La Porta et al. 1997; La Porta et al. 1998). Especially when macroeconomic stability is at risk, banking regulators have the incentive to intervene in the financial reporting of banks by impairing the rigorousness of financial reporting, which could conflict with the investor demand for high quality information (Skinner 2008). Because of the importance of institutional aspects in the implementation of accounting standards, the impact of IFRS adoption could affect banks differently from non-financial firms.

I focus on a European sample for two reasons. First, because of the economic unification of European countries, several common policies related to IFRS adoption were implemented. This commonality in policy implementation mitigates noise from the differences in the schedule of policy implementations. On the other hand, cross-country variations in institutional environments still exist among EU countries as they have not fully unified their political and legal systems. In addition, the economic unification of EU is unlikely to eliminate the variations in institutional environments because regulation environments are sticky in nature (Christensen et al. 2011). Hence, European banks provide a good setting to examine the cross-country variation in the impact of IFRS adoption.

I use implied cost of capital as the proxy for cost of equity capital. My measure for implied cost of equity is the average of four estimates of implied cost of equity calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004), and Gode and Mohanram (2003). I examine the change of the implied cost of equity in the time period around mandatory IFRS adoption. I include several groups of variables in my research models to control for the effects of firm risk, cross-listing on the U.S. stock market, inflation, errors in analyst earnings forecasts, and dispersion of analyst earnings forecasts.

My sample has 372 bank-year observations from 52 banks of 12 European countries, which include both mandatory and voluntary adopters. Within the sample, I focus on the banks that adopted IFRS mandatorily because IFRS adoption was an exogenous event in nine out of twelve countries in my sample. The mandatory adopter subsample has 324 bank-year observations for 45 banks from 12 European countries.

The first analysis examines the impact of mandatory IFRS adoption on the cost of equity of European banks using the difference-in-differences model. In this analysis, I examine the change in the cost of equity capital of mandatory adopters in comparison with that of voluntary adopters to control for potential confounding factors of macroeconomic conditions and the EU policies that influence European Banks. The results show that mandatory IFRS adoption does not have a significant impact on the cost of equity of banks for both voluntary adopters and mandatory adopters, on average.

The second analysis investigates the influence of institutional environments on the impact of mandatory IFRS adoption. Following the Basel II Guidelines on bank regulation, I investigate the influence of capital regulation, bank supervisory office, and legal protection. The results show that banks in countries with strong bank regulations and legal enforcement have a low cost of equity. Furthermore, IFRS adoption increases the cost of equity of banks in countries with a strong bank supervisory office. In countries with strong bank supervisory office power, bank regulators would intervene in the financial reporting of banks to control drastic changes from the adoption of new accounting standards (Bischof 2009). The intervention could damage the informativeness of the financial reporting of banks, which results in the increase of the cost of equity capital.

I further examine the impact of additional disclosure requirements and enhanced comparability resulting from IFRS adoption on the cost of equity. I measure additional disclosure requirements and the increase in comparability by mandatory IFRS adoption based on the survey of Nobes (2001). I exclude items that have no direct relation with bank operations (e.g. changes in inventory costing method or depreciation methods) from my main measures. My results show that additional disclosure requirements and strong legal enforcement jointly reduce the cost of equity capital of European banks, which suggests that legal enforcement facilitates the implementation of additional disclosures. On the other hand, banking regulatory power and the improvement of comparability jointly increase the cost of equity. These results imply that investor protection facilitates the implementation of IFRS adoption, which enhances the informativeness of financial reporting, whereas bank regulation impedes the implementation of IFRS, which decreases informativeness and increases the cost of equity capital.

This study has several contributions to the literature. First of all, my study is one of few studies that examine the impact of IFRS adoption on the valuation implications through financial reporting in the banking sector. Armstrong et al. (2010) examine market reactions to the announcement of IFRS adoption in Europe and find that bank stocks reacted to IFRS adoption more strongly than stocks of other industries. However, they do not show a direct link between market reaction and accounting information prepared by IFRS. Daske et al. (2008) and Li (2010) examine the market reaction to the financial reporting prepared by IFRS. However, those studies do not consider the differences in the financial reporting between non-financial firms and banks when examining the impact of IFRS adoption on the cost of equity. My study contributes to the literature by addressing the missing points of the studies mentioned above.

In addition, this study contributes to the literature on bank regulation. In bank regulation, the importance of market discipline by the sophisticated investors of banks increases with the complexity of financial markets (Greenbaum and Thakor 2007). Since investors who initiate disciplinary actions rely on public information, the relevance of public information is necessary to implement market discipline successfully (Stephanou 2010). Especially, indirect market discipline that enforces the soundness of banks through the prices of securities is closely related to this study. The stock price of banks is an effective measure of indirect market discipline because it reacts the most sensitively to the default risk of banks among several security prices (Stephanou 2010). This study examines the impact of the enhanced informativeness of financial reporting by IFRS adoption on the cost of equity capital, which is one of the determinants of the stock prices of banks. Therefore, this study provides insight on the effect of IFRS adoption on bank regulation by the private sector, i.e. market discipline.

Third, my study investigates the influence of the regulation environment of banks in the adoption of new accounting standards. Prior studies point out that institutional environments play an important role in activities in financial markets, including financial reporting (Ball et al. 2000; Ball et al. 2003; Bushman et al. 2004; La Porta et al. 1997; La Porta et al. 1998; Leuz et al. 2003). Related to this research, studies on mandatory IFRS adoption provide evidence that the protection of investor property rights, which is an aspect of institutional environments, facilitates the implementation of IFRS (Byard et al. 2011; Li 2010). However, despite the apparent interactions between bank regulation and financial reporting of banks (Skinner 2008), no studies examine the role of bank regulation in the implementation of new accounting standards. My study contributes to the literature by examining the role of bank regulation as one of the institutional environments in financial reporting.

This study also has limitations. Because my study focuses on listed banks, which have incentives that are different from private banks, I cannot generalize the findings of this study to all types of banks. Additionally, due to the data requirements of the implied cost of equity capital, my sample only includes a limited number of banks. My estimate of the cost of equity is calculated based on analyst earnings forecasts in the I/B/E/S database, which does not cover all listed banks. The existence of earnings forecasts of a bank in the I/B/E/S database means that the bank is within a good information environment. For banks with a bad information environment, IFRS adoption could affect the cost of equity capital differently.

The remaining part of this paper proceeds as follows. Section 2 summarizes prior studies regarding the effect of IFRS adoption on the cost of equity, institutional environments of the banking industry, and the economic consequences of IFRS adoption. Section 3 documents hypotheses development. Section 4 shows research design, sample selection, and descriptive statistics. The results of regression analyses are documented in section 5. Section 6 concludes and discusses the caveats of this study.

2. Literature Review

2.1. The Effect of IFRS Adoption on the Cost of Equity Capital

Mandatory IFRS adoption in 2005 brought comprehensive changes in the accounting standards of European countries (Nobes 2001). Prior studies argue that IFRS (or International Accounting Standards, IAS) adoption improves earnings quality (Barth et al. 2008; Gebhardt and Novotny-Farkas 2011), information environments (Byard et al. 2011; Yip and Young 2012; Tan et al. 2011; Chen et al. 2013), and comparability of financial statements across countries (Yip and Young 2012). Theoretical studies predict that improved disclosure quality will decrease the cost of equity capital (e.g. (Diamond and Verrecchia 1991; Easley and O'Hara 2004; Lambert et al. 2007). Empirical studies provide evidence that the cost of equity decreases in the quality of disclosure (Botosan 1997; Botosan and Plumlee 2002). Furthermore, Francis et al. (2005) report that firms utilize disclosures before they raise capital to enjoy valuation premiums.

Since IFRS adoption improves the quality of accounting information and the information environment (Barth et al. 2008; Gebhardt and Novotny-Farkas 2011; Byard et al. 2011; Yip and Young 2012; Tan et al. 2011; Chen et al. 2013), mandatory IFRS adoption is likely to decrease the cost of equity capital. Especially when institutional aspects support investor demand for high quality disclosures (Ball et al. 2000; Ball et al. 2003; Bushman et al. 2004), the impact of IFRS adoption would be stronger. On the other hand, if institutional aspects conflict with disclosures, IFRS adoption cannot decrease the cost of equity.

2.2. The Institutional Environment of Banks

Most countries regulate the banking sector to maintain the stability of the financial system because capital allocation is critical in economic stability and growth. Nowadays most countries prepare their bank regulation following the Basel II Guidelines, which is based on three pillars (Greenbaum and Thakor 2007). The first pillar, which is the main part of regulation, is minimum capital requirements, which require more regulatory capital as the risks of investments increase. The second pillar is the review process of the bank supervisor, which checks the calculation process of the regulatory capital ratio. The first and second pillars are unique in the banking sector. The enforcement of the first and second pillars can utilize information obtained directly from banks or bank auditors. In addition, banking laws or bank regulations frequently take priority over accounting standards (e.g. Skinner 2008; Peek and Rosengren 2005; Bischof 2009), which implies that the coverage of these two pillars is not limited by financial reporting. The last pillar is market discipline that relies on the monitoring of sophisticated investors, direct penalties through investor activism, and indirect penalties via the market prices of securities. Due to the increasing complexity of the financial sector that is difficult for regulators to follow, the demand for market monitoring is growing (Greenbaum and Thakor 2007).

Bank regulations affect the informativeness of the financial statements of banks. When specific private information found during the review process is critical for market participants, bank supervisors can require banks to disclose that private information (Flannery and Houston 1999; Flannery et al. 2004). In addition, strong minimum capital regulations and bank supervisors can enhance information dissemination over the level required by accounting standards, because the regulatory capital ratio includes timely and extensive information under strong capital regulations (Barth et al. 2004). Alternatively, strong banking regulators could conflict with the adoption of new accounting standards because their objectives are different from each other. Financial reporting is more inclined to the protection of property rights by reducing the information asymmetry between a firm and outside entities than the soundness of the banking system. On the other hand, banking regulators mainly aim to protect the soundness of the banking system. Therefore, financial reporting can be sacrificed to stabilize the financial system in economic emergencies (Skinner 2008; Huizinga and Laeven 2012; Peek and Rosengren 2005), or to prevent rapid changes in information environments (Bischof 2009). These regulatory forbearances could damage the informativeness of financial reporting, which is likely to increase the cost of equity.

High quality financial reporting is critical for market discipline because the enforcers of market discipline, i.e. sophisticated investors, utilize financial reporting as well as other information sources. Strong legal enforcement provides managers with incentives for transparent disclosures (Ball et al. 2000; Ball et al. 2003). Thus strong legal enforcement improves the quality of financial reporting (Bushman and Piotroski 2006; Bushman et al. 2004; Leuz et al. 2003). Consequently, strong legal enforcement is likely to reduce the cost of equity of banks by facilitating the implementation of disclosure requirements by IFRS adoption (Hail and Leuz 2006, 2009), as it does for non-financial firms (Li 2010).

2.3. IFRS Adoption in the Banking Sector

Studies on the IFRS adoption in the banking sector predict that disclosure requirements by IFRS adoption would enhance the informativeness of the financial reporting of banks. IFRS adoption expands the implementation of fair value methods in most countries, which is likely to improve the timeliness and informativeness of the financial reporting of banks (Bischof et al. 2011; Barth et al. 1996). IFRS adoption improves earnings quality by restricting discretion for the recognition in loan loss provisions (Gebhardt and Novotny-Farkas 2011). Furthermore, off-balance sheet transactions are harder to conduct than before, after IFRS adoption. This is because IFRS tightens the consolidation criteria of special purpose entities (SPE), which makes the risk estimation of outsiders easier. These changes could improve the informativeness of the financial reporting of banks.[2]

Although IFRS adoption could enhance the informativeness of the accounting information of banks, the valuation impact of IFRS on the banking sector is not clear because of innate uncertainties in the banking sector. Unlike non-financial firms, most of the assets in banks are financial assets. Financial instruments require specific information about contractual details of financial instruments. Therefore even sophisticated investors may not be able to reach a consistent evaluation on the risks of banks (Morgan 2002; Iannotta 2006). This implies that the change of accounting standards could have an insignificant impact on the valuation of banks.

In addition to the direct impact of IFRS adoption on the financial reporting of banks, IFRS could affect the financial reporting of banks indirectly through the financial reporting of bank customers. A large portion of bank assets are bound to the financial status of their clients via lending relationships (Skinner 2008). Hence, the

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[2] If hidden bad news is disclosed by IFRS adoption, enhanced informativeness could decrease firm value by increasing the cost of equity. Especially, if accounting numbers were influenced by regulatory forbearance, a faithful compliance with IFRS could be more damaging to the valuation of banks.

informativeness of the financial statements of their clients could affect the informativeness of the financial reporting of banks. In other words, as the financial reporting of clients explains more about the operations of those clients by IFRS adoption, the risks in the loan assets of banks could be estimated more precisely after IFRS adoption. Alternatively, because hedge instruments and the easy rebalancing of bank trading assets mitigate the risk from the financial position of their clients, the impact of IFRS adoption on bank clients could have negligible influence on the informativeness of the financial reporting of banks.

3. Hypothesis Development

Prior studies argue that IFRS adoption improves the quality of financial reporting of banks as well as non-financial industries (Ashbaugh and Pincus 2001; Barth et al. 2008; Bischof et al. 2011; Gebhardt and Novotny-Farkas 2011). As the studies on the influence of disclosure on the cost of equity predict (Diamond and Verrecchia 1991; Easley and O'Hara 2004; Gao 2010; Lambert et al. 2007), IFRS adoption could decrease the cost of equity of banks by enhancing the informativeness of financial reporting as it does for non-financial firms (Li 2010). Following these conjectures about capital regulation, I suggest my first hypothesis:

H1: Mandatory IFRS adoption decreases the cost of equity of banks.

Institutional aspects are as important as the quality of accounting standards for the adoption of new accounting standards (Ball et al. 2000; Ball et al. 2003) because institutional environments affect the incentives of managers regarding the faithful implementation of the new accounting standards. The most important institutional environment of the banking sector is the bank regulation that focuses on the stability of the financial system.

Among the three pillars of the Basel II guidelines on bank regulation, minimum capital regulation plays the central role. The minimum capital regulation requires banks to raise equity capital as the risks of assets increase, which is to reduce such risks. As the strength of the minimum capital regulation becomes stronger, the regulatory capital ratio is more likely to include more comprehensive and timely information (Barth et al. 2004). Thus in countries with strong capital regulations, such capital regulations could provide information about bank risks before IFRS adoption and thus reduce the impact of IFRS adoption.

Bank supervisors affect the valuation of listed banks (Beltratti and Stulz 2012; Flannery and Houston 1999). If bank regulators are effective, they can reduce the cost of equity by enforcing the risk management of banks. Regarding financial reporting, strong regulatory offices could enhance the informativeness of financial reporting by guaranteeing the faithfulness of the financial reporting of banks (Flannery and Houston 1999; Flannery et al. 2004). Alternatively, since bank supervisors could damage the faithfulness of accounting information by limiting the accurate representation of financial information to avoid procyclical economic impacts (Skinner 2008; Bischof 2009). Between these two possibilities, I conjecture that the latter point of view is more reasonable since banking regulators have strong incentives to avoid procyclical economic impacts. IFRS adoption would bring the most important and comprehensive changes in financial reporting, and therefore bank supervisors are expected to suppress sudden changes in disclosure. This is because accounting numbers are the base of the calculation for the regulatory capital ratio, which can exacerbate procyclical activities in financial markets (Greenbaum and Thakor 2007; Skinner 2008).

The third pillar of the Basel II guideline, market discipline, depends on investor monitoring. The strength of country level investor protection provides investors with disciplinary mechanisms to enforce the manager's faithful representation of accounting standards (Ball et al. 2000; Ball et al. 2003), which leads to the reduction of the cost of equity capital (Hail and Leuz 2006, 2009; Leuz et al. 2003). Thus, IFRS would be implemented more thoroughly in strong investor protection regimes, which leads to the reduction of the cost of equity capital. Following these conjectures, I suggest my hypotheses related to the institutional aspects of the banking sector.

H2: Strorng minimum capital regulations reduces the cost of equity of banks.

H3: Strong bank supervisory offices reduce the cost of equity of banks.

H4: Strong minimum capital regulations mitigate the cost of equity effect of IFRS adoption.

H5: IFRS adoption increases the cost of equity of banks in countries that have strong bank supervisors.

H6: IFRS adoption decreases the cost of equity of banks in strong investor protection regimes.

Because European countries adopted their own local GAAPs before mandatory IFRS adoption, the impact of IFRS adoption is different among European countries (Bae et al. 2008). The more their local GAAP is different from IFRS, the more severe the impact of IFRS would be. Thus, I propose the following hypotheses.

H7: The impact of IFRS adoption increases with additional disclosure requirements by IFRS adoption.

H8: The impact of IFRS adoption increases with the inconsistencies between IFRS and local GAAPs.

4. Research Design

4.1. Sample Selection

This study focuses on EU banks because European countries share a common implementation schedule of IFRS and related regulatory actions, which mitigates the influence of economic events other than IFRS adoption.[3] Sample period is from 1995 to 2009 (Li 2010).[4] I select bank observations by requiring SIC codes to be between 6020 and 6099. I obtain analyst forecast data and accounting data from I/B/E/S and Compustat Global, respectively. To make sure that the information in accounting data is fully incorporated into stock prices, I match prices and forecasts to seven months after the fiscal-year end. I require earnings forecasts to be strictly positive. Following prior studies (Hail and Leuz 2006, 2009; Li 2010), if three-year-ahead to five-year-ahead earnings forecasts are missing, I fill those missing values with a value estimated by long-term earnings growth rate forecasts. The expected dividend payout ratio is calculated by averaging the historical three-year payout ratio of each bank. If data on the payout ratio are missing or outside of 0 to 1, firm payout ratio is replaced by the country-median value of the payout ratio. I require banks to have observations in both before and after the mandatory IFRS adoption. Years from 1995 to 2004 are classified as the pre-mandatory adoption period, and years after 2005 are classified as the post-mandatory adoption period.

Table 1 shows the composition of my sample. The final sample has 376 observations from 52 banks of 12 countries, which has 7 voluntary adopters and 45 mandatory adopters. Among 376 observations, 52 (324) observations are obtained from

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[3] Though European countries share a common implementation schedule, the degree of faithful representation of accounting standards and the impact on the equity capital would vary across countries because each country has its unique economic environment, including regulations.

[4] Following prior studies (Li 2010), I choose my sample from 1995 because the IAS Comparability / Improvement Project was completed and endorsed in 1995. A decade-long gap exists between 1995 and 2005, which can incur serial correlation problems (Bertrand et al. 2004). Thus, I rerun my analyses after limiting the sample period for 4 years around mandatory IFRS adoption in 2005.

voluntary (mandatory) adopters. Only three countries, Germany, Greece and Poland have voluntary adopters, implying that the voluntary adoption of IFRS for the banking sector is not common in in other European countries.[5] Among 210 (166) observations before (after) mandatory IFRS adoption, 181 (143) observations are obtained from mandatory adopters.

4.2. Basic Model

My proxy for the cost of equity capital is the implied cost of equity.[6] As my proxy of the implied cost of equity, I use the average of four estimates of the cost of equity, which are calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004), and Gode and Mohanram (2003) to reduce measurement error (Hail and Leuz 2006, 2009). These estimates are calculated with analyst earnings forecasts. All the four models are modifications of the dividend discount model.

The first analysis examines the overall impact of mandatory IFRS on the cost of equity of European banks by difference-in-differences model. This is the basic regression model for the first analysis.

$$\begin{aligned} CoC = \alpha &+ \beta_1 VOLUNT + \beta_2 POST + \beta_3 VOLUNT * POST \\ &+ \beta_4 SIZE\_DEC + \beta_5 OTC + \beta_6 EXCH + \beta_7 INFLA \\ &+ \beta_8 RETVOL\_DEC + \beta_9 LEV\_DEC + \beta_{10} CAPR + \beta_{11} CAPR\_DUM \\ &+ \beta_{12} FBIAS + \beta_{13} DISP + \beta_{14} ONEFORECAST + \beta_{15} BPR + \beta_{16} IFRS7 \\ &+ \sum \beta_n Country\_Dummy + \varepsilon \cdots\cdots (1) \end{aligned}$$

Variables of interests are the two indicator variables and the interaction term of the two indicator variables. *VOLUNT* is the indicator variable for voluntary adopters that

[5] Sample selection did not drive this result. I find the same result from the entire Compustat Global database.

[6] Prior studies suggest that the implied cost of capital is the most reliable and unbiased among the candidates for the proxy of the cost of equity (Hail and Leuz 2006, 2009; Stulz 1999). Realized return is a potential candidate to examine the policy impact on the cost of capital. However, since realized returns require a long time-series to avoid bias, it is not appropriate for my study (Stulz 1999).

adopted IFRS before 2005. *POST* is the indicator variable for the post-mandatory adoption period, which is equal to one if the bank-year falls in the period from 2005. Several events other than mandatory IFRS adoption could affect the cost of equity of European banks during the sample period. Hence, I use voluntary adopters as the control sample in my difference-in-differences design to mitigate the impact from other economic events on the cost of equity because voluntary adopters and mandatory adopters experience the same economic events during my sample period. If there is any systematic difference in the change of the cost of equity between voluntary and mandatory IFRS adopter, β_3 will capture the difference. I adjusted the standard deviation of coefficients in every regression analysis by firm-clusters to avoid over-rejection by serial correlations within observations of the same firm.[7]

I include four groups of control variables to address several factors that affect the implied cost of equity. The first group of variables controls firm-level risk. This group consists of the decile of size (*SIZE_DEC*), the decile of return volatility (*RETVOL_DEC*), the decile of leverage (*LEV_DEC*), the total capital ratio (*CAPR*), and book-to-price ratio (*BPR*). Size, return volatility, and leverage are measured by the decile rank of each variable to mitigate measurement errors. The second group has variables to control the effect of cross listing (Hail and Leuz 2009). *EXCH*, *OTC*, and *PP* indicate whether the stock is traded in the U.S. through major stock exchanges, the over-the-counter markets, or a private placement under Rule 114A, respectively. The third group of controls is the annual inflation rate and the indicator variable for the year after 2007 (*IFRS7*). I include the annual inflation rate to control the effect of country level economic conditions. I also include the indicator variable for the year after 2007 (*IFRS7*) because IFRS 7 was endorsed and the financial crisis started in year 2007,

[7] I do not use two-way cluster adjusted regressions since most of banks do not have sufficient observations for two-way cluster adjusted regressions. Thompson (2011) suggests that at least 25 firm observations are required for each firm to use this method.

which would have significant influence on the cost of equity of banks. Finally, to mitigate bias from analyst forecasts and the nonlinearity of the models for implied cost of equity, I include the bias and dispersion of analyst forecasts (Easton and Sommers 2007; Gebhardt et al. 2001). Because a significant portion of bank-year observations have only one one-year-ahead earnings forecasts, I include an indicator variable for the observations (*ONEFORECAST*) that have only one analyst forecast and replace the missing value of the dispersion of analyst forecasts (*DISP*) with zero.

4.3. Descriptive Statistics

Panel A of Table 2 reports the country mean of several variables. The appendix presents variable definitions. Among twelve countries in my sample, Denmark has the highest average implied cost of capital (*CoC*), which is 13.86%. The country average of the implied cost of capital is the lowest in Swedish banks, at 10.17%. Among German banks, mandatory adopters have lower implied cost of capital than voluntary adopters. On the other hand, in Poland, the implied cost of capital is higher in mandatory adopters than in voluntary adopters.

The size of banks varies substantially by countries. The average total book of assets (*TA*) of French banks is 71 times larger than that of Polish banks. The average market value of banks (*MKT*) is the largest in UK, which is 48 times larger than the average value of Finland banks. The average of the ratio of book value of equity to market value of equity (*BPR*) is larger than 1 in most countries except Denmark and France. The country average of stock return volatility (*RETVOL*) is between 0.0715 and 0.1176, the highest being from Poland, where the prices of Polish mandatory adopters are more volatile. Return volatility reflects the risk of the stock. The high average return volatility of Polish banks could imply a high risk in Polish banks. The average of risk adjusted total capital ratio (Total Regulatory Capital Ratio) in most countries is higher than 11%

except for Sweden. Polish banks have the highest capital risk adjusted total capital ratio. In addition, the average leverage (*LEV*) of Polish banks is the lowest among all countries in my sample. The low leverage and high regulatory capital ratio of Polish banks could be due to the result of their risk management. Since Polish banks are generally small and risky, they would manage their risk more conservatively by accumulating more capital and maintaining low leverage. Except for Swedish banks and German banks that have adopted IFRS mandatorily, one-year-ahead analyst earnings forecasts (*FBIAS*) are generally larger than actual earnings.

Table 3 documents the differences in the characteristics of mandatory adopters before and after IFRS adoption. In the full sample results of Panel A, the means of *CoC* are significantly higher for the pre-adoption period (before mandatory IFRS adoption) than the post-adoption period. However, in the partial sample results, the difference is insignificant. Book-to-price (*BPR*) significantly changed in the full sample analysis (Panel A), but no significant differences appear in Panel B. The differences in *CoC* and *BPR* are likely to come from the large decrease of stock prices during the financial crisis from 2007. Table 4 presents Pearson correlations of the mandatory adopter sample.

5. Analysis Results

5.1. Results from Basic Model

Table 5 reports the results of the regression analysis of model (1). The analysis for the full sample period shows that the coefficient of *POST* is significantly positive (β=0.006, t=2.33), implying that the cost of equity increases after mandatory IFRS adoption. However, the interaction term of *POST* and *VOLUNT* is insignificant, which means that the impact of IFRS adoption on the cost of equity of voluntary adopters is not statistically different from mandatory adopters.[8] The positive and significant coefficient of *IFRS7* suggests that the cost of equity capital is higher for years from 2007 than prior to 2007, which is probably due to the financial crisis from 2007. Since the full sample period covers more than 10 years, several macroeconomic events having little relation with mandatory IFRS adoption could affect the cost of equity. I rerun model (1) with a subsample of four years, from 2003 to 2006 to confirm my results. In column (B), the coefficient of the interaction between *POST* and *VOLUNT* is not significant, as it is in column (A).

One concern about the analysis in Table 5 is that more than half of the countries do not have voluntary adopters. This implies that the IFRS adoption decision is determined exogenously in most European banks, in contrast to the case of non-financial firms (Bischof 2009; Li 2010).[9] Hence, I interpret the comparison of the impact of mandatory IFRS adoption on the two adopters with caution because the difference between the two adopters could be due to the differences in the country level approach towards the adoption of IFRS in the banking industry.

5.2. The Influence of Institutional Aspects on the Cost of Equity Effect of IFRS Adoption

The second analysis investigates how the institutional environment influences the impact of mandatory IFRS adoption on the cost of equity. Government regulation is the most important and influential institutional environment of the banking industry. Most countries prepare their bank regulation system based on the guidelines of the Basel II accord, which suggests three pillars of bank regulation: capital regulation, supervisory

[8] This result should be interpreted with caution. The number of observations is different between mandatory adopters and voluntary adopters.

[9] This pattern is not driven by the variable preparation process of my study. I double-checked this pattern with the entire Compustat global database. Among the countries included in my sample, only three countries have banks that adopted IFRS voluntarily, which is consistent with what I found.

agencies, and market discipline. I include measures for the strength of capital regulation (*CAPITAL*), the power of bank supervisors (*OFFICE*), and efficiency of legal enforcement (*ENFORCE*) to analyze the influence of institutional environments. *CAPITAL* and *OFFICE* are based on The Bank Regulation and Supervision Survey 2003 conducted by the World Bank (Barth et al. 2004; Caprio et al. 2007).[10] As capital regulation becomes stronger, the calculation of regulatory capital incorporates more timely and comprehensive information. *OFFICE* increases when the power and discretion of bank supervisory offices is stronger. *ENFORCE* is proxy of the efficiency of legal enforcement that provides market participants the disciplinary tools through lawsuit (La Porta et al. 1998; Leuz et al. 2003).

I focus on mandatory adopters in subsequent analyses because of several reasons. First, as presented in Table 1, only three countries have voluntary adopters, implying that voluntary adopters could not be a good control sample for the banks that adopted IFRS mandatorily. In addition, the analysis in Table 5 shows no significant difference between the two adopters. Furthermore, for most European banks, since they adopted IFRS mandatorily, IFRS adoption is more of an exogenous event than an event from endogenous decision making. This is the main model:

$$\begin{aligned} CoC = {} & \alpha + \beta_1 POST + \beta_2 ENFORCE + \beta_3 OFFICE + \beta_4 CAPITAL \\ & + \beta_5 POST * ENFORCE + \beta_6 POST * OFFICE + \beta_7 POST * CAPITAL \\ & + CONTROLS + \varepsilon \cdots\cdots\cdots\cdots\cdots (2) \end{aligned}$$

In the analysis by model (2), I centered *CAPITAL*, *OFFICE* and *ENFORCE* by the sample mean of each variable to mitigate multicollinearity problems from biases of

[10] The World Bank conducted another survey on this issue in 2007; however, I applied the survey result of 2003 because European countries adopted IFRS in year 2005. The survey of 2007 is inappropriate because bank regulation systems could be adjusted to follow the changes in accounting system. Thus measures for regulation before IFRS adoption should be employed to avoid the causality issue. Since regulation is sticky in nature (Christensen et al. 2011), the regulation environment of year 2003 can be a good proxy for that of 2005.

spurious correlations (West and Aiken 1991).[11] *CONTROLS* include *SIZE_DEC* to *IFRS7* from model (1). β_2, β_3, and β_4 indicate on-average influences of legal enforcement, bank supervisor, and capital regulation, respectively. If legal enforcement is helpful in the implementation of IFRS and reduces the cost of equity, β_5 will be negative. The sign of β_6 or β_7 will be positive if bank regulation damages the informativeness of financial reporting by limiting the implementation of IFRS. Alternatively, the signs will be negative if bank regulation expedites IFRS adoption.

Table 7 shows the results of the regression analysis of model (2). In the full sample period results in column (A), the coefficients of *OFFICE* and *CAPITAL* are negatively significant. This shows that the power of the banking supervisory office and capital regulations reduce the cost of equity. *ENFORCE* is also negatively associated to the cost of equity capital, which is consistent with arguments of prior studies (Hail and Leuz 2006, 2009). The interaction term between *OFFICE* and *POST* is significantly positive, implying that strong supervisory offices impede IFRS adoption. This result is consistent with the arguments of prior studies that bank supervisors modify or limit the implementation of accounting standards to maintain the stability of banking system (Huizinga and Laeven 2012; Skinner 2008). Since IFRS adoption changes financial reporting comprehensively, the adoption affects the measures of the stability of banks, e.g. regulatory capital ratio. Banks supervisors would want to avoid potential negative impacts on financial instability; hence they would limit the full adoption of new

[11] I apply centered regression of model (2) for two reasons. First, centered regression can mitigate the multicollinearity problem of interaction terms. Moreover, uncentered regression has interpretation problems. In a regression model with interaction terms, if a variable has both single order term and interaction terms, the coefficient of a single order term indicates the impact of the variable when the other variables in interaction terms are all zero (West and Aiken 1991). However, table 6 shows that the uncentered value of country specific variables are strictly positive. Hence lower order terms in uncentered regression of model (2), (3) and (4) are not easily interpretable. Actually, multicollinearity problem is not severe in model (2), but I also use the centered regression for model (2) to improve consistencies of the interpretation of the results because the multicollinearity problem is severe in model (3) and (4).

accounting standards (Bischof 2009). The regulator intervention is likely to damages reliability and quality of bank accounting information, which would result in the increase of the cost of equity. Alternatively, the increase of the cost of equity can be due to risks of financial instruments, or SPEs that are newly recognized by IFRS (Ahmed et al. 2006, 2011; Callahan et al. 2012). This happens when regulatory authorities strongly enforce to disclose the information about risk exposure. However, because regulators have strong incentives to avoid potential shocks to the markets, the second scenario cannot explain regulator incentives. I also rerun model (2) with the subsample from 2003 to 2006. In column (B), except for *CAPITAL*, the variables of interest have the same relation with the cost of equity as they have in column (A).

5.3. The Impact of the Changes in Disclosure Requirement on the Cost of Equity of banks

IFRS adoption affects the cost of equity through additional disclosure requirements and the enhancement of the comparability of financial statements (Tweedie 2006; Li 2010). The two mechanisms of IFRS adoption can be effective when the institutional aspects support the faithful representation of financial statements (Ball et al. 2000; Ball et al. 2003). However, since the policy goal of bank regulation is more on the stability of the financial system, bank regulation is less likely to encourage additional disclosures and enhancement of comparability.

Following prior studies (Bae et al. 2008; Li 2010), I measure additional disclosure requirements and the enhancement of comparability by IFRS adoption based on the survey of Nobes (2001). The measures of additional disclosure requirements by IFRS adoption (*ADD*) and overall inconsistencies between IFRS and local accounting standards (*INC*)[12] include items related to assets with a tangible form, e.g. inventory or plant assets, which are not relevant to the main operation of banks. To avoid potential measurement errors from items that are irrelevant, I redefine additional disclosure requirements (*ADD2*) and inconsistencies between IFRS and local accounting standards (*INC2*) from Nobes (2001) by excluding items that are not relevant to bank operation. I employ these variables as a measure of the differences introduced by IFRS adoption. Column (5) and (7) of Table 6 reports the value of *ADD*2 and *INC2*. The distributions of *ADD*2 and *INC2* are not exactly proportional to each other. These are the models to test the impact of additional disclosure requirements and the improvement of comparability on the cost of equity of banks.

$$\begin{aligned} CoC = \alpha &+ \beta_1 POST + \beta_2 ENFORCE + \beta_3 OFFICE + \beta_4 CAPITAL + \beta_5 ADD2 \\ &+ \beta_6 POST*ENFORCE + \beta_7 POST*OFFICE + \beta_8 POST*CAPITAL \\ &+ \beta_9 POST*ADD2 + \beta_{10} POST*ENFORCE*ADD2 + \beta_{11} POST*OFFICE*ADD2 \\ &+ \beta_{12} POST*CAPITAL*ADD2 + CONTROLS + \varepsilon \cdots\cdots\cdots\cdots\cdots\cdots (3) \end{aligned}$$

$$\begin{aligned} CoC = \alpha &+ \beta_1 POST + \beta_2 ENFORCE + \beta_3 OFFICE + \beta_4 CAPITAL + \beta_5 INC2 \\ &+ \beta_6 POST*ENFORCE + \beta_7 POST*OFFICE + \beta_8 POST*CAPITAL \\ &+ \beta_9 POST*INC2 + \beta_{10} POST*ENFORCE*INC2 + \beta_{11} POST*OFFICE*INC2 \\ &+ \beta_{12} POST*CAPITAL*ADD2 + CONTROLS + \varepsilon \cdots\cdots\cdots\cdots\cdots (4) \end{aligned}$$

Model (3) and Model (4) examine the impact of additional disclosure requirements and the enhancement of comparability of financial statements, respectively. I centered *ADD*, *INC*, *ADD*2 and *INC*2 by their sample means.

Panel A of Table 8 reports the impact of additional disclosures on the cost of equity of banks. In column (A), the three-way interaction term of *ENFORCE* has a negative and significant coefficient (β= -0.007, t= -2.16), implying that legal enforcement facilitates high quality accounting standards to reduce the cost of equity of banks, on average. The coefficients of three-way interaction terms of *CAPITAL* and *OFFICE* are insignificant.

[12] Since IFRS adoption eliminates the inconsistency among countries adopting IFRS, the measure of inconsistency between IFRS and local GAAP can be a proxy for the enhancement of comparability.

In the subsample period test in column (B), I find qualitatively consistent results with those of column (A), but the significance and magnitude of the coefficients are different.

Panel B of Table 8 presents the influence of the enhancement of comparability on the cost of equity impact of IFRS adoption. In column (A), *CAPITAL* and the two-way interaction term of *CAPITAL* have significantly negative coefficients, implying that capital regulation is effective in suppressing the risk of banks before and after IFRS adoption. On the other hand, the three-way interaction term of *CAPITAL* has positive coefficients, meaning that inconsistencies between IFRS and local accounting standards increase the cost of equity under strong capital regulations. A potential explanation is that countries with strong capital regulation limit the faithful implementation of IFRS adoption, which damages the informativeness of accounting information (Bischof 2009; Skinner 2008). The regulatory capital ratio can vary depending on the details of financial reporting and capital regulation requirements. Since the countries had revised their local accounting standards for several decades before IFRS adoption, their local accounting standards and minimum capital regulation are likely to have reached stabilized states (Watts 2006). Hence, under the influence of bank regulation, the inconsistencies between local accounting standards and IFRS do not necessarily mean a higher risk of banks (Bischof 2009).[13] Because changes in disclosure requirements could trigger bank transactions to meet the minimum capital requirement, bank regulators have incentives to limit changes in disclosure requirements by IFRS adoption. Regulatory forbearances would damage the faithful implementation of IFRS, which can cause the increase in the cost of equity of banks. Alternatively, if local accounting standards and minimum capital regulation reached stabilized states before IFRS adoption, changes in the detailed disclosure requirements by IFRS adoption could incur

[13] This explanation does not conflict with the conjecture of (Li 2010), because this sample Li (2010) does not include banks.

confusion in the assessment of the risks of banks. The confusion would increase with the strength of minimum capital regulation. This could also cause the positive coefficient of the three-way interaction term of *CAPITAL*.

The results in column (B) from the subsample are qualitatively the same as those in (A), except for the three-way interaction term of *OFFICE* that is positively associated to the cost of equity. Regulation agencies can restrict the adoption of new accounting standards more strongly when they have stronger enforcement power, which enhances the impact of regulatory forbearance.

Because banks are associated with other industries via lending relationships, the financial reporting of firms in other industries can indirectly affect the financial reporting of banks (Skinner 2008). I examine this possibility by replacing *ADD2* and *INC2* in model (3) and (4) with *ADD* and *INC*, respectively. If IFRS adoption can affect the cost of equity of banks via indirect channels, the results of would be qualitatively similar to the results in Table 8. The results of Table 9 are generally consistent with table 8, however, the significance of the results are weaker. The weak results imply that the indirect effect of IFRS adoption via borrowers of banks is not an important mechanism that affects the impact of IFRS adoption on the cost of equity of banks.

6. Conclusion

This study examines the effect of mandatory IFRS adoption on the cost of equity of European banks. I find that strong bank regulations and legal enforcement reduce the cost of equity capital of banks regardless of IFRS adoption. I also find that strong legal enforcement and additional disclosure requirements by IFRS adoption jointly reduce the cost of equity capital of European banks. These findings suggest that legal enforcement facilitates the implementation of additional disclosures and improves the market value of European listed banks. On the other hand, strong banking regulatory power and inconsistencies between IFRS and local GAAP jointly increase the cost of equity of European banks. These results suggest that strong bank regulations could limit the implementation of IFRS, which causes the increase of the cost of equity.

This study has several caveats. First, due to the limitations in data availability, some countries do not have enough banks to represent country characteristics. Thus, my results could have a selection bias. Readers should interpret my results with the consideration of the data limitation of my sample. Second, among several institutional aspects of banks, I incorporated only two aggregate measures of bank regulations. In addition, the effects of specific regulatory events that have occurred during my sample period are not addressed in this study. Although regulations are sticky (Christensen et al. 2011), each event could have a significant impact on the cost of capital. Third, this study mainly focuses on the impact on the cost of equity of listed banks. Considering the fact that several banks are unlisted, readers should be careful in generalizing the implications of this study to the entire banking sector. Since the dynamics in the institutional environment are different between listed banks and unlisted banks, the adoption of high quality accounting standards would have a different impact on unlisted banks. Finally, this study mainly examines the impact of IFRS adoption on stock valuation but not the comprehensive effects on the banking sector. The impact of IFRS adoption on the other aspects of banks, e.g. credit allocation activities, should be examined separately in other studies.

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Table 1. Sample Composition

Panel A. The Number of Observations

	Voluntary adopters	Mandatory adopters	Pre mandatory adoption period (Before 2005)	Post mandatory adoption period (From 2005)
Belgium	0	11	7	4
Denmark	0	17	8	9
Finland	0	6	1	5
France	0	34	16	18
Germany	33	4	23	14
Greece	7	29	17	19
Ireland	0	21	15	6
Netherland	0	17	10	7
Poland	12	28	16	24
Spain	0	38	18	20
Sweden	0	37	26	11
UK	0	82	53	29
Sum	52	324	210	166

Panel A shows the number of bank-year observations of the final sample by country. The second and third columns show the number of observations by the type of IFRS adoption. Banks that adopted IFRS before (from) 2005 are classified as voluntary (mandatory) adopters. The third (fourth) column shows the number of observations before (from) 2005.

Panel B. The Number of Banks

	Voluntary adopters	Mandatory adopters
Belgium	0	1
Denmark	0	3
Finland	0	1
France	0	5
Germany	4	1
Greece	1	4
Ireland	0	3
Netherland	0	2
Poland	2	6
Spain	0	5
Sweden	0	4
UK	0	10
Sum	7	45

Panel B shows the number of banks in the final sample by country and the type of IFRS adoption. Banks that adopted IFRS before (from) 2005 are classified as voluntary (mandatory) adopters. Only three countries, Greece, Germany and Poland, have banks that adopted IFRS voluntarily. This pattern is common in the overall Compustat Global dataset.

Panel C. The Number of Observations of Mandatory Adopters

	Pre adoption	Post adoption
Belgium	7	4
Denmark	8	9
Finland	1	5
France	16	18
Germany	2	2
Greece	14	15
Ireland	15	6
Netherland	10	7
Poland	11	17
Spain	18	20
Sweden	26	11
UK	53	29
Sum	181	143

Panel C shows the numbers of bank-year observations that adopted IFRS mandatorily in the final sample by country and year. A bank that adopted IFRS from 2005 is classified as a mandatory adopter.

Table 2. Descriptive Statistics
Panel A. Country Means of Variables

	N	*CoC*	*TA*	*MKT*	*BPR*	*RETVOL*	*LEV*	Total Regulatory Capital Ratio	*FBIAS*
Belgium	11	0.1088	287,787	21,299	0.6461	0.1091	0.9552	13.20	0.0276
Denmark	17	0.1386	242,110	10,351	1.0366	0.0849	0.9342	11.25	0.0208
Finland	6	0.1039	35,182	2,270	0.9883	0.0868	0.9333	12.23	0.0083
France	34	0.1282	1,144,530	41,695	1.2034	0.0802	0.9612	11.00	0.0011
Germany	37	0.1086	706,373	23,640	0.8417	0.1040	0.9625	11.57	0.0304
(Mandatory adopters)	4	0.1011	44,256	2,355	0.8906	0.0820	0.9381	13.07	-0.0081
Greece	36	0.1288	54,801	8,335	0.4622	0.1057	0.9305	13.10	0.0150
(Mandatory adopters)	29	0.1285	52,806	8,133	0.4555	0.1099	0.9322	13.06	0.0159
Ireland	21	0.1228	133,542	12,645	0.4001	0.0725	0.9509	12.29	0.0003
Netherland	17	0.1146	355,608	21,282	0.7334	0.0792	0.9508	11.83	0.0043
Poland	40	0.1250	15,973	4,356	0.5193	0.1176	0.8943	14.47	0.0070
(Mandatory adopters)	28	0.1285	17,946	4,701	0.5415	0.1224	0.9077	14.01	0.0109
Spain	38	0.1116	364,031	36,571	0.4950	0.0908	0.9391	11.65	0.0010
Sweden	37	0.1017	192,251	13,381	0.5836	0.0715	0.9578	10.44	-0.0049
UK	82	0.1037	596,390	109,912	0.5010	0.0766	0.9405	13.19	0.0053

Panel A shows the averages of the variables. Since Germany, Greece and Poland have banks that adopted IFRS voluntarily, these three countries have two rows. The first (second) row of these countries show the average of variables of both types of adopters (mandatory). The cost of equity capital (*CoC*) is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003). TA is the value of total assets in millions of U.S. dollars. MKT is the value of market value of equity in millions of U.S. dollars. Capital Ratio is the ratio of the sum of core and supplementary capital to risk weighted assets. Missing values of total regulatory capital ratio are excluded from the calculation of the average value. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *RETVOL* is the standard deviation of monthly stock returns for the last twelve months before the fiscal year end. *LEV* is total liabilities divided by total assets. *FBIAS* is calculated as one-year ahead earnings forecasts less actual earnings scaled by the forecast-period stock price. All values are measured at the end of the fiscal year.

Panel B. Summary Statistics of Full Sample

Variable	Mean	STD	5%	25%	50%	75%	95%
CoC	0.1150	0.0306	0.0765	0.0960	0.1093	0.1270	0.1741
SIZE	12.5453	2.5862	9.6050	10.9217	12.2901	13.4738	16.5092
OTC	0.1649	0.3716	0	0	0	0	1
EXCH	0.1383	0.3457	0	0	0	0	1
PP	0.0559	0.2299	0	0	0	0	1
INFLA	2.7212	2.3848	0	0.69565	2.134	4.2124	6.8771
RETVOL	0.0891	0.0592	0.0329	0.0501	0.0717	0.1087	0.2043
LEV	0.9418	0.0311	0.8766	0.9312	0.9510	0.9625	0.9720
CAP Ratio	12.2579	4.5377	9.5	10.8	11.7	13.1	15.4
CAPR_DUM	0.3431	0.4754	0	0	0	1	1
FBIAS	0.0081	0.0395	-0.0279	-0.0090	-0.0010	0.0115	0.0736
BPR	0.6449	0.5156	0.2150	0.3877	0.5368	0.7352	1.4143
DISP	0.0041	0.0164	0	0	0	0.0048	0.0152
FOLLOW	3.6170	4.1617	1	1	1	5	13

Panel B shows summary statistics of both types of adopters for the full period from 1995 to 2009. The cost of equity capital (*CoC*) is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003). *SIZE* is the natural log of the value of total assets in millions of U.S. dollars. *OTC*, *EXCH*, and PP are indicator variables equal to 1 if a firm trades its shares in the U.S. over-the-counter markets, major stock markets (NYSE, NASDAQ, or Amex), and a private placement under Rule 144A, respectively. *INFLA* is the inflation rate measured by the wholesale price index. *RETVOL* is the standard deviation of monthly stock returns for the last twelve months before the fiscal year end. *LEV* is total liabilities divided by total assets. CAP Ratio is the ratio of core and supplementary capital to risk weighted assets. Missing values of total regulatory capital ratio are excluded from the calculation of the average of the CAP Ratio. *CAPR_DUM* is equal to 1 if CAP Ratio is not missing, 0 otherwise. *FBIAS* is calculated as one-year ahead earnings forecast less actual earnings scaled by forecast-period stock price. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *DISP* is the standard variation of one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price if more than one one-year ahead earnings forecasts exist, 0 otherwise. FOLLOW is the number of analysts following.

Panel C. Summary Statistics of Mandatory Adopter Sample

Variable	Mean	STD	5%	25%	50%	75%	95%
CoC	0.1151	0.0313	0.0769	0.0954	0.1091	0.1275	0.1741
SIZE	12.5461	2.6912	9.5256	10.8235	12.1843	13.4516	16.5655
OTC	0.1605	0.3676	0	0	0	0	1
EXCH	0.1605	0.3676	0	0	0	0	1
INFLA	2.7076	2.4165	0	0.6391	2.11515	4.2124	6.8771
RETVOL	0.0867	0.0601	0.0321	0.0483	0.0694	0.1051	0.2055
LEV	0.9427	0.0281	0.8893	0.9317	0.9502	0.9618	0.9708
CAP Ratio	12.2899	4.7399	9.5	10.8	11.62	13	15.37
CAPR_DUM	0.3302	0.4710	0	0	0	1	1
FBIAS	0.0057	0.0348	-0.0279	-0.0094	-0.0014	0.0084	0.0642
BPR	0.6354	0.5379	0.2124	0.3834	0.5247	0.6890	1.3667
DISP	0.0040	0.0175	0	0	0	0.0042	0.0145
FOLLOW	3.5370	4.1319	1	1	1	4	13

Panel C shows summary statistics of mandatory adopters for the full period from 1995 to 2009. The definitions of variables are the same as panel B.

Table 3. The Changes of Variables between before and after Mandatory IFRS Adoption
Panel A. Full Sample

Variable	Pre-adoption (A)	Post-adoption (B)	Difference (B-A)	t-Value	p-value	
CoC	0.104	0.130	0.026	7.87	0.000	***
TA	243,865	581,665	337,800	5.10	0.000	***
MKT	16,309	31,747	15,438	3.64	0.000	***
RETVOL	0.089	0.084	-0.005	-0.72	0.470	
BPR	0.493	0.815	0.322	5.07	0.000	***
LEV	0.943	0.943	0.000	-0.01	0.993	
CAP Ratio	12.474	11.784	-0.690	-1.44	0.151	
FBIAS	0.003	0.010	0.007	1.74	0.083	*
DISP	0.005	0.003	-0.001	-0.68	0.497	
Follow	4.039	2.902	-1.137	-2.48	0.014	**
ONEFORECAST	0.475	0.601	0.126	2.27	0.024	**

Panel A shows summary statistics of both types of adopters for the full period from 1995 to 2009. The cost of equity capital (*CoC*) is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003). *SIZE* is the natural log of the value of total assets in millions of U.S. dollars. *OTC*, *EXCH*, and PP are indicator variables equal to 1 if a firm trades its shares in the U.S. over-the-counter markets, major stock markets (NYSE, NASDAQ, or Amex), and a private placement under Rule 144A, respectively. *INFLA* is the inflation rate measured by the wholesale price index. *RETVOL* is the standard deviation of monthly stock returns for the last twelve months before the fiscal year end. *LEV* is total liabilities divided by total assets. CAP Ratio is the ratio of core and supplementary capital to risk weighted assets. Missing values of total regulatory capital ratio are excluded from the calculation of the average of the CAP Ratio. *CAPR_DUM* is equal to 1 if CAP Ratio is not missing, 0 otherwise. *FBIAS* is calculated as one-year ahead earnings forecast less actual earnings scaled by forecast-period stock price. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *DISP* is the standard variation of one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price if more than one one-year ahead earnings forecasts exist, 0 otherwise. FOLLOW is the number of analysts following. *, **, *** indicates significance at the 10%, 5%, 1% levels by two-tailed tests, respectively.

Panel B. Subsample from 2003 to 2006

Variable	Pre-adoption (A)	Post-adoption (B)	Difference (B-A)	t-Value	p-value	
CoC	0.111	0.114	0.003	0.65	0.516	
TA	317,738	469,774	152,036	1.89	0.061	*
MKT	20,877	34,310	13,433	1.94	0.055	*
RETVOL	0.062	0.054	-0.009	-1.97	0.051	*
BPR	0.542	0.501	-0.041	-1.28	0.203	
LEV	0.940	0.942	0.003	0.50	0.619	
CAP Ratio	12.404	11.769	-0.635	-1.71	0.090	*
FBIAS	-0.003	0.001	0.004	0.69	0.492	
DISP	0.004	0.002	-0.002	-2.90	0.004	***
Follow	5.174	2.684	-2.490	-3.50	0.001	***
ONEFORECAST	0.391	0.645	0.253	3.13	0.002	***

Panel B shows summary statistics of both types of adopters for the subsample period from 2003 to 2006. Variable definitions are in Appendix. *, **, *** indicates significance at the 10%, 5%, 1% levels by two-tailed test, respectively.

Table 4. Pearson Correlation Coefficients

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	*COC*	1												
(2)	*IFRS7*	**0.5358**	1											
(3)	*SIZE_DEC*	-0.0359	0.0658	1										
(4)	*OTC*	-0.0512	**0.1297**	0.1027	1									
(5)	*EXCH*	0.0386	0.0466	**0.1889**	**-0.1912**	1								
(6)	*INFLA*	**0.2740**	**0.2457**	-0.0552	0.0608	0.0275	1							
(7)	*RETVOL_DEC*	0.0509	**0.2325**	-0.0213	0.0031	-0.0086	**-0.1329**	1						
(8)	*LEV_DEC*	-0.0305	-0.0154	**0.4016**	0.1039	**-0.2110**	-0.0648	**-0.1987**	1					
(9)	*CAPR*	**-0.3116**	**-0.5645**	-0.0409	**-0.1230**	-0.0939	**-0.2112**	**-0.1867**	0.0941	1				
(10)	*CAPR_DUM*	**0.3561**	**0.6785**	-0.0581	**0.1221**	0.1042	**0.2357**	**0.2243**	**-0.1757**	**-0.8309**	1			
(11)	*FBIAS*	**0.2985**	**0.2072**	-0.0724	-0.0594	0.0072	**0.1221**	0.0109	**-0.1540**	**-0.1747**	**0.2205**	1		
(12)	*DISP*	0.0410	0.0379	0.0072	0.0137	0.0051	-0.0099	0.0789	-0.0347	-0.0914	**0.1152**	0.0018	1	
(13)	*ONEFORECAST*	0.0843	0.0219	0.0491	-0.0776	-0.0944	-0.0044	-0.0072	0.0895	-0.0184	0.0289	0.0917	**-0.2445**	1
(14)	*BPR*	**0.5090**	**0.5097**	0.001	0.0141	-0.0867	0.0124	**0.1439**	0.0033	**-0.2695**	**0.3106**	**0.1119**	-0.012	**0.1304**

CoC is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003). *IFRS7* is equal to one if the year of an observation is after 2007, 0 otherwise. *SIZE_DEC* is the decile of the value of total assets. *OTC* and *EXCH* are indicator variables equal to 1 if a firm trades its shares in the U.S. over-the-counter markets and major stock markets (NYSE, NASDAQ, or Amex), respectively. *INFLA* is the inflation rate measured by the wholesale price index. *RETVOL_DEC* and *LEV_DEC* are deciles of *RETVOL* and *LEV*, respectively. *CAPR* is the ratio of core and supplementary capital to risk weighted assets. Missing *CAPR* is replaced by zero. *CAPR_DUM* is equal to 1 if total regulatory capital ratio is not missing, 0 otherwise. *FBIAS* is calculated as one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *DISP* is the standard variation of one-year ahead earnings forecasts less actual earnings scaled by the forecast-period stock price if more than one one-year ahead earnings forecasts exist, 0 otherwise. *ONEFORECAST* is equal to 1 if only one analyst follows, 0 otherwise. The significance at the 5% level by the two-tailed tests is reported in bold.

Table 5. Comparison between Mandatory Adopters and Voluntary Adopters

	(A) Full Sample Period			(B) From 2003 to 2006		
Variable	Coef.	t-Value		Coef.	t-Value	
POST	0.0061	(2.33)	**	0.0037	(1.04)	
VOLUNT	0.0007	(0.18)		-0.0077	(-0.77)	
*POST*VOLUNT*	-0.0013	(-0.28)		0.0139	(1.51)	
IFRS7	0.0193	(3.12)	***			
SIZE_DEC	-0.0006	(-1.08)		-0.0007	(-0.66)	
OTC	-0.0061	(-1.49)		-0.0042	(-1.04)	
EXCH	0.0102	(3.75)	***	0.0067	(1.53)	
PP	-0.0018	(-0.29)		-0.0196	(-1.26)	
INFLA	0.0023	(2.65)	**	-0.0021	(-1.26)	
RETVOL_DEC	-0.0006	(-1.01)		-0.0021	(-1.93)	*
LEV_DEC	0.0013	(1.93)	*	0.0017	(1.80)	*
CAPR	-0.0002	(-1.22)		0.0007	(0.90)	
CAPR_DUM	-0.0090	(-1.85)	*	-0.0029	(-0.19)	
FBIAS	0.1559	(2.36)	**	0.2325	(1.67)	
BPR	0.0242	(3.00)	***	0.0519	(3.69)	***
DISP	0.1226	(2.59)	**	-0.3167	(-0.59)	
ONEFORECAST	0.0007	(0.32)		0.0031	(0.80)	
Country Dummy	Yes			Yes		
# of OBS	376			170		
ADJ R2	0.5233			0.2659		

The dependent variable is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003). *VOLUNT* is 1 if the bank adopted IFRS voluntarily, 0 otherwise. *POST* is equal to 1 if a firm-year observation falls in 2005 or later, and 0 otherwise. *IFRS7* is equal to one if the year of an observation is after 2007, 0 otherwise. *SIZE_DEC* is decile of the value of total assets. *OTC*, *EXCH*, and PP are indicator variables equal to 1 if a firm trades its shares in the U.S. over-the-counter markets, major stock markets (NYSE, NASDAQ, or Amex), and a private placement under Rule 144A, respectively. *INFLA* is the inflation rate measured by the wholesale price index. *RETVOL_DEC* and *LEV_DEC* are decile ranks of *RETVOL* and *LEV*, respectively. *CAPR* is the ratio of core and supplementary capital to risk weighted assets. Missing *CAPR* is replaced by zero. *CAPR_DUM* is equal to 1 if total regulatory capital ratio is not missing, 0 otherwise. *FBIAS* is calculated as one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *DISP* if the standard variation of one-year ahead earnings forecast less actual earnings scaled by the forecast-period stock price. If only one analyst follows the bank, *DISP* is replaced by zero and *ONEFORECAST* is equal to 1. Otherwise, *ONEFORECAST* is zero. The interaction term between *VOLUNT* and *POST* captures systematic differences in the cost of equity between mandatory adopters and voluntary adopters. t-values are adjusted by firm cluster. *, **, *** indicates significance at the 10%, 5%, 1% level by two-tailed tests, respectively.

Table 6. Country Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Legal enforcement (*ENFORCE*)	The index of official supervisory power of bank regulators (*OFFICE*)	Regulatory restrictions on bank capital (*CAPITAL*)	Additional Disclosure Required by IFRS adoption (*ADD*)	Additional Disclosure Required by IFRS adoption for banks (*ADD*2)	Total number of Inconsistencies between Local Standards and IFRS (*INC*)	Total number of Inconsistencies between Local Standards and IFRS for banks (*INC*2)
Belgium	9.44	-	-	7	7	15	13
Denmark	10	8	2	5	5	13	13
Finland	10	8	4	8	7	19	13
France	8.68	7	2	6	5	19	15
Germany	9.05	10	1	7	6	20	16
Greece	6.82	10	3	9	8	20	14
Ireland	8.36	9	1	0	0	15	15
Netherland	10	8	3	2	2	5	5
Poland	-	-	-	5	3	18	14
Spain	7.14	9	4	9	8	22	18
Sweden	10	6	3	4	4	11	9
UK	9.22	11	3	0	0	15	15

Legal enforcement), which is the proxy of property right protection, is the average of three indices for the efficiency of judicial system, the rule of law, and corruption by La Porta et al. (1998). I use the index of official supervisory power of bank regulators (the second column) and regulatory restrictions on bank capital (the third column) of Caprio et al. (2007) to measure the regulatory environment of the banking sector. Column (4) to (9) present the measures for changes in financial reporting by IFRS adoption based on the survey of Nobes (2001). The fifth and sixth column shows additional disclosure requirements by IFRS adoption with respect to local accounting standards before the adoption. The fourth column measures overall increase of disclosure requirements, and the fifth column presents the increase of disclosure requirements that are not related to assets with a tangible form, e.g. depreciable assets or inventory. The values in the fifth column are a better measure of additional disclosure requirements for banks than those in column (4). The total number of inconsistencies between local accounting standards and IFRS are presented in the sixth and seventh columns. These measures are proxies for the increase of comparability. Column (6) presents overall inconsistencies, and the seventh column presents inconsistencies for banks.

Table 7. Basic Regression Analysis

Parameter	Predicted Sign	(A) Full Sample Period Coef	t-Value		(B) From 2003 to 2006 Coef	t-Value	
Intercept		0.0852	(14.18)	***	0.2003	(5.70)	***
POST		0.0061	(2.20)	**	-0.0177	(-0.60)	
ENFORCE	(-)	-0.0054	(-2.73)	***	-0.0076	(-3.49)	***
OFFICE	(-)	-0.0023	(-1.81)	*	-0.0049	(-1.96)	*
CAPITAL	(-)	-0.0078	(-3.24)	***	-0.0021	(-0.86)	
*POST*ENFORCE*	(-)	0.0010	(0.39)		-0.0024	(-0.88)	
*POST*OFFICE*	(+)	0.0037	(2.75)	***	0.0044	(2.53)	**
*POST*CAPITAL*	(+)	-0.0016	(-0.50)		0.0012	(0.40)	
IFRS7		0.0226	(3.04)	***			
SIZE_DEC		-0.0007	(-1.43)		-0.0007	(-0.64)	
OTC		-0.0049	(-0.89)		-0.0036	(-0.68)	
EXCH		0.0100	(3.06)	***	0.0082	(1.47)	
INFLA		0.0023	(2.51)	**	0.0000	(0.01)	
RETVOL_DEC		0.0000	(-0.03)		-0.0006	(-0.88)	
LEV_DEC		0.0011	(1.56)		0.0007	(0.93)	
CAPR		-0.0001	(-0.83)		0.0014	(1.62)	
CAPR_DUM		-0.0041	(-0.83)		0.0075	(0.70)	
FBIAS		0.2182	(1.90)	*	0.3136	(1.68)	
DISP		0.0780	(2.72)	***	0.2251	(0.42)	
ONEFORECAST		0.0029	(1.29)		0.0047	(1.16)	
BPR		0.0188	(2.77)	***	0.0155	(1.84)	*
# of OBS		285			131		
ADJ R2		0.572			0.3528		

The regression results in table 7 are obtained from European banks that adopted IFRS mandatorily. The dependent variable is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003). *POST* is equal to 1 if a firm-year observation falls in 2005 or later, and 0 otherwise. *ENFORCE* is a measure of the efficiency of the legal system (La Porta et al. 1998). *OFFICE* and *CAPITAL* are measures of official supervisory power of bank regulators and Regulatory restrictions on bank capital, respectively (Barth et al. 2004; Caprio et al. 2007). *IFRS7* is equal to one if the year of an observation is after 2007, 0 otherwise. *SIZE_DEC* is decile of the value of total assets. *OTC* and *EXCH* are indicator variables equal to 1 if a firm trades its shares in the U.S. over-the-counter markets, major stock markets (NYSE, NASDAQ, or Amex), respectively. *INFLA* is the inflation rate measured by the wholesale price index. *RETVOL_DEC* and *LEV_DEC* are decile ranks of *RETVOL* and *LEV*, respectively. *CAPR* is the ratio of core and supplementary capital to risk weighted assets. Missing *CAPR* is replaced by zero. *CAPR_DUM* is equal to 1 if total regulatory capital ratio is not missing, 0 otherwise. *FBIAS* is calculated as one-year ahead earnings forecast less actual earnings scaled by forecast-period stock price. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *DISP* if the standard variation of one-year ahead earnings forecasts less actual earnings scaled by the forecast-period stock price. If only one analyst follows the bank, *DISP* is replaced by zero and *ONEFORECAST* is equal to 1. Otherwise, *ONEFORECAST* is zero. The interaction term between *VOLUNT* and *POST* captures systematic differences in the cost of equity between mandatory adopters and voluntary adopters. t-values are adjusted by firm cluster. *, **, *** indicates significance at the 10%, 5%, 1% levels by two-tailed tests, respectively.

Table 8. Cost of Capital Effect of the Changes of Disclosures of Banks
Panel A. The Effect of Additional Disclosures

Parameter	Predicted Sign	(A) Full Sample Period Coef	t-Value		(B) From 2003 to 2006 Coef	t-Value	
Intercept		0.0869	(10.33)	***	0.0794	(6.17)	***
POST		-0.0147	(-1.53)		-0.0082	(-0.82)	
ENFORCE		-0.0046	(-0.97)		-0.0050	(-1.03)	
OFFICE		-0.0023	(-1.12)		-0.0031	(-1.26)	
CAPITAL		-0.0081	(-2.23)	**	-0.0035	(-0.92)	
ADD2		0.0002	(0.08)		0.0015	(0.70)	
*POST*ENFORCE*		0.0163	(1.10)		0.0041	(0.38)	
*POST*OFFICE*		0.0009	(0.27)		0.0002	(0.05)	
*POST*CAPITAL*		-0.0160	(-1.49)		-0.0033	(-0.36)	
*POST*ADD2*		0.0009	(0.25)		-0.0031	(-1.04)	
*POST*ENFORCE*ADD2*	(-)	-0.0069	(-2.16)	**	-0.0050	(-1.71)	*
*POST*OFFICE*ADD2*	(+)	-0.0026	(-1.69)		-0.0001	(-0.06)	
*POST*CAPITAL*ADD2*	(+)	0.0031	(1.47)		0.0019	(1.09)	
IFRS7		0.0232	(2.81)	***			
SIZE_DEC		-0.0011	(-1.59)		-0.0005	(-0.48)	
OTC		-0.0038	(-0.67)		-0.0030	(-0.58)	
EXCH		0.0103	(2.96)	***	0.0074	(1.41)	
INFLA		0.0024	(2.24)	**	-0.0001	(-0.10)	
RETVOL_DEC		0.0002	(0.37)		-0.0002	(-0.28)	
LEV_DEC		0.0009	(1.35)		0.0006	(0.77)	
CAPR		-0.0001	(-0.68)		0.0016	(1.79)	*
CAPR_DUM		-0.0049	(-0.94)		0.0089	(0.84)	
FBIAS		0.2212	(1.94)	*	0.3116	(1.77)	*
DISP		0.0766	(2.75)	***	-0.0595	(-0.12)	
ONEFORECAST		0.0016	(0.71)		0.0013	(0.33)	
BPR		0.0186	(2.50)	**	0.0231	(2.16)	**
# of OBS		285			131		
ADJ R2		0.5772			0.3757		

The regression results in panel A of table 8 are obtained from European banks that adopted IFRS mandatorily. The dependent variable is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003). *POST* is equal to 1 if a firm-year observation falls in 2005 or later, and 0 otherwise. *ENFORCE* is a measure of the efficiency of the legal system (La Porta et al. 1998). *OFFICE* and *CAPITAL* are measures of the official supervisory power of bank regulators and Regulatory restrictions on bank capital, respectively (Barth et al. 2004; Caprio et al. 2007). *ADD*2 is additional disclosure requirements for banks by IFRS adoption (Nobes 2001). *IFRS7* is equal to one if the year of an observation is after 2007, 0 otherwise. *SIZE_DEC* is the decile of the value of total assets. *OTC* and *EXCH* are indicator variables are equal to 1 if a firm trades its shares in the U.S. over-the-counter markets, major stock markets (NYSE, NASDAQ, or Amex), respectively. *INFLA* is the inflation rate measured by the wholesale price index. *RETVOL_DEC* and *LEV_DEC* are decile ranks of *RETVOL* and *LEV*, respectively. *CAPR* is the ratio of core and supplementary capital to the risk weighted assets. Missing *CAPR* is replaced by zero. *CAPR_DUM* is equal to 1 if total regulatory capital ratio is not missing, 0 otherwise. *FBIAS* is calculated as one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *DISP* if the standard variation of one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price. If only one analyst follows the bank, *DISP* is replaced by zero and *ONEFORECAST* is equal to 1. Otherwise, *ONEFORECAST* is zero. The interaction term between *VOLUNT* and *POST* captures systematic differences in the cost of equity between mandatory adopters and voluntary adopters. t-values are adjusted by firm cluster. *, **, *** indicates significance at the 10%, 5%, 1% levels by two-tailed tests, respectively.

Panel B. The Effect of Inconsistencies

Parameter	Predicted Sign	(A) Full Sample Period Coef	t-Value		(B) From 2003 to 2006 Coef	t-Value	
Intercept		0.0882	(14.92)	***	0.0775	(7.01)	***
POST		0.0073	(1.29)		-0.0001	(-0.03)	
ENFORCE		-0.0078	(-3.12)	***	-0.0110	(-4.40)	***
OFFICE		-0.0015	(-1.04)		-0.0041	(-1.43)	
CAPITAL		-0.0085	(-3.87)	***	-0.0016	(-0.63)	
INC2		-0.0013	(-2.16)	**	-0.0013	(-1.50)	
*POST*ENFORCE*		0.0018	(0.50)		-0.0057	(-1.54)	
*POST*OFFICE*		0.0031	(1.85)	*	0.0061	(3.01)	***
*POST*CAPITAL*		-0.0094	(-2.20)	**	-0.0087	(-3.41)	***
*POST*INC2*		-0.0016	(-0.83)		-0.0012	(-1.01)	
*POST*ENFORCE *INC2*	(-)	0.0018	(1.59)		0.0011	(1.18)	
*POST*OFFICE *INC2*	(+)	0.0009	(1.15)		0.0024	(3.43)	***
*POST*CAPITAL *INC2*	(+)	0.0064	(2.04)	**	0.0051	(2.93)	***
IFRS7		0.0233	(3.12)	***			
SIZE_DEC		-0.0010	(-1.81)	*	-0.0007	(-0.61)	
OTC		-0.0039	(-0.76)		-0.0036	(-0.83)	
EXCH		0.0108	(3.60)	***	0.0077	(1.46)	
INFLA		0.0019	(1.96)	*	-0.0009	(-0.81)	
RETVOL_DEC		-0.0002	(-0.40)		-0.0010	(-1.42)	
LEV_DEC		0.0010	(1.54)		0.0008	(1.08)	
CAPR		-0.0001	(-0.82)		0.0016	(1.99)	*
CAPR_DUM		-0.0038	(-0.78)		0.0107	(1.12)	
FBIAS		0.2151	(1.77)	*	0.3305	(1.77)	*
DISP		0.0752	(2.62)	**	0.1549	(0.37)	
ONEFORECAST		0.0021	(0.95)		0.0027	(0.75)	
BPR		0.0193	(2.69)	**	0.0330	(3.16)	***
# of OBS		285			131		
ADJ R2		0.5814			0.4146		

The regression results in panel B of table 8 are obtained from European banks that adopted IFRS mandatorily. Variable definitions are the same as panel A. *INC2* is the inconsistencies of disclosure requirements between IFRS and the local accounting standards implemented before the adoption for banks. t-values are adjusted by firm cluster. *, **, *** indicates significance at the 10%, 5%, 1% levels by two-tailed test, respectively.

Table 9. Cost of Capital Effect of Changes of Overall Disclosure Requirements

Panel A. The Effect of Additional Disclosures

Parameter	Predicted Sign	(A) Full Sample Period Coef	t-Value		(B) From 2003 to 2006 Coef	t-Value	
Intercept		0.0860	(9.89)	***	0.0770	(6.09)	***
POST		-0.0105	(-1.20)		0.0003	(0.03)	
ENFORCE		-0.0053	(-1.11)		-0.0060	(-1.22)	
OFFICE		-0.0027	(-1.37)		-0.0036	(-1.48)	
CAPITAL		-0.0077	(-2.30)	**	-0.0031	(-0.84)	
ADD		-0.0002	(-0.10)		0.0009	(0.48)	
*POST*ENFORCE*		0.0122	(0.86)		-0.0043	(-0.39)	
*POST*OFFICE*		0.0011	(0.33)		0.0009	(0.32)	
*POST*CAPITAL*		-0.0122	(-1.21)		0.0030	(0.34)	
*POST*ADD*		0.0001	(0.04)		-0.0039	(-1.53)	
*POST*ENFORCE *ADD*	(-)	-0.0050	(-1.83)	*	-0.0020	(-0.78)	
*POST*OFFICE *ADD*	(+)	-0.0017	(-1.26)		0.0010	(0.76)	
*POST*CAPITAL *ADD*	(+)	0.0022	(1.29)		0.0005	(0.32)	
IFRS7		0.0227	(2.74)	***			
SIZE_DEC		-0.0010	(-1.51)		-0.0005	(-0.45)	
OTC		-0.0037	(-0.65)		-0.0028	(-0.56)	
EXCH		0.0102	(2.96)	***	0.0075	(1.45)	
INFLA		0.0025	(2.31)	**	0.0001	(0.08)	
RETVOL_DEC		0.0002	(0.39)		-0.0003	(-0.38)	
LEV_DEC		0.0009	(1.39)		0.0007	(0.90)	
CAPR		-0.0001	(-0.69)		0.0015	(1.81)	*
CAPR_DUM		-0.0047	(-0.91)		0.0093	(0.92)	
FBIAS		0.2210	(1.91)	*	0.3173	(1.78)	*
DISP		0.0763	(2.74)	***	-0.0447	(-0.09)	
ONEFORECAST		0.0016	(0.71)		0.0015	(0.40)	
BPR		0.0189	(2.45)	**	0.0259	(2.33)	**
# of OBS		285			131		
ADJ R2		0.577			0.3984		

The regression results in panel A of table 9 are obtained from European banks that adopted IFRS mandatorily. The dependent variable is the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram

(2003). *POST* is equal to 1 if a firm-year observation falls in 2005 or later, and 0 otherwise. *ENFORCE* is a measure of the efficiency of the legal system (La Porta et al. 1998). *OFFICE* and *CAPITAL* are measures of the official supervisory power of bank regulators and Regulatory restrictions on bank capital, respectively (Barth et al. 2004; Caprio et al. 2007). *ADD* is additional disclosure requirements by IFRS adoption (Nobes 2001). *IFRS7* is equal to one if the year of an observation is after 2007, 0 otherwise. *SIZE_DEC* is the decile of the value of total assets. *OTC* and *EXCH* are indicator variables equal to 1 if a firm trades its shares in the U.S. over-the-counter markets, major stock markets (NYSE, NASDAQ, or Amex), respectively. *INFLA* is the inflation rate measured by the wholesale price index. *RETVOL_DEC* and *LEV_DEC* are decile ranks of *RETVOL* and *LEV*, respectively. *CAPR* is the ratio of core and supplementary capital to risk weighted assets. Missing *CAPR* is replaced by zero. *CAPR_DUM* is equal to 1 if total regulatory capital ratio is not missing, 0 otherwise. *FBIAS* is calculated as one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price. *BPR* is the ratio of book value of equity to market value of common shares outstanding. *DISP* if the standard variation of one-year ahead earnings forecasts less actual earnings scaled by forecast-period stock price. If only one analyst follows the bank, *DISP* is replaced by zero and *ONEFORECAST* is equal to 1. Otherwise, *ONEFORECAST* is zero. The interaction term between *VOLUNT* and *POST* captures systematic differences in the cost of equity between mandatory adopters and voluntary adopters. t-values are adjusted by firm cluster. *, **, *** indicates significance at the 10%, 5%, 1% levels by two-tailed tests, respectively.

Panel B. The Effect of Inconsistencies

Parameter	Predicted Sign	(A) Full Sample Period Coef	t-Value		(B) From 2003 to 2006 Coef	t-Value	
Intercept		0.0821	(12.26)	***	0.0741	(7.58)	***
POST		0.0083	(1.83)	*	0.0060	(1.28)	
ENFORCE		-0.0099	(-3.21)	***	-0.0145	(-4.49)	***
OFFICE		-0.0017	(-1.35)		-0.0040	(-1.61)	
CAPITAL		-0.0081	(-3.86)	***	-0.0014	(-0.56)	
INC		-0.0014	(-2.11)	**	-0.0016	(-2.06)	**
*POST*ENFORCE*		-0.0015	(-0.20)		-0.0062	(-1.15)	
*POST*OFFICE*		0.0029	(1.40)		0.0056	(2.74)	***
*POST*CAPITAL*		-0.0013	(-0.25)		0.0018	(0.45)	
*POST*INC*		-0.0009	(-0.64)		-0.0007	(-0.71)	
*POST*ENFORCE*INC*	(-)	0.0008	(0.72)		0.0014	(1.32)	
*POST*OFFICE*INC*	(+)	0.0001	(0.17)		0.0015	(2.75)	***
*POST*CAPITAL*INC*	(+)	0.0012	(1.26)		0.0009	(1.47)	
IFRS7		0.0212	(2.74)	***			
SIZE_DEC		-0.0005	(-1.01)		-0.0003	(-0.30)	
OTC		-0.0033	(-0.64)		-0.0023	(-0.54)	
EXCH		0.0103	(3.28)	***	0.0076	(1.52)	
INFLA		0.0023	(2.42)	**	-0.0006	(-0.55)	
RETVOL_DEC		-0.0001	(-0.19)		-0.0011	(-1.49)	
LEV_DEC		0.0011	(1.73)	*	0.0010	(1.41)	
CAPR		-0.0001	(-0.89)		0.0012	(1.62)	
CAPR_DUM		-0.0031	(-0.65)		0.0073	(0.80)	
FBIAS		0.2167	(1.81)	*	0.3320	(1.76)	*
DISP		0.0799	(2.87)	***	0.2285	(0.50)	
ONEFORECAST		0.0028	(1.33)		0.0042	(1.18)	
BPR		0.0212	(2.65)	**	0.0380	(3.84)	***
# of OBS		285			131		
ADJ R2		0.5787			0.4148		

The regression results in panel B of table 9 are obtained from European banks that adopted IFRS mandatorily. Variable definitions are the same as panel A. *INC* is the inconsistencies of disclosure requirements between IFRS and the local accounting standards implemented before the adoption. t-values are adjusted by firm cluster. *, **, *** indicates the significance at 10%, 5%, 1% levels by two-tailed tests, respectively.

Appendix. Variable Definitions

Name		Definition
ADD	=	overall increase of disclosure requirements by IFRS adoption measured by Nobes (2001)
ADD2	=	the increase of disclosure requirements that are not related to assets with a tangible form, e.g. depreciable assets or inventory (Nobes 2001).
BPR	=	the ratio of book value of equity to market value of common shares outstanding
CAPITAL	=	regulatory restrictions on bank capital from Caprio et al. (2007)
Capital Ratio	=	the ratio of the sum of core and supplementary capital to risk weighted assets.
CAPR	=	*CAPR* is the ratio of core and supplementary capital to risk weighted assets. Missing value is replaced by zero.
CAPR_DUM	=	1 if CAP Ratio is available, 0 otherwise
CoC	=	the average of four estimates of implied cost of capital calculated by the models of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Gode and Mohanram (2003)
DISP	=	the standard variation of one-year ahead earnings forecasts less actual earnings scaled by the forecast-period stock price if more than one one-year ahead earnings forecasts exist, 0 otherwise
ENFORCE	=	the average of three indices for efficiency of judicial system, rule of law, and corruption from La Porta et al. (1998)
EXCH	=	1 if a firm trades its shares in major stock markets (NYSE, NASDAQ, or Amex)
FBIAS	=	one-year ahead earnings forecast less actual earnings scaled by forecast-period stock price
FOLLOW	=	the number of analysts following
IFRS7	=	one if the year of an observation after 2007, 0 otherwise
INC	=	total number of inconsistencies between local accounting standards and IFRS measured by Nobes (2001)
INC2	=	total number of inconsistencies for banks between local accounting standards and IFRS measured by Nobes (2001)
INFLA	=	inflation rate measured by the wholesale price index
LEV	=	total liabilities divided by total assets
LEV_DEC	=	the decile of *LEV*
MKT	=	the value of market value of equity in millions of U.S. dollars

Name		Definition
OFFICE	=	the index of official supervisory power of bank regulators from Caprio et al. (2007)
ONEFORECAST	=	1 if only one analyst follows, 0 otherwise
OTC	=	1 if a firm trades its shares in the U.S. over-the-counter markets, 0 otherwise
POST	=	1 if a firm-year observation falls in 2005 or later, and 0 otherwise
PP	=	1 if a firm trades its shares in a private placement under Rule 144A
RETVOL	=	the standard deviation of monthly stock returns for the last twelve months before the fiscal year end.
RETVOL_DEC	=	the decile of *RETVOL*
SIZE	=	the natural log of the value of total assets in millions of U.S. dollars
SIZE_DEC	=	the decile of the value of total assets
TA	=	the value of total assets in millions of U.S. dollars
VOLUNT	=	1 if the bank adopted IFRS voluntarily, 0 otherwise

Essay 2.

The Pricing of Accruals Quality with Expected Returns:

Vector Autoregression Return Decomposition Approach

1. Introduction

The pricing of accruals quality is one of the most controversial issues in accounting literature because of the inconsistency in empirical test results (Francis et al. 2005; Core et al. 2008; Ogneva 2012). Most prior studies examine the pricing of accrual quality by using the accruals quality measure (*AQ*) of Dechow and Dichev (2002) and realized monthly stock returns as the proxy for expected returns (Francis et al. 2005; Core et al. 2008). Prior studies on the pricing of *AQ* have two concerns: first, the proxies of expected returns in most studies include unexpected information shocks, which could be associated with *AQ* (Elton 1999).[14] Second, prior studies match annual earnings to monthly returns. The difference in the measurement period could bias the test because the informativeness of earnings dissipates over time. Ogneva (2012) tries to address the first concern by excluding cash flow shocks from the proxy for expected returns. However, this method does not remove a significant amount of information shocks in the proxy for expected returns. I reinvestigate the pricing test of *AQ* by using an alternative proxy for expected returns that excludes both discount rate shocks and cash flow shocks.

As in Ogneva (2012), this study excludes information shocks from the proxy for expected returns. Ogneva (2012) excludes the part of cash flow shocks that is related to earnings surprises and uses/applies the remaining part as the proxy for expected returns. However this approach does not remove most of the significant information contents of realized returns from the proxy of expected returns. To address this concern, I estimate expected returns using the vector autoregression (VAR) model of Vuolteenaho (2002) (Callen and Segal 2010). Through this method, all returns that are not explained by the estimation model are classified as information shocks. Therefore this method provides a

[14] In this article, I use unexpected returns and information shocks interchangeably. Following the framework of Campbell (1991), I divide information shocks into two components: cash flow shocks and discount rate shocks.

more strictly measured proxy for expected returns. Furthermore, I use annual returns to match the measurement frequency of accounting earnings and stock returns. This is notable because as the importance of information contents in announced earnings dissipates as time passes after earnings announcements, the difference in measurement frequency could bias the proxy for expected returns.

By using U.S stock market data of 44 years from 1969 to 2012, I test the pricing of *AQ*. I estimate expected returns from the vector autoregression model of Vuolteenaho (2002).. In the decomposition of returns, I use annual stock return data to match the measurement periods of returns and accounting earnings. This proxy for expected returns is less volatile and less skewed than realized returns. The volatility and skewness of realized returns are mainly assigned to information shocks instead of expected returns by the return decomposition. The firm-level pooled regression analysis shows that the estimated expected returns are positively related to the decile rank of *AQ* (*RAQ*) only when the year-fixed effect is controlled. However, after controlling beta, book-to-market ratio, and the log of market value of equity (*lnME*) in the regression model, the positive relation disappears. The Pearson correlation coefficient shows that *RAQ* has a weak positive relation with the expected returns. The positive relation between *RAQ* and the expected returns in the regression test is not robust to the inclusion of firm risk factors. Most information shocks are significantly and positively related to *RAQ*, but none of estimated discount rate shocks have a significant relation with *RAQ*. These results are generally opposite to the results of Ogneva (2012), which show a negative relation between *RAQ* and cash flow shocks. This inconsistency is likely come from the difference in the calculation methods of information shocks. Ogneva (2012) defines cash flow shocks as the returns that are explained by unexpected earnings, and classifies the remainder as non-cash-flow returns. However, the VAR approach calculates expected returns based on prior information and classifies remainders as information shocks. As a consequence, in Ogneva's model, the information shocks that are not explained by earnings surprises, including measurement errors or noises, are included in the proxy for expected returns. On the other hand, in the autoregressive model, measurement errors or noises are assigned to information shocks.

In the pricing test with two-stage cross-sectional factor regressions, I find evidence of the pricing of returns on the *AQ* factor mimicking portfolio (*AQ_Factor*), which is interpreted as the evidence of the pricing of *AQ*. However, realized returns exhibit no significant positive risk premium for *AQ*. These test results support the fact that the use of realized returns as the proxy for expected returns could bias the test for *AQ* pricing.

Studies on asset pricing argue that the risk premium is larger in bad economic conditions. To confirm the results of the two-stage cross-sectional factor regressions, I further examine whether the pricing is stronger in recession periods. By using the expectation model for market returns of Petkova and Zhang (2005), I estimate the expected market premium and divide the sample periods into four groups by the quartiles of the expected market premium. The years in the first and the fourth groups are classified as expansion periods and recession periods, respectively. Using the recession period subsample and the expansion period subsample, I rerun the two-stage cross-sectional factor regressions. The positive risk premium for *AQ* is observed only in the recession periods; however, I find no evidence of a risk premium for *AQ* in expansion periods. The risk premium for *AQ* the recession period is larger than the risk premium for full sample period.

The first contribution of this paper is that this study suggests and tests an alternative proxy for expected returns. Although the expected returns proxy of this study is widely applied for the calculation of information shocks in prior studies (Vuolteenaho 2002; Callen et al. 2006; Callen and Segal 2004), few studies try to the proxy for expected returns from Vuolteenaho (2002) in asset pricing tests. Second, my results support the conjecture of Ogneva (2012) that information shocks should be excluded from the *AQ* pricing test. By extracting information thoroughly from the proxy for expected returns, I find evidence that supports the argument of Francis et al. (2005) that AQ is a priced risk factor. Third, the pricing of information risk is one of the most important issues in the literature on asset pricing. In addition, among several forms of information sources, accounting can provide the most comprehensive and reliable information. However, despite its importance, the conflicting arguments on AQ pricing have not reached a conclusion (Easley and O'Hara 2004; Lambert et al. 2007). This paper contributes evidence to the argument that high quality accounting information is beneficial for firm valuation by lowering the cost of equity capital.

This study has several limitations. Due to the use of annual returns, my measure of stock returns becomes less timely than the measures of prior studies on *AQ* pricing which use monthly returns. Annual returns cannot capture the effects of risks that change within one year. As the accruals quality measure is calculated using data from the previous five years, this concern could be partially mitigated, but the possibility that annual returns miss significant market reactions still remains. In addition, the method in this study strongly depends on an autoregression model that has a limited number of determinants. It is highly likely that returns include more information than what can be explained by the three determinants of my autoregression model. Although the VAR model is based on a reasonable conjecture and the reliable conclusions of prior studies, the possibility of incorrect regression models still remains which is the shortcoming of all regression analyses.

The remainder of this paper proceeds as follows. Section 2 will examine prior literature and the research motivation of this study. The VAR decomposition method is also explained in section 2. Section 3 shows the research design and definition of *AQ*.

Main empirical results will be presented in section 4. In section 5, I will rerun the main tests by dividing samples according to market conditions. Finally, section 6 concludes.

2. Literature Review and Motivation

2.1. The Pricing of Accruals Quality

Easley and O'Hara (2004) investigate whether the heterogeneous distribution of private information among investors affects required returns.[15] They argue that uninformed investors are likely to require high returns for holding stocks with unequal information distribution due to the disadvantages in adjusting investment portfolios. Easley and O'Hara conjecture that this information risk of uninformed investors is undiversifiable. They expect that this risk, hereafter information risk, is a priced risk factor.

Easley and O'Hara (2004) specifically point out accounting information as an important factor that affects the firm's information environment and information risk. Following this argument, Francis et al. (2005) test the pricing of accounting quality by using accruals quality as the proxy for accounting quality, using the accruals quality measure from Dechow and Dichev (2002). This is because accruals contain information about future cash flows with uncertainty created from managers' judgment on recognition of accounting information (Allen et al. 2013). They calculate the returns on the factor-mimicking portfolio for accruals quality (*AQ factor*) and test whether the *AQ factor* is priced by firm-specific time-series regressions. Francis et al. (2005) find a significantly positive relation between *AQ factor* and realized returns. The positive relation is interpreted as evidence of the pricing of accruals quality.

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[15] In this study, I use expected returns, required returns, and cost of equity interchangeably.

Core et al. (2008) point out that the firm specific time-series regression is not an appropriate test method for asset pricing tests. By using a standard pricing test method, i.e. two-stage cross-sectional regression, Core et al. (2008) reexamine the relation between excess returns and *AQ factor*. They fail to find evidence supporting *AQ* pricing and they conclude that accrual quality is not a priced risk factor.

Core et al. (2008) use realized returns as the proxy for expected returns, which is common in asset pricing tests. Realized returns are widely used as the proxy for expected returns based on the premise that the differences between realized returns and expected returns, i.e. unexpected returns, have no systematic and persistent components (Elton 1999).[16] Ogneva (2012) asserts that the *AQ* measure is negatively associated with the unexpected returns because the AQ measure of Dechow and Dichev (2002) is related to unexpected future economic events that are damaging to the firm's cash flows. If this is the case, the reason Core et al. (2008) could not find the evidence of *AQ* pricing is because unexpected returns are likely to be associated with *AQ* negatively. Based on the conjecture above, Ogneva (2012) revisits the tests on the pricing of accruals quality. Using an earnings response coefficient (ERC) model, Ogneva (2012) estimates stock returns due to unexpected earnings and excludes that amount from realized returns to calculate the proxy for expected returns. Using this proxy, Ogneva (2012) finds evidence of *AQ* pricing in the two-stage cross-sectional regression analyses.

2.2. The Separation of Information Shocks from the Proxy for Expected Returns

Many studies of asset pricing, including several studies on the pricing of *AQ*, use realized returns as a proxy for expected returns on the premise that realized returns are

[16] Hereafter, I use unexpected returns and information shocks interchangeably.

the sum of expected returns and independent unexpected returns that can be canceled out by using a long time series of returns. However, Elton (1999) argues that the unexpected returns may not be canceled out over the sample period if the information shocks are significant in amount or correlated over time. Furthermore, significant events, e.g. earnings surprise, could leave persistent effects on stock returns (e.g. Kormendi and Lipe 1987; Collins and Kothari 1989). Because of unexpected economic events, the assumption of the independence of unexpected returns is not valid, and this would be the reason for bias in the asset pricing tests.

Previous studies find that *AQ* has a significant relation with several firm characteristics that can affect future cash flows or discount rates. For example, high *AQ* firms are likely to have large sales growth in previous periods, volatile operating cash flows, and volatile sales. Those firms are also likely to report loss in the following period (Dechow and Dichev 2002; Doyle et al. 2007). In addition, firms that have grown fast are likely to have volatile earnings, cash flows, and sales (Lakonishok et al. 1994). Therefore, because volatile earnings, cash flows, and sales are associated with poor stock performance (Mohanram 2005), *AQ* is related to poor future stock performance. These studies imply that *ex ante AQ* is related to negative information shocks in the future. If accruals quality is a proxy for undiversifiable information risk, the negative relation between *AQ* and information shocks could cancel out or weaken the test for *AQ* pricing when realized returns are used as the proxy for expected returns. This is because asset pricing theory predicts a positive relation between risks and returns. As Ogneva (2012) argues, this could bias the empirical test for the pricing of *AQ*.

To avoid the problems from the correlation between information shocks and realized returns, Ogneva (2012) tries to exclude the cash flow shocks from realized returns by using an earnings response coefficient (ERC) model. Stock returns related to unexpected earnings by ERC model are estimated and the estimated cash flow shocks are excluded from realized returns. Realized returns less cash flow shocks are used as the proxy for expected returns in the test for the pricing of *AQ*.

Although the method of Ogneva (2012) extracts cash flow shocks in a reasonable way, it has several concerns. First, as admitted in Ogneva (2012), this method does not exclude discount factor news from the proxy for expected returns. Cash flow shocks are considered to be more important than discount rate shocks at the firm level (Vuolteenaho 2002), but discount factor shocks are also a significant component of information shocks. More importantly, discount rate shocks could be related to *AQ* as cash flow shocks are (Dechow and Dichev 2002; Doyle et al. 2007; Mohanram 2005; Lakonishok et al. 1994). Second, Ogneva (2012) utilizes only accounting earnings to estimate cash flow shocks. Stock returns include all relevant information regardless of its format, whereas, accounting earnings recognize only earnings defined by accounting standards. Thus the coverage of accounting information is more restrictive compared to the coverage of information in stock returns.[17] Moreover, though earnings surprises have new information contents, accounting information has a backward-looking nature, whereas stock returns have a forward-looking nature. These conjectures raise suspicion that the results of Ogneva (2012) could be driven by the information shocks that are not captured by accounting information. Third, the method of Ogneva (2012) is inconsistent in measurement frequency. The study uses annual unexpected earnings as an input for the separation of cash flow shocks from realized monthly returns. Although the information contents of earnings surprises can take months to be fully incorporated into the stock price (Bernard and Thomas 1989, 1990; Collins and Kothari 1989), the magnitude of the impact of earnings surprise on unexpected returns dissipates as the

[17] In ERC studies, the variations of unexpected earnings generally explain less than 10% of the variations of stock returns.

time passes. Thus, the difference in measurement frequency could cause measurement errors.

A potential alternative for the approach of Ogneva (2012) is the expected returns of the return decomposition method in Vuolteenaho (2002), which modifies the decomposition framework of Campbell (1991) at the firm-level. The method of Vuolteenaho (2002) decomposes firm-level stock returns into three components: expected returns and two information shocks, which are cash flow shocks and discount rate shocks.[18] The method utilizes autoregression to extract expected returns from realized returns. The stock returns that are not explained by the autoregression model are defined as information shocks. As a consequence, in opposition to the method of Ogneva (2012), all measurement errors are allocated to information shocks.[19] Compared to Ogneva (2012), the estimate for expected returns from Vuolteenaho (2002) is more conservative and is likely to have less measurement errors. The details of Vuolteenaho's (2002) method are explained in section 3.2 and appendix A.

3. Research Design and Sample

3.1. Annual Two-Stage Cross-Sectional Regression

This study tests the pricing of *AQ* by two-stage cross-sectional regressions following prior studies on this issue (Core et al. 2008; Kim and Qi 2010; Ogneva 2012). However, unlike prior studies, this study examines *AQ* pricing using annual returns instead of monthly returns to avoid potential measure errors by matching the

[18] Campbell (1991) names the two components as cash flow news and discount rate news. Vuolteenaho (2002) also uses the same terminology as Campbell (1991). In this study, I use cash flow news and cash flow shocks (discount rate news and discount rate shocks) interchangeably.

[19] In Ogneva's model, all returns that are not explained by earnings surprises are allocated to the proxy for expected returns. Ogneva (2012) admits that this proxy for expected return includes more than expected returns.

measurement frequencies of returns and accounting information.[20] The first stage regression includes the returns on the *AQ* factor-mimicking portfolio (*AQ factor*), and the three Fama and French (1993) factors.

AQ is calculated following Dechow and Dichev (2002) and McNichols (2002). First, I estimate the residuals of the modified Dechow and Dichev (2002) accruals model

$$TCA_{it} = \alpha_t + \beta_{1t} CFO_{it-1} + \beta_{2t} CFO_{it} + \beta_{3t} CFO_{it+1} + \beta_{4t} \Delta REV_{it} + \beta_{5t} PPE_{it} + \varepsilon_{it} . \qquad (1)$$

Appendix B documents detailed definitions of the variables. I estimate equation (1) by industry-year using the Fama and French (1997) industry classification. Industry-years with less than 20 observations are excluded from the estimation. The standard deviation of residuals (ε_{it}) of equation (1) from year t-5 to t-1 is defined as the *AQ* of of firm *i* at year t.[21] The *AQ factor* is calculated following the procedure of Francis et al. (2005). First, I make five portfolios based on the quintile rank of *AQ* for each year. Then equal-weighted average annual stock returns are calculated for each portfolio. *AQ factor* is defined as the average of portfolio returns of the two bottom *AQ* quintiles (quintile 4 and 5) less the average of portfolio returns of the two upper *AQ* quintiles (quintile 1 and 2) (Francis et al. 2005).[22] The *AQ* factor in this study is also measured annually using compounded monthly returns.

I calculate annual Fama and French (1993) three factors, especially *HML* and *SMB* following Fama and French (1993), except for the measurement frequency of returns.[23]

[20] Using of annual returns also has downsides. As the measurement frequency of returns changes, the relation of risks and returns captured in the pricing test could change as well because firm risks are time-varying. However, in the *AQ* pricing test, the time-varying characteristic of risk is not critical because the *AQ* measure in this test is measured based on 5 years of accounting information, which is longer than the measurement period of returns.

[21] Though Core et al. (2008) use the residual term from year t-4 to t, this can cause the forward-looking bias. Thus Ogneva (2012) calculates the measure using residuals from year t-5 to t-1. I follow this approach.

[22] I calculate *AQ_factor*, *HML*, and *SMB* separately from the VAR decomposition to avoid potential interference from the data treatment of the VAR decomposition.

[23] Unlike monthly Fama and French (1993) three factors, annual three factors are not publically available. In addition, Annualized *HML* and *SMB* factors are not the linear sum of their monthly measured values.

Since Fama and French (1992, 1993) rebalance their portfolio annually, most of the calculation of annualized *HML* and annualized *SMB* are the same as that of monthly *HML* and monthly *SMB*, except for the returns used in the calculation. Annualized market excess return is measured by compounded realized monthly market returns less compounded Treasury bill rates from July of year t to June of year t+1.

3.2. Vector Autoregression Return Decomposition

The method of Vuolteenaho (2002) uses the vector autoregressive relation of the determinants of returns, which is expressed as the following vector autoregression model (VAR)

$$\mathbf{z}_{t+1} = \boldsymbol{\Gamma}\mathbf{z}_t + \boldsymbol{\eta}_{t+1}. \qquad (2)$$

Vector $\mathbf{z}_t$ has k elements that include stock return of year t (r_t), return on equity of year t (roe_t), and other determinants that affect stock returns and/or return on equity. In addition to r_t and roe_t, I include book-to-market ratio (bm_t) as a proxy of aggregate risk (Fama and French 1992, 1993; Jegadeesh and Titman 1993).[24,25] Thus, equation (2) is estimated with the following model:

$$\begin{pmatrix} r_{t+1} \\ roe_{t+1} \\ bm_{t+1} \end{pmatrix} = \begin{pmatrix} \alpha_1 & \alpha_2 & \alpha_3 \\ \beta_1 & \beta_2 & \beta_3 \\ \gamma_1 & \gamma_2 & \gamma_3 \end{pmatrix} \begin{pmatrix} r_t \\ roe_t \\ bm_t \end{pmatrix} + \begin{pmatrix} \eta_{1t+1} \\ \eta_{2t+1} \\ \eta_{3t+1} \end{pmatrix}. \qquad (3)$$

Estimation of equation (3) is equivalent to the estimation of these three equations individually:

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24 Lewellen (2014) shows that these three determinants are the most effective in explaining future realized returns among several potential determinants of expected returns. Hence, considering parsimoniousness, I do not add any other determinants in the autoregression models.

25 All three elements of $\mathbf{z}_t$ are in log-linear form.

$$
\begin{aligned}
r_{t+1} &= \alpha_1 r_t + \alpha_2 roe_t + \alpha_3 bm_t + \eta_{1t+1} \\
roe_{t+1} &= \beta_1 r_t + \beta_2 roe_t + \beta_3 bm_t + \eta_{2t+1} \\
bm_{t+1} &= \gamma_1 r_t + \gamma_2 roe_t + \gamma_3 bm_t + \eta_{3t+1}
\end{aligned}
\qquad (3a)
$$

Thus, estimated expected returns of t+1 is calculated as

$$\hat{r}_{t+1} = \hat{\alpha}_1 r_t + \hat{\alpha}_2 roe_t + \hat{\alpha}_3 bm_t . \qquad (4)$$

I measure annualized stock returns by compounding monthly stock returns from July of year t to June of year t+1.[26] The remaining details of estimation follow Callen and Segal (2010). Appendix A summarizes the details of the derivation of VAR decomposition models.

The unique advantage of the VAR return decomposition method is that surprises in the elements of vector $\mathbf{z}_t$ can be utilized to estimate the future values of these elements through the VAR structure (Greene 2008). With the estimated companion matrix ($\mathbf{\Gamma}$), I calculate cash flow shocks and earnings shocks from the impulse-response relation of the VAR model. Once a type of the shock is estimated, the other shock is calculated residually. Hence, information shocks can be measured in two methods depending on which shock is estimated first. Campbell (1991) recommends calculating discount rate shocks directly with the residuals of the stock returns and companion matrix, and then assigning the remaining part to cash flow shocks. Using equation (2) and (3), the discount rate shock and cash flow shock are expressed as the following equations:

$$-Nr_t = -\boldsymbol{\lambda}_1' \boldsymbol{\eta}_t \qquad (5)$$

[26] I define the point of measurement following Fama and French (1993). I use the most recent accounting information available before the end of December of year t to calculate variables of year t. Market related information, e.g. stock returns or market value of equity, are measured at June of year t+1. For example, in the case of firms whose fiscal year ends on December 31, book to market of year 2000 is calculated using book value of equity at the end of year 2000 and market value of equity at the end of June 2001. The difference in measurement point is to ensure that accounting information is fully reflected into stock prices.

and $Ne_t = (\mathbf{e}_1 + \boldsymbol{\lambda}_1)'\boldsymbol{\eta}_t$ (6)

where $\mathbf{e}'_k = (0,...,1,....,0)$ and $\boldsymbol{\lambda}'_k = \mathbf{e}'_k \rho\boldsymbol{\Gamma}\left(\mathbf{I} - \rho\boldsymbol{\Gamma}\right)^{-1}$

Alternatively, cash flow shocks can be calculated first. In this case, discount rate shocks include the remaining part.

$$Ne_t = (\mathbf{e}'_2 + \boldsymbol{\lambda}'_2)\boldsymbol{\eta}_t \qquad (7)$$

and $-Nr_t = -(\mathbf{e}'_2 - \mathbf{e}'_1 + \boldsymbol{\lambda}'_2)\boldsymbol{\eta}_t$ (8)

I calculate the shocks in both ways to check robustness.

Estimated expected returns by VAR process have several differences from proxies for expected returns in prior studies. First, unlike realized returns, expected returns from the VAR process address the concern that realized returns have significant information shocks. Regarding this point, my method is similar to that of Ogneva (2012). As another widely used expected return proxy, the implied cost of equity is not successful in resolving the bias from information shocks in stock prices as well.[27] Second, compared to implied cost of equity methods, this method does not require assumptions for long term growth rates (Easton et al. 2002; Nekrasov and Ogneva 2011). Third, this method is free from the bias in analyst forecasts (Mohanram and Gode 2013).

Estimation of expected returns by VAR has several limitations as well. First, the VAR model depends on a limited numbers of factors in the estimation of expected returns. The literature on asset pricing tests has suggested several potential risk factors. Though prior returns or the book-to-market ratio are widely accepted proxies for aggregated risks, the VAR approach cannot rule out the possibility of bias from

[27] Studies using the implied cost of equity frequently include variables for forecast bias or variables to control the volatility of stock returns. However, the main reason of controlling those variables is not to correct information shocks, but to correct non-linearity.

correlated omitted variables.[28] Second, the sensibility of expectations to prior information could vary over time depending on economic environments. Despite such limitations, the VAR decomposition approach has significant advantages Hou et al. (2012) show the possibility that a regression-based approach can be successfully applied in estimating expected returns, despite limitations similar to those of the VAR approach. Though the research focus of this study is different from mine, Hou et al. (2012) indirectly or partially show that a time-series regression approach can explain a significant portion of the valuation process. Furthermore, the VAR approach is widely used in separating unexpected returns from realized returns in the literature.

3.3. Sample

The final sample consists of 70,440 firm-year observations, which have accounting data from 1968 to 2010, and stock return data from 1969 to 2012, for 44 years. I obtain accounting data from Compustat, and stock returns and market value of equity from the Center for Research in Security Prices (CRSP) database.[29]

4. Empirical Analysis

4.1. Descriptive Statistics

Panel A of Table 1 presents the descriptive statistics of firm level variables. The mean value of realized excess return (*Rret-Rf*) is about 9.7%, which is larger than the mean of expected return (*Eret-Rf*), 0.77%. The difference between *Rret-Rf* and *Eret-Rf* is information shocks, which can be divided into two parts; discount factor shocks (–*Nr_est* or –*Nr_rsd*) and cash flow shocks (*Ne_est* or *Ne_rsd*). *Ne_est* (–*Nr_est*) is cash

[28] Lewellen (2014) show that the elements in my VAR model are reliable to predict future returns. However, most of return volatility is not explained by these determinants.

[29] I matched the two data sets with CUSIP instead of the Compustat/CRSP link table provided by Wharton Research Data Services (WRDS) because of the limitation of access to the table.

flow shocks (discount rate shocks) estimated with coefficients of equation (2), and *Ne_rsd* (*–Nr_rsd*) is cash flow shocks (discount rate shocks) residually calculated. Since Campbell (1991) and Vuolteenaho (2002) adopt log transformation for VAR decomposition method, I re-transform decomposed returns and shocks from log-scale to normal scale in order to avoid potential problems from non-linearity and to improve readability. Because of the transformation, the linear sum of means of expected returns (*Eret-Rf*) and the two shocks (*Ne*, *-Nr*) is not the equal to the mean of realized returns (*Rret-Rf*). The standard deviation of *Rret-Rf* (48.98%) is more than 6 times larger than the standard deviation of *Eret-Rf* (7.19). In addition, all four standard deviations of information shocks are larger than the standard deviation of *Eret-Rf,* implying that the return decomposition assigns the variation of realized returns to information shocks. The skewnesses of *ME* and *B/M* are about 17 and 13, respectively, indicating that *ME* and *B/M* are right-skewed. Compared to the skewnesses of *ME* and *B/M*, the skewnesses of *lnME, ln(B/M), RME* or *R*(*B/M)* are noticeably smaller.

The results in Panel B of Table 1 show the returns on factor-mimicking portfolios. The average of *AQ_factor* is -0.26%, which is insignificantly (p-value = 0.87) different from zero. Despite the difference in the measurement frequency of *AQ_factor*, the mean value of my *AQ_factor* is insignificant which is consistent with prior studies (Core et al. 2008; Francis et al. 2005; Ogneva 2012).[30]

Panel A of Table 2 shows the Pearson correlation coefficients of firm-level variables. The correlation coefficient between *Rret-Rf* and *Eret-Rf* is 0.13 and significant at the 5% level on two tailed tests. *Rret-Rf* is positively associated to all four information shocks; on the other hand, *Eret-Rf* is negatively associated to all information shocks. More importantly, *Rret-Rf* has larger correlation coefficients with information shocks than

[30] Core et al. (2008) argue that the premium should be large enough to be a risk factor (Shanken and Weinstein 2006). However, despite the argument of Core et al. (2008), Ogneva (2012) finds evidence of pricing.

Eret-Rf, meaning that a large portion of the variance in realized return is assigned to information shocks. A potential explanation for the difference in the magnitude of coefficients is twofold. First, unexpected economic events could cause abrupt stock return movements that are not captured in the expected returns. This would amplify the positive relation between realized returns and information shocks. Second, due to the imperfection of the estimation model, risk-return relations that are not captured by the model could be classified as information shocks. Both explanations are reasonable and are not mutually exclusive. Because most aggregate *ex ante* risks are likely to be controlled by previous stock returns and the book-to-market ratio, the first explanation is more plausible to explain the difference in the magnitude of correlation coefficients. The signs of the correlation coefficients also support this conjecture. *RAQ* is positively related to *Eret-Rf*, which is consistent with the argument of Francis et al. (2005). However, the correlation coefficient is weak (ρ= 0.019). On the other hand, *RAQ* has a larger correlation coefficient (ρ= -0.347) with *ln(ME)*, which is generally used as a control variable in asset pricing tests. Because the association between *ln(ME)* and *Eret-Rf* is stronger than the association between *RAQ* and *Eret-Rf*, the result of the pricing test cannot be clearly observed at this point. Panel B of Table 2 shows the correlation matrix of these factors. Most correlations are insignificant, except for the correlation between *HML* and *SMB*.

4.2. Return Components by *AQ* Decile

Panel A of Table 3 shows the mean values of *Rret-Rf*, *Eret-Rf* and information shocks according to the decile rank of *AQ* (*RAQ*) for the full sample period. Panel A and B of Figure 1 depict the graphs of the results in Panel A of Table 3. *Rret-Rf* does not monotonically increase or decrease according to *AQ* decile. On the other hand, *Eret-Rf* shows a generally increasing trend except for the 10^{th} decile, but the increasing trend is weak. Among information shocks, discount rate shocks increase in *RAQ*, especially when discount rate shocks are calculated residually (*-Nr_rsd*). These results should be interpreted with caution because *-Nr_rsd* contains large measurement errors (Callen and Segal 2010).

The trend reported in Panel B of Figure 1 does not consider the influence of known risk factors. Hence, I regress realized returns, expected returns, and information shocks on *RAQ*, control variables for risks, and year dummy variables for further examination. The regression model is

$$y_{it+1} = \alpha + \beta_1 RAQ_{it} + \beta_2 Beta_{it} + \beta_3 lnME_{it} + \beta_4 ln(B/M)_{it} + \sum year\_dummies_t + \varepsilon_{it+1} \quad (9)$$

where y_{it+1} is *Rret-Rf, Eret-Rf, -Nr_est, -Nr_rsd, Ne_rsd, or Ne_est*. Among subscripts, *i* is the firm identifier, and t denotes year of observation.

The regression results of equation (9) are reported in Panel A of Table 4. The coefficient of *RAQ* is positive in the regression for *Eret-Rf* (column (2)), whereas *RAQ* has a negative coefficient in the regression for *Rret-Rf*. When other control variables, *Beta*, *lnME*, and *ln(B/M)* are included in the model, *RAQ* is not significantly associated with *Eret-Rf* but is positively related to *Rret-Rf*. As documented in the Pearson correlation coefficient table, both *RAQ* and *Eret-Rf* are strongly associated to *lnME*, and thus the inclusion of *lnME* could drive the change in the signs of the coefficients of *RAQ*. I further examine this conjecture with different sets of control variables after replacing *lnME* and *ln(B/M)* with the raw values of the market value of equity (*ME*) and the book-to-market (*B/M*) or with the decile ranks of the market value of equity (*ME*) and the book-to-market (*R(B/M)*).. Panel C shows the results of the regressions after the replacement of control variables. In the results with decile rank variables presented in column (1) and (3), results are consistent with the results in Panel B. Because decile ranks (*RME* and *R(B/M)*) and logged variables (*lnME* and *ln(B/M)*) are strongly correlated (ρ=0.82, 0.77, respectively), these results are reasonable. But the coefficients of *RAQ* are insignificant in column (2) and positively significant at the 1 % level (ρ=0.081, t=4.84) only in the regression for *Eret-Rf* in column (4). Untabulated results show that the inclusion of *lnME* or *RME* is critical in the inconsistent significance of the coefficients of *RAQ*. However, the choice of the book-to-market-ratio-related variables does not affect the coefficients of *RAQ* significantly. Overall, Table 4 shows inconsistent results on the relations between *RAQ* and the two return proxies for expected returns, *Rret-Rf* and *Eret-Rf*. Both relations are strongly affected by the use of control variables for firm size measured by the market value of equity. These results imply that the significance of the coefficient of *RAQ* depends on the distribution of the control variable for the market value of equity. Descriptive statistics show that *ME* is strongly right skewed. Controlling the skewness by taking the logarithm value or using decile rank affects the significance of the coefficient of *RAQ*.

To examine the time trend of the relation between *RAQ* and the two expected return proxies, I estimate equation (9) for each year by using *Rret-Rf* and *Eret-Rf* as the dependent variable and report the coefficients of *RAQ* graphically in Figure 3. The coefficients of *RAQ* in the regression for *Rret-Rf* are more volatile (σ=0.83) than the coefficients in the regression for *Eret-Rf* (σ=0.08). Although the volatility of coefficients of *RAQ* for *Rret-Rf* is large, the coefficients are generally positive. This is consistent with regression results in Panel B of Table 4. On the other hand, the coefficients of *RAQ* for *Eret-Rf* are persistently close to zero. The high volatility of the coefficients of *RAQ* for *Rret-Rf* could be the consequence of the relation between *RAQ* and information shocks.

To confirm that the results of Table 4 are not driven by the cross-sectional correlation of returns, I rerun equation (4) by Fama-MacBeth regressions without year dummies. The results of Fama-MacBeth regressions are summarized in Table 5. The results are generally consistent with the results in Table 4.

The relations between information shocks and *RAQ* are also examined through regression analyses. Column (3) to (6) in Panel A and Panel B of Table 4 provide the results of the regressions of information shocks on *RAQ*. The coefficients of *RAQ* vary depending on the control variables. However they are non-negative values. Thus, as accruals quality decreases, information shocks from the increase of expected future cash flows or the decrease of future discount rates are likely positively affect realized returns. This is opposite to the conjecture of Ogneva (2012) that states that *AQ* is negatively related to future information shocks. The inconsistency could be due to the difference in decomposition approaches. Ogneva (2012) defines cash flow shocks narrowly as the stock reaction related to unexpected accounting earnings and classifies the residual as the proxy for expected returns. On the other hand, the VAR decomposition calculates expected returns with a limited number of determinants, and all residuals are classified as information shocks. Because accounting information explains only a small portion of the variance in realized stock returns, returns that are not explained by the estimation model couldhave significant information contents. The handling of the residuals in the estimation models is the key difference between the decomposition methods of this study and those of Ogneva (2012) .

4.3. Pricing Test: Two-Stage Cross-Sectional Regression

The pricing of risk factors should be tested by examining whether the proxy for expected returns is positively related to the covariance between the risk factors and the proxy for expected returns following a two-step process (Core et al. 2008; Cochrane

2005).[31] The regression tests in Table 4 and 5 are the tests for association between returns and risk factors, but those results do not guarantee that the covariance is priced in the stock returns. I examine the pricing of *AQ* by two-stage cross-sectional regressions, which is commonly applied in asset pricing tests (Core et al. 2008; Fama and MacBeth 1973; Cochrane 2005). The first stage model is

$$(Rret_{pt} - Rf_t) \text{ or } (Eret_{pt} - Rf_t) = \alpha + \beta^{AQ} R_t^{AQ} + \beta^{MktRf} (R^{Mkt} - Rf)_t + \beta^{SMB} R_t^{SMB} + \beta^{HML} R_t^{HML} + \varepsilon_{pt} \qquad (10)$$

$Rret_{pt}$ and $Rret_{pt}$ are equal-weighted realized returns and expected returns on portfolio *p*, respectively.[32] The dependent variables of equation (10), R_t^{AQ}, R_t^{SMB}, and R_t^{HML}, are returns on the factor-mimicking portfolio by *AQ*, market value of equity, and book-to-market ratio, respectively (Fama and French 1993; Francis et al. 2005). The coefficients of equation (10) are estimated by time series regressions of each portfolio. The second stage model is cross-sectionally estimated using the coefficients of (10) as dependent variables. The model for the second stage regression is

$$\left(\overline{Rret}_{pt} - Rf_t\right) \text{ or } \left(\overline{Eret}_{pt} - Rf_t\right) = \alpha + \widehat{\beta}_p^{AQ} \lambda_t^{AQ} + \widehat{\beta}_p^{MktRf} \lambda_t^{MktRf} + \widehat{\beta}_p^{SMB} \lambda_t^{SMB} + \widehat{\beta}_p^{HML} \lambda_t^{HML} + \varepsilon_{pt} \qquad (11)$$

The coefficients of equation (11) indicate the pricing of risk factors. Statistical significance of each coefficient is measured by Fama-McBeth t-statistics.[33]

Table 6 shows the results of the second stage regressions. I use two sets of test portfolios: (1) 25 portfolios by independently sorted size and book-to-market quintiles; (2) 64 portfolios by independently sorted size, book-to-market, and *AQ* quartiles. Column (1) and (2) show the results for the 25 size and book-to-market portfolios. When realized returns are used as the proxy for expected returns (column (1)), $\widehat{\beta}_p^{AQ}$ is

[31] For the same reason, firm-level Fama-MacBeth regressions cannot be the evidence of pricing as well.
[32] Tests that use value-weighted portfolios are influenced by large stocks. Thus I use equal-weighted portfolio in the tests.
[33] In Table 7, I did not adjust for the underestimation of standard errors due to autocorrelations. When I adjust potential correlation with the Newey-West method by giving a lag of 1 or 2 years, FM t-statistics of *RAQ* or *AQ_factor* generally increase or at least stay at nearly the same level.

negatively related to realized returns (λ= -0.164, t= -5.18). Some studies on the pricing of accruals quality support the existence of a positive premium on *AQ* (Easley and O'Hara 2004; Francis et al. 2005) and other studies find no relation between expected return and *AQ* (Core et al. 2008; Lambert et al. 2007). However, to the best of my knowledge, there is no study that expects a negative relation between *AQ* and expected returns. On the other hand, in column (2), $\hat{\beta}_p^{AQ}$ is positively related to expected returns (λ= 0.030, t= 5.85), which supports the pricing of *AQ*. This is consistent with the results of Ogneva (2012) in the point that removing information shocks from proxies for expected returns increases the significance of the pricing of *AQ_factor*.

In the test with size, book-to-market, and *AQ* portfolios (column (3) and (4)), $\hat{\beta}_p^{AQ}$ is positively related to expected returns at the 1% level (λ= 0.025, t= 5.80), which is consistent with the results in column (2). However, $\hat{\beta}_p^{AQ}$ is negatively associated to realized returns (λ= -0.096, t= -3.06). Combined with the results in column (2), column (4) supports the conjecture that *AQ* is priced when information shocks are excluded.

5. Additional Analysis

Prior studies on asset pricing argue that risk premiums are larger in recession periods than in expansion periods. If the results in Table 6 are due to the pricing of information risk, the premium on *AQ_factor* should be larger in recession periods. Thus, the results of the two-stage cross-sectional regressions are reexamined by dividing the sample into two groups depending on economic conditions. I divide the sample period based on the method of Petkova and Zhang (2005) where expected market return is used as the criterion of macroeconomic conditions.[34] Based on the method of Petkova and

[34] Realized market return is frequently utilized as the proxy for market conditions. However, realized market characteristics are likely to be a noisy measure of economic conditions (Fama 1981). Therefore

Zhang (2005), I estimate annual expected market risk premium. First, I calculate expected market returns by estimating this model by month:

$$R_{m\omega} = \delta_0 + \delta_1 DIV_{\omega-1} + \delta_2 DEF_{\omega-1} + \delta_3 TERM_{\omega-1} + \delta_4 Rf_{\omega-1} + \varepsilon_{m\omega}. \quad (12)$$

The dependent variable, $R_{m\omega}$ is market excess returns for month ω. *DIV*, *DEF*, and *TERM* are the dividend yield, the default spread, and the term spread for month ω, respectively. Subscript ω indicates month. Monthly expected market premium is defined as follows:

$$\hat{R}_{m\omega} = \hat{\delta}_0 + \hat{\delta}_1 DIV_{\omega-1} + \hat{\delta}_2 DEF_{\omega-1} + \hat{\delta}_3 TERM_{\omega-1} + \hat{\delta}_4 Rf_{\omega-1} \quad (13)$$

Annualized expected market premium for year t is calculated by compounding monthly expected market premium for 12 months from July of year t-1 to June of year t. The expected market premium increases (decreases) as the expectation about market condition becomes more pessimistic (optimistic). I classify years into four groups according to the quartiles of annualized expected market premium. Years with an expected market premium in the first (fourth) quartile rank are classified as expansion (recession) periods. I rerun the two-stage cross-sectional regression using the subsample of expansion periods and recession periods.

Panel A of Table 7 summarizes the results of the two-stage cross-sectional regressions for recession periods. When I use the 25 size & book-to-market portfolios, $\hat{\beta}^{AQ\_factor}$ is insignificantly related to realized returns (column (1), λ=0.063, t=1.68), but significantly and positively related to expected returns (column (2), λ=0.860, t=14.87). When the 64 size, book-to-market, and *AQ* portfolios are applied, the results are qualitatively the same. The significance of the coefficient of $\hat{\beta}^{AQ\_factor}$ becomes smaller than the results from the 25 size -book-to-market portfolios presented in column

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Petkova and Zhang (2005) suggest expected market risk premium as an alternative measure for market expectations about macroeconomic conditions.

(2), but are still statistically significant at the 1% level in two-tailed tests. These results are consistent with the results for the full sample period in Table 6. Furthermore, the coefficients of $\hat{\beta}^{AQ\_factor}$ are larger in recession periods than in the full sample, which is consistent with the conjecture that the risk premium is larger in recession periods. On the other hand, in the results for expansion period presented in Panel B of Table 7, I do not find a significantly positive coefficient on $\hat{\beta}^{AQ\_factor}$ in any model. Overall, the results in Table 7 support the conjecture that the risk premium is larger in recession periods. The results also provide evidence that the significantly positive coefficient of $\hat{\beta}^{AQ\_factor}$ is due to the pricing of risks that are related to *AQ*.

6. Conclusion

Information shocks could be related to the potential risk factors that pricing tests attempt to investigate. This could bias test results. By using expected returns estimated by an autoregressive model, I reinvestigate whether accruals quality is a priced risk factor. I find evidence of the pricing of accruals quality in two-stage cross-sectional regressions by using estimated expected returns. The evidence of pricing is strong when market recession was expected *ex ante*. Considering the fact that risk premiums are expected to be large when recession is expected, I conclude that my results support the pricing of *AQ*.

This study contributes to the literature by showing that the use of the proxy for expected returns can affect the results of asset pricing tests. This is because realized stock returns may contain significant information surprises associated with the risk factors. The findings of this study suggest that the proxy for expected returns should be chosen carefully to avoid potential biases in the pricing tests. However, the return decomposition method of my study has several limitations as well. The most important shortcoming is that the model utilizes a limited number of inputs in the estimation, despite the fact that stock returns aggregate all of the information available for market participants. Thus, estimated expected returns could fail to incorporate all expectations of market participants. From this point of view, the decomposition of information shocks in this study is incomplete. The method to decompose returns has more room for development.

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Table 1. Descriptive Statistics

Panel A. Firm Level Variables

Variable	Mean	STD	Skew	5%	25%	50%	75%	95%
Rret-Rf	9.68	48.98	1.87	-53.25	-20.61	2.74	30.02	95.76
Eret-Rf	0.77	7.19	0.05	-10.56	-3.52	0.55	5.04	12.66
-Nr_est	1.16	17.36	3.28	-21.31	-7.96	-0.33	7.69	27.11
Ne_rsd	8.67	39.59	1.81	-44.19	-15.07	3.66	25.51	77.96
-Nr_rsd	7.93	123.27	83.09	-42.15	-17.47	-1.88	16.30	69.38
Ne_est	8.67	53.11	54.53	-36.84	-7.63	5.69	20.68	56.79
Beta	1.09	0.65	0.79	0.17	0.66	1.04	1.44	2.21
ME	2,199	11,642	17	5	31	154	845	8,080
B/M	1.39	4.59	12.72	0.19	0.44	0.74	1.21	2.80
lnME	5.15	2.25	0.24	1.69	3.44	5.04	6.74	9.00
ln(B/M)	-0.29	0.89	0.74	-1.66	-0.83	-0.30	0.19	1.03
RME	4.52	2.82	-0.01	0.00	2.00	5.00	7.00	9.00
R(B/M)	4.52	2.82	-0.01	0.00	2.00	5.00	7.00	9.00

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Panel A reports the descriptive statistics for firm-level variables. *Rret-Rf* is realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess return estimated by the VAR model. *–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *Beta* is the beta of the market model calculated with monthly returns for the previous 5 years. *ME* is the market value of equity in million dollars. *B/M* is the book value of equity to market value of equity. *lnME* and *ln(B/M)* are the natural logarithms of *ME* and *B/M*. *RME* and *R(B/M)* are the decile ranks of *ME* and *B/M*.

Panel B. Return on Factors

Factor return	Mean	STD	25%	50%	75%	p-value
R^{AQ_factor}	-0.26	10.80	-9.19	-0.40	4.60	(0.87)
R^{Mkt}-Rf	5.84	18.85	-2.21	7.04	15.44	(0.04)
R^{HML}	0.02	43.57	-5.57	4.45	15.87	(0.99)
R^{SMB}	6.12	29.19	-8.43	-0.14	9.21	(0.17)

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Panel B documents descriptive statistics for the returns on factor-mimicking portfolios. R^{AQ_factor} is the return on the *AQ* factor-mimicking portfolio. R^{Mkt}-Rf is the annual excess return on the market portfolio. R^{HML} is the return on the size factor-mimicking portfolio. R^{SMB} is the return on the book-to-market factor-mimicking portfolio. All the returns are measured annually, and presented in percentage unit.

Table 2. Pearson Correlation Coefficients
Panel A. Firm Level Variables

	Rret-Rf	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*	*RAQ*	*Beta*	*ME*	*B/M*	*lnME*	*ln(B/M)*	*R(B/M)*
Eret-Rf	0.1309*	1											
-Nr_est	0.4364*	-0.0273*	1										
Ne_rsd	0.8987*	-0.0354*	0.1175*	1									
-Nr_rsd	0.2205*	-0.0213*	0.3986*	0.1303*	1								
Ne_est	0.3252*	-0.0760*	-0.0227*	0.4373*	-0.1001*	1							
RAQ	-0.0078*	0.0188*	0.0162*	0.002	0.0323*	0.0034	1						
Beta	-0.0196*	-0.0600*	0.0140*	-0.0102*	0.0307*	0.0093*	0.1814*	1					
ME	0.0308*	-0.1113*	0.0390*	0.0419*	-0.0038	0.0545*	-0.1212*	-0.0421*	1				
B/M	-0.0209*	0.0927*	-0.0597*	-0.0149*	-0.0165*	-0.0137*	-0.0420*	-0.0291*	-0.0340*	1			
lnME	0.1274*	-0.3474*	0.1438*	0.1415*	0.0141*	0.1150*	-0.3737*	-0.0288*	0.3981*	-0.0897*	1		
ln(B/M)	-0.1141*	0.5244*	-0.3292*	-0.0999*	-0.0856*	-0.1061*	-0.0421*	-0.0718*	-0.1642*	0.5642*	-0.3740*	1	
RME	0.1085*	-0.2406*	0.0890*	0.1295*	-0.0069	0.0864*	-0.3141*	0.0511*	0.2557*	-0.1079*	0.8200*	-0.3091*	1
R(B/M)	-0.1166*	0.5235*	-0.3017*	-0.1086*	-0.0639*	-0.0926*	0.0209*	-0.0661*	-0.1267*	0.2685*	-0.3374*	0.7720*	-0.3816*

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Panel A reports Pearson correlation coefficients for firm-level variables. *Rret-Rf* is realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess return estimated by the VAR model. *–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *RAQ* is the decile rank based of the *AQ* measure for each year. *Beta* is the beta of the market model calculated with monthly returns for the previous 5 years. *ME* is the market value of equity in million dollars. *B/M* is the book value of equity to market value of equity. *lnME* and *ln(B/M)* are the natural logarithms of *ME* and *B/M*. *RME* and *R(B/M)* are the decile ranks of *ME* and *B/M*. * denotes statistical significance at 5%.

Panel B. Pearson correlation of the Return on Factors

Variable	R^{AQ_factor}	R^{Mkt}-Rf	R^{HML}	R^{SMB}
R^{AQ_factor}	1	-0.156	0.210	-0.141
		(0.31)	(0.17)	(0.36)
R^{Mkt}-Rf	-0.156	1	-0.134	0.238
	(0.31)		(0.39)	(0.12)
R^{HML}	0.210	-0.134	1	-0.750
	(0.17)	(0.39)		(0.00)
R^{SMB}	-0.141	0.238	-0.750	1
	(0.36)	(0.12)	(0.00)	

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Panel B documents Pearson correlation coefficients for the annual returns on portfolios. R^{AQ_factor} is the annual return on the *AQ* factor-mimicking portfolio. R^{Mkt}-Rf is the annual excess return on the market portfolio in percentage. R^{HML} is the annual return on the size factor-mimicking portfolio. R^{SMB} is the annual return on the book-to-market factor-mimicking portfolio. All the returns are measured annually. The table shows Pearson correlation coefficients, and the p-value is in the parentheses.

Table 3. Stock Returns and Information Shocks by *AQ* Decile

Panel A. Full Sample Period

RAQ	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
1	9.58	0.52	0.54	7.17	1.95	7.38
2	10.16	0.56	1.18	8.67	5.02	8.66
3	9.88	0.52	1.12	8.86	4.64	8.48
4	9.80	0.74	0.86	8.96	5.43	9.62
5	10.53	0.72	1.24	9.51	7.09	9.23
6	9.97	0.93	0.99	9.12	8.26	8.64
7	9.89	0.91	1.24	8.99	8.58	8.29
8	9.94	1.08	0.74	9.37	7.55	8.65
9	8.88	1.19	1.28	8.26	10.18	9.32
10	8.13	0.50	2.37	7.74	20.55	8.43

Panel B. Partial Sample (*Market downturn*)

RAQ	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
1	14.66	1.77	0.45	10.85	3.18	8.94
2	15.59	1.94	1.42	12.14	7.71	9.90
3	15.54	1.78	1.15	12.90	6.62	9.42
4	15.37	2.15	1.20	12.43	9.80	10.54
5	15.51	2.20	1.39	12.73	8.56	10.12
6	16.12	2.38	1.15	13.45	12.57	10.31
7	16.44	2.42	1.69	13.42	11.54	9.66
8	15.94	2.33	1.04	13.91	9.39	10.77
9	15.73	2.73	1.98	12.74	12.35	9.43
10	14.63	2.01	2.95	11.93	21.71	11.86

Panel C. Partial Sample (*Market upturn*)

RAQ	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
1	4.20	-0.80	0.64	3.28	0.64	5.72
2	4.40	-0.90	0.92	5.00	2.17	7.35
3	3.88	-0.82	1.09	4.58	2.55	7.50
4	3.88	-0.76	0.49	5.28	0.79	8.65
5	5.25	-0.85	1.07	6.10	5.54	8.28
6	3.47	-0.59	0.83	4.55	3.71	6.86
7	2.95	-0.69	0.77	4.30	5.45	6.83
8	3.60	-0.24	0.43	4.56	5.61	6.41
9	1.62	-0.44	0.53	3.51	7.88	9.20
10	1.24	-1.09	1.75	3.31	19.31	4.80

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Table 3 reports the mean value of *Rret-Rf*, *Eret-Rf*, *–Nr_est*, *Ne_est*,*–Nr_rsd*, and *Ne_rsd* by *RAQ*. Panel A reports full sample results. Panel B and Panel C reports subsample results depending on expected market condition. If the annualized expected market premium is smaller (larger) than the median value, the year is classified as a market upturn (downturn). *Rret-Rf* is realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess return estimated by the VAR model. *–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *RAQ* is the decile rank of the *AQ* measure for each year.

Table 4. Information Shocks and AQ Decile

Panel A. Regression without Control Variables

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
RAQ	-0.133**	0.047***	0.098***	0.027	1.385***	0.063
	(-2.40)	(2.81)	(4.05)	(0.55)	(10.50)	(0.75)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	70,440	70,440	70,440	70,440	70,440	70,440
Adj. R2	0.198	0.178	0.114	0.158	0.013	0.032

Panel B. Regression with Control Variables

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
RAQ	0.610***	-0.010	0.000	0.773***	0.430**	0.641***
	(9.35)	(-0.69)	(0.00)	(13.81)	(2.53)	(7.82)
Beta	-1.576***	-0.583***	0.306**	-0.822***	6.103***	-0.174
	(-5.28)	(-9.76)	(2.51)	(-3.26)	(6.37)	(-0.19)
lnME	2.524***	-0.429***	-0.035	2.566***	-1.855***	2.165***
	(23.37)	(-13.18)	(-0.65)	(27.13)	(-4.32)	(16.03)
ln(B/M)	-4.761***	3.427***	-5.747***	-3.095***	-12.226***	-4.895***
	(-17.03)	(28.74)	(-28.10)	(-13.18)	(-11.33)	(-14.02)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	70,440	70,440	70,440	70,440	70,440	70,440
Adj. R2	0.219	0.393	0.191	0.183	0.020	0.048

Panel C. Regression with Alternative Control Variables

VARIABLES	(1) *Rret-Rf*	(2) *Rret-Rf*	(3) *Eret-Rf*	(4) *Eret-Rf*
RAQ	0.418***	-0.080	0.013	0.081***
	(6.84)	(-1.37)	(1.10)	(4.84)
Beta	-1.633***	-0.383	-0.647***	-1.125***
	(-5.49)	(-1.27)	(-12.42)	(-15.35)
RME	1.467***		-0.113***	
	(22.38)		(-7.17)	
R(B/M)	-1.497***		1.282***	
	(-23.75)		(76.20)	
ME		0.000***		-0.000***
		(4.21)		(-5.83)
B/M		-0.227***		0.132***
		(-6.09)		(8.19)
Year Dummy	Yes	Yes	Yes	Yes
Observations	70,440	70,440	70,440	70,440
Adj. R2	0.217	0.199	0.457	0.200

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Table 4 reports firm-level pooled results of regressions of annual realized excess returns (*Rret-Rf*) and five return components (*Eret-Rf, –Nr_est, Ne_est,–Nr_rsd*, and *Ne_rsd*) on *RAQ*. Panel A reports regressions on *RAQ* and year dummy variables. Panel B reports the results of regressions on *RAQ, lnME, ln(B/M)*, and year dummy variables. Panel C reports the results of regressions of *Rret-Rf* and *Eret-Rf* on *RAQ, ME, (B/M), RME, R(B/M)*, and year dummy variables. *Rret-Rf* is realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess return estimated by the VAR model. *–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *RAQ* is the decile rank of the *AQ* measure for each year. The table shows coefficients and statistical significance. *, **, *** denote two-tailed significance at 10%, 5%, and 1%, respectively. Firm-cluster adjusted t-statistics are in the parentheses.

Table 5. Firm-Level Fama-MacBeth Regression

VARIABLES	(1) *Rret-Rf*	(2) *Rret-Rf*	(3) *Rret-Rf*	(4) *Eret-Rf*	(5) *Eret-Rf*	(6) *Eret-Rf*
RAQ	0.567***	0.392**	-0.097	-0.007	0.011	0.062**
	(4.51)	(2.47)	(-0.54)	(-0.59)	(0.74)	(2.66)
Beta	-2.326	-2.418	-0.971	-0.427***	-0.609***	-1.074***
	(-1.22)	(-1.21)	(-0.48)	(-2.82)	(-3.90)	(-6.26)
lnME	2.437***			-0.350***		
	(5.84)			(-6.39)		
ln(B/M)	-4.863***			3.800***		
	(-5.17)			(23.25)		
RME		1.504***			-0.097***	
		(6.38)			(-3.87)	
R(B/M)		-1.414***			1.271***	
		(-7.41)			(62.23)	
ME			0.000			-0.000***
			(1.39)			(-5.52)
B/M			-0.558***			0.378***
			(-4.04)			(5.69)
Constant	-6.728*	8.061***	10.176***	4.040***	-3.981***	1.184***
	(-1.86)	(3.02)	(4.48)	(9.79)	(-9.80)	(2.78)
Observations	70,440	70,440	70,440	70,440	70,440	70,440
R-squared	0.103	0.091	0.056	0.301	0.363	0.058
No. of groups	44	44	44	44	44	44

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Table 5 reports firm-level Fama-MacBeth regression results of annual realized excess returns (*Rret-Rf*) and five return components (*Eret-Rf, –Nr_est, Ne_est,–Nr_rsd*, and *Ne_rsd*) on *RAQ*, *lnME*, *ln(B/M)*. *Rret-Rf* is realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess return estimated by the VAR model.*–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *RAQ* is the decile rank of the *AQ* measure for each year. The table shows coefficients and statistical significance. *, **, *** denote two-tailed significance at 10%, 5%, and 1%, respectively. Fama-Mac-Beth t-statistics are in the parentheses.

Table 6. Portfolio Factor Regression

Portfolio	*ME-B/M* (5x5)		*ME-B/M-AQ* (4x4x4)	
	(1)	(2)	(3)	(4)
Dep.Var.	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*
$\hat{\beta}^{AQ}$	-0.164***	0.030***	-0.096***	0.025***
	(-5.18)	(5.85)	(-3.06)	(5.80)
$\hat{\beta}^{MktRf}$	-0.047**	0.147***	-0.008	0.083**
	(-2.54)	(4.68)	(-0.44)	(2.84)
$\hat{\beta}^{SMB}$	-0.401***	2.001***	-0.239***	-0.037
	(-6.77)	(27.28)	(-4.45)	(-0.71)
$\hat{\beta}^{HML}$	0.988***	-2.515***	0.527***	-1.844***
	(6.96)	(-25.24)	(7.53)	(-23.38)
Constant	-1.871***	6.165***	-1.072***	4.034***
	(-9.07)	(36.40)	(-8.30)	(31.68)
R-squared	0.471	0.534	0.264	0.270
No. of groups	44	44	44	44

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Table 6 reports the second stage regression results of the two-stage cross-sectional regression. The first stage regression model is

$$(Rret_{pt} - Rf_t) \text{ or } (Eret_{pt} - Rf_t) = \alpha + \beta^{AQ} R_t^{AQ} + \beta^{MktRf} (R^{Mkt} - Rf)_t + \beta^{SMB} R_t^{SMB} + \beta^{HML} R_t^{HML} + \varepsilon_{pt} \cdot$$

R^{AQ} is the annual return on the *AQ* factor-mimicking portfolio. R^{Mkt}-Rf is the annual excess return on the market portfolio in percentage. R^{HML} is the annual return on the size factor-mimicking portfolio. R^{SMB} is the annual return on the book-to-market factor-mimicking portfolio. All returns are measured annually. Using the estimated coefficients of first stage time series regression, the second stage cross-sectional regression is estimated with the following model:

$$\left(\overline{Rret}_{pt} - Rf_t\right) \text{ or } \left(\overline{Eret}_{pt} - Rf_t\right) = \alpha + \hat{\beta}_p^{AQ} \lambda_t^{AQ} + \hat{\beta}_p^{MktRf} \lambda_t^{MktRf} + \hat{\beta}_p^{SMB} \lambda_t^{SMB} + \hat{\beta}_p^{HML} \lambda_t^{HML} + \varepsilon_{pt} \cdot$$

Column (1) and (2) report the results using 25 size & book-to-market portfolios, and column (3) and (4) report the results using 64 size & book-to-market & *AQ* portfolios. The table shows coefficients and statistical significance. *, **, *** denote two-tailed significance at 10%, 5%, and 1%, respectively. Fama-MacBeth t-statistics are in the parentheses.

Table 7. Portfolio Factor Regression by Market Condition

Panel A. Recession Period

	Size-B/M (5x5)		Size-B/M-AQ (4x4x4)	
	(1)	(2)	(3)	(4)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*
$\hat{\beta}^{AQ}$	0.063	0.860***	0.061	0.147***
	(1.68)	(14.87)	(1.68)	(4.10)
$\hat{\beta}^{MktRf}$	-0.144***	-0.566***	-0.042	-0.169***
	(-3.07)	(-7.63)	(-0.94)	(-3.82)
$\hat{\beta}^{SMB}$	-0.116**	-0.282***	-0.050	0.039
	(-2.49)	(-5.98)	(-1.06)	(0.97)
$\hat{\beta}^{HML}$	0.011	0.391***	0.024	-0.012
	(0.29)	(7.20)	(0.58)	(-0.29)
Constant	-0.091	-0.058***	0.008	-0.003
	(-1.07)	(-8.26)	(0.11)	(-0.48)
R-squared	0.493	0.144	0.435	0.270
No. of groups	11	11	11	11

Panel B. Expansion Period

	Size-B/M (5x5)		Size-B/M-AQ (4x4x4)	
	(1)	(2)	(3)	(4)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*
$\hat{\beta}^{AQ}$	-0.019	-0.027	0.007	-0.123***
	(-0.52)	(-0.68)	(0.20)	(-3.14)
$\hat{\beta}^{MktRf}$	-0.057	-0.847***	-0.020	-0.327***
	(-0.67)	(-7.23)	(-0.27)	(-4.12)
$\hat{\beta}^{SMB}$	0.392***	0.129	0.191**	0.085
	(4.88)	(1.59)	(2.46)	(1.04)
$\hat{\beta}^{HML}$	0.117	0.740***	0.013	0.216***
	(1.63)	(8.97)	(0.18)	(3.13)
Constant	0.130***	-0.041***	0.051*	-0.023***
	(3.04)	(-13.06)	(1.98)	(-12.74)
R-squared	0.498	0.084	0.394	0.165

No. of groups	11	11	11	11

The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Table 7 reports the second stage regression results of the two-stage cross-sectional regression by market condition. If the annualized expected market premium is in the first (fourth) decile, the year is classified as an expansion (recession) period. Panel A and Panel B report the results of recession periods and expansion periods, respectively. The first stage regression model is

$(Rret_{pt} - Rf_t)$ or $(Eret_{pt} - Rf_t) = \alpha + \beta^{AQ} R_t^{AQ\_factor} + \beta^{MktRf}(R^{Mkt} - Rf)_t + \beta^{SMB} R_t^{SMB} + \beta^{HML} R_t^{HML} + \varepsilon_{pt}$.

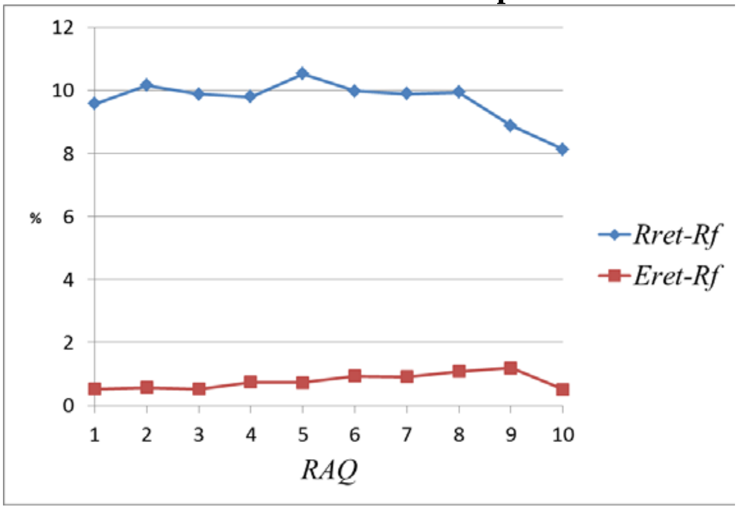
R^{AQ_factor} is the annual return on the *AQ* factor-mimicking portfolio. R^{Mkt}-Rf is the annual excess return on the market portfolio in percentage. R^{HML} is the annual return on the size factor-mimicking portfolio. R^{SMB} is the annual return on the book-to-market factor-mimicking portfolio. All returns are measured annually. Using the estimated coefficients of the first stage time series regression, the second stage cross-sectional regression is estimated with the following model:

$\left(\overline{Rret}_{pt} - Rf_t\right)$ or $\left(\overline{Eret}_{pt} - Rf_t\right) = \alpha + \widehat{\beta}_p^{AQ} \lambda_t^{AQ} + \widehat{\beta}_p^{MktRf} \lambda_t^{MktRf} + \widehat{\beta}_p^{SMB} \lambda_t^{SMB} + \widehat{\beta}_p^{HML} \lambda_t^{HML} + \varepsilon_{pt}$.

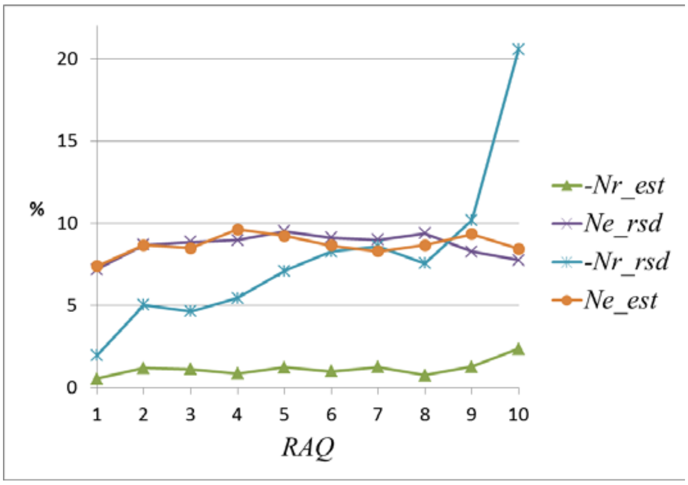
Column (1) and (2) report the results using 25 size & book-to-market portfolios, and column (3) and (4) report the results using 64 size & book-to-market & *AQ* portfolios. The table shows coefficients and statistical significance. *, **, *** denote two-tailed significance at 10%, 5%, and 1%, respectively. Fama-MacBeth t-statistics are in the parentheses.

Figure 1. Trends of Returns and Information Shocks by *AQ* Decile

Panel A. Realized Return and Expected Return



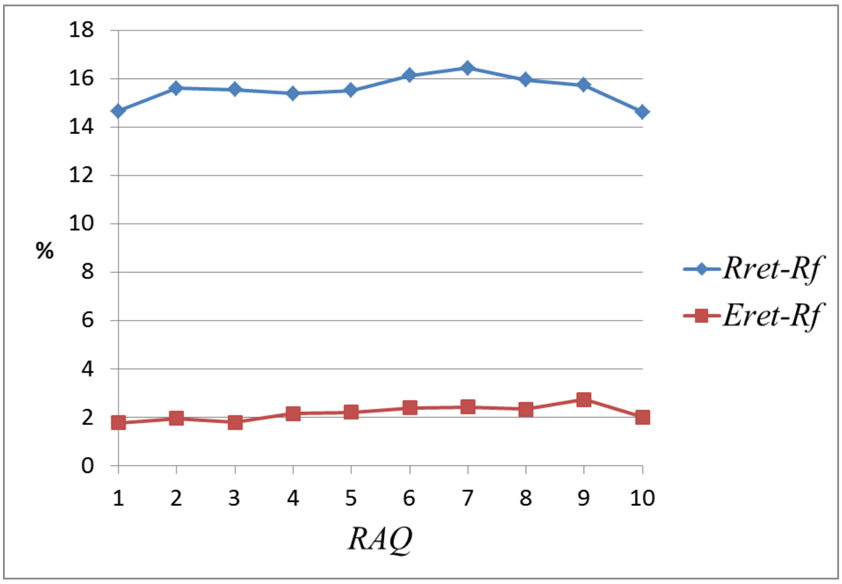
Panel B. Information Shocks



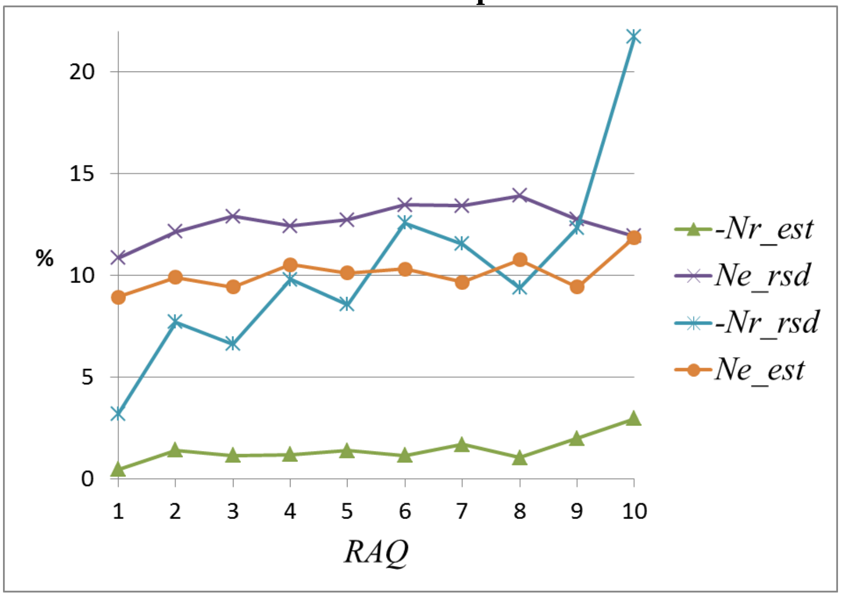
The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Panel A of Figure 1 reports the trend of the mean value of *Rret-Rf* and *Eret-Rf* by *RAQ*. Panel B of Figure 1 reports the trend of the mean value of –*Nr_est*, *Ne_est*,–*Nr_rsd*, and *Ne_rsd* by *RAQ*. *Rret-Rf* is realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess return estimated by the VAR model. –*Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. –*Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *RAQ* is the decile rank of the *AQ* measure for each year.

Figure 2. Trends of Returns and Information Shocks by *AQ* Decile depending on Market Conditions

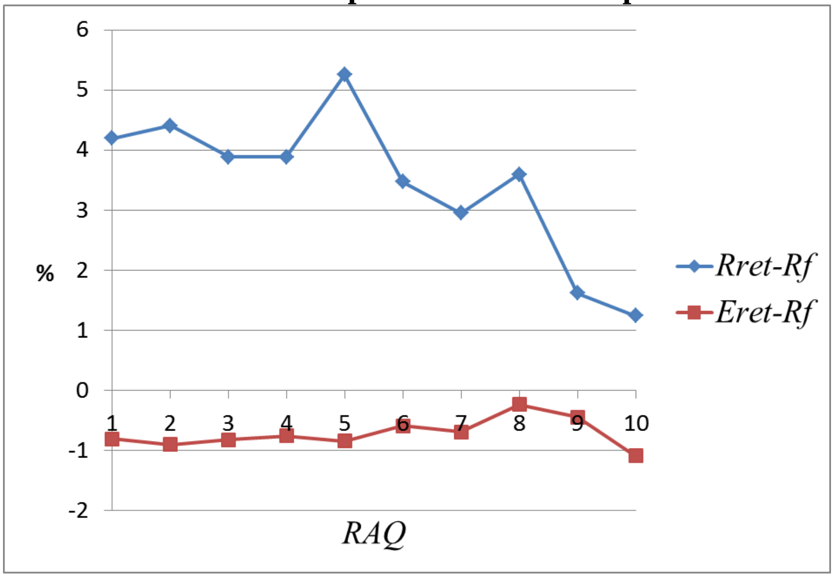
Panel A. Realized Return and Expected Return in Expected Market Downturns.



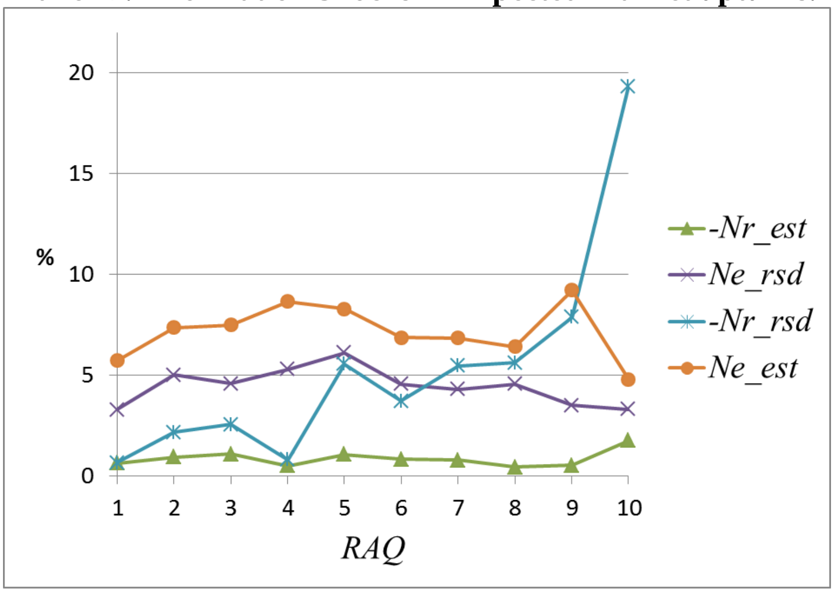
Panel B. Information Shocks in Expected Market downturns.



Panel C. Realized Return and Expected Return in Expected Market upturns.

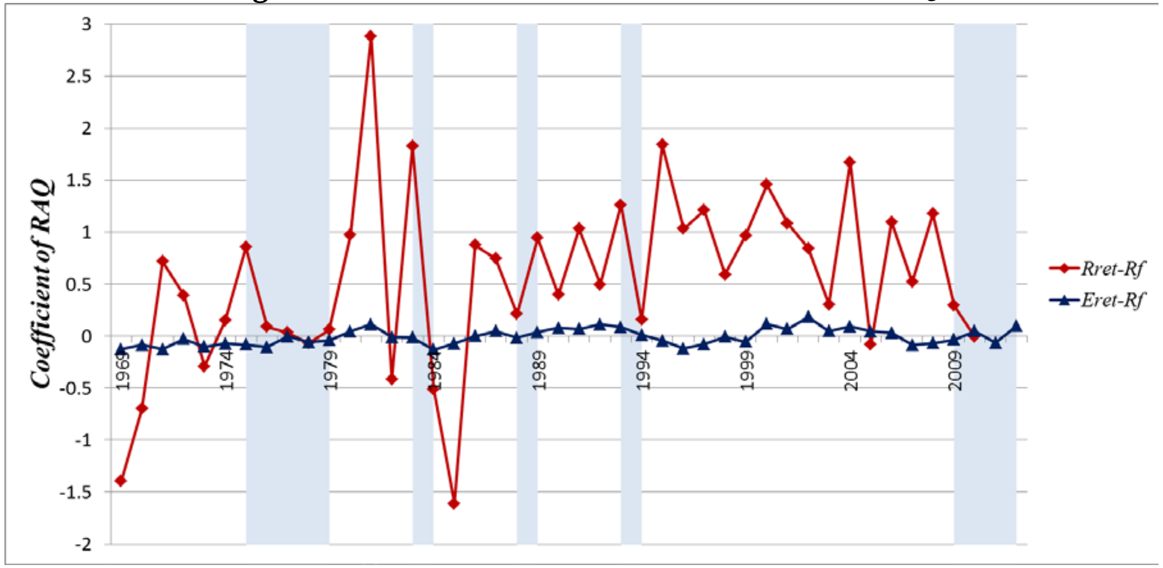


Panel D. Information Shocks in Expected Market upturns.



The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Figure 2 reports the trend of the mean value of realized returns and its components by the expected market condition. If the annualized expected market premium is smaller (larger) than the median value, the year is classified as a market upturn (downturn). The results of expected market downturns are reported in Panel A and Panel B, and the results of expected market upturns are reported in Panel C and Panel D. Panel A and Panel C report the trend of the mean value of *Rret-Rf* and *Eret-Rf* by *RAQ*. Panel B and Panel D report the trend of the mean value of –*Nr_est*, *Ne_est*,–*Nr_rsd*, and *Ne_rsd* by *RAQ*. *Rret-Rf* is realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess return estimated by the VAR model. –*Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. –*Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *RAQ* is the decile rank of the *AQ* measure for each year.

Figure 3. The Time Trend of the Coefficients of *RAQ*



The final sample consists of 70,440 observations of U.S. public firms from 1968 to 2013. Figure 3 reports the time trend of the coefficients of *RAQ* estimated by the following regression equation: $y_{it+1} = \alpha + \beta_1 RAQ_{it} + \beta_2 Beta_{it} + \beta_3 lnME_{it} + \beta_4 ln(B/M)_{it} + \varepsilon_{it+1}$. (9)

The red line and blue line show the coefficients of the regressions for *Rret-Rf* and *Eret-Rf*, respectively. The shaded areas indicate market downturn. If the annualized expected market premium of the year is larger than third quartile of the annualized expected market premium for the full sample period, the year is classified as a market recession period.

Appendix A: The Decomposition of Information Shocks

This section briefly explains the decomposition method of unexpected returns into cash flow shocks and discount rate shocks by the VAR approach. The book-to-price ratio can be re-written as follows.

$$\frac{BV_t}{P_t} = \frac{[1+\Delta BV_t / BV_{t-1}]}{[1+(\Delta P_t + D_t)/P_{t-1} - D_t / P_{t-1}]} \cdot \frac{BV_{t-1}}{P_{t-1}} \quad \text{(A1)}$$

Here, *BV*, *P*, *D* denote book value of equity, market value of equity, and dividends, respectively. Subscript t indicates the time period, and ΔX_t means change of *X* in period t, i.e. the $\Delta X_t = X_t - X_{t-1}$. By applying clean surplus relation, (A1) is re-written as

$$\frac{BV_t}{P_t} = \frac{[1+\Delta BV_t / BV_{t-1}]}{[1+(\Delta P_t + D_t)/P_{t-1} - D_t / P_{t-1}]} \cdot \frac{BV_{t-1}}{P_{t-1}} \quad \left(\because \Delta BV_t = X_t - D_t\right). \quad \text{(A2)}$$

Taking logarithm on (A2) yields

$$bm_t \equiv \log\left(\frac{BV_t}{P_t}\right)$$

$$= \log\left(\frac{[1+\Delta BV_t / BV_{t-1}]}{[1+(\Delta P_t + D_t)/P_{t-1} - D_t / P_{t-1}]}\right) + bm_{t-1} \quad \text{(A3)}$$

Let $roe_t \equiv \log\left(1+X_t / BV_{t-1}\right)$, $r_t \equiv log\left(1+(\Delta P_t + D_t)/P_{t-1}\right)$. If D=0, then (A3) can be re-written as

$$roe_t - r_t = bm_t - bm_{t-1}. \quad \text{(A4)}$$

If D≒0, by using Taylor expansion, (A3) is re-written as

$$roe_t - r_t = \rho bm_t - bm_{t-1} + \xi_t. \quad \text{(A5)}$$

Here, ρ is discount rate. Iterating (A5) N times, and summing those yields

$$bm_{t-1} = \sum_{j=0}^{N} \rho^j r_{t+j} - \sum_{j=0}^{N} \rho^j roe_{t+j} + \sum_{j=0}^{N} \rho^j \xi_{t+j} + \rho^{N+1} bm_{t+N} . \quad \text{(A6)}$$

By N→∞, (A6) becomes

$$bm_{t-1} = \sum_{j=0}^{\infty} \rho^j r_{t+j} - \sum_{j=0}^{\infty} \rho^j roe_{t+j} + \sum_{j=0}^{\infty} \rho^j \xi_{t+j} \quad \text{(A7)}$$

By combining with the change in expectation, (A7) gives

$$r_t - E_{t-1}(r_t) = \Delta E_t \sum_{j=0}^{\infty} \rho^j roe_{t+j} - \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} . \quad \text{(A8)}$$

Finally, (A8) is expressed as

$$r_t - E_{t-1}(r_t) = Ne_t - Nr_t \quad \text{(A9)}$$

where $Ne_t \equiv \Delta E_t \sum_{j=0}^{\infty} \rho^j roe_{t+j}$, (A10)

and $Nr_t \equiv \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j}$. (A11)

By assuming that return follows the vector autoregression model

$$\mathbf{z}_{t+1} = \mathbf{\Gamma} \mathbf{z}_t + \boldsymbol{\eta}_{t+1} , \quad \text{(1)}$$

returns are $r_t = \mathbf{e}_1' \mathbf{z}_t$ where $\mathbf{e}_k' = (0,...,1,....,0)$.

The VAR model estimates expected returns as

$$E_{t-1} r_{t+j-1} = \mathbf{e}_1' \mathbf{\Gamma}^j \mathbf{z}_{t-1}$$

where $\mathbf{z}_t = \begin{pmatrix} r_t \\ roe_t \\ bm_t \end{pmatrix}$, $\mathbf{\Gamma} = \begin{pmatrix} \alpha_1 & \alpha_2 & \alpha_3 \\ \beta_1 & \beta_2 & \beta_3 \\ \gamma_1 & \gamma_2 & \gamma_3 \end{pmatrix}$, and $\boldsymbol{\eta}_t = \begin{pmatrix} \eta_{1t} \\ \eta_{2t} \\ \eta_{3t} \end{pmatrix}$.

Thus, discount rate news can be expressed as

$$Nr_t = \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} = \left(E_t - E_{t-1}\right) \sum_{j=1}^{\infty} \rho^j r_{t+j}$$

$$= \mathbf{e}_1' \sum_{j=1}^{\infty} \rho^j \mathbf{\Gamma}^j \boldsymbol{\eta}_t = \mathbf{e}_1' \rho \mathbf{\Gamma} \left(\mathbf{I} - \rho \mathbf{\Gamma}\right)^{-1} \boldsymbol{\eta}_t = \boldsymbol{\lambda}_1' \boldsymbol{\eta}_t \quad \text{(A12)}$$

where $\boldsymbol{\lambda}_k' = \mathbf{e}_k' \rho \mathbf{\Gamma} \left(\mathbf{I} - \rho \mathbf{\Gamma}\right)^{-1}$.

In this case, the remaining part of η_{1t} is classified as cash flow news, that is expressed as

$$Ne_t = (\mathbf{e}_1 + \boldsymbol{\lambda}_1)' \boldsymbol{\eta}_t . \quad \text{(A13)}$$

Since the information shocks are reversed from log scale to raw scale, information shocks *Ne_rsd* and -*Nr_est* are calculated by using (A12) and (A13) as

$$-Nr\_est_t = \exp(-Nr_t) - 1 \quad \text{(A12a)}$$

and $Ne\_rsd_t = \exp(Nr_t) - 1$. (A13a)

Alternatively, Ne can be estimated first. Because of the difference in starting points of summation in (A10) and (A11),

$$Ne_t - roe_t = \mathbf{e}_2' \rho \mathbf{\Gamma} (\mathbf{I} - \rho \mathbf{\Gamma})^{-1} = \boldsymbol{\lambda}_2' \boldsymbol{\eta}_t . \quad \text{(A14)}$$

Thus, $Ne_t = (\mathbf{e}_2' + \boldsymbol{\lambda}_2') \boldsymbol{\eta}_t$ (A15)

and $Nr_t = (\mathbf{e}_2' - \mathbf{e}_1' + \boldsymbol{\lambda}_2') \boldsymbol{\eta}_t$. (A16)

Information shocks *Ne_est* and -*Nr_rsd* are calculated by using (A15) and (A16) as

$$Ne\_est_t = \exp(Ne_t) - 1 . \quad \text{(A15a)}$$

and $-Nr\_rsd_t = \exp(-Nr_t) - 1$. (A16a)

Appendix B: Variable Definitions

Variables for Discretionary Accruals Model

TCA (*ΔCA*-*ΔCash*)-(*ΔCL*-*ΔSTDEBT*)

ΔCA change in current assets (Compustat name: **ACT**) deflated by average total assets

ΔCash change in cash and short-term investments (Compustat name: **CHE**) deflated by average total assets

ΔCL change in current liabilities (Compustat name: **LCT**) deflated by average total assets

ΔSTDEBT change in debt in current liabilities (Compustat name: **DLC**) deflated by average total assets

CFO *NIBE*-*TA*

NIBE Income before extraordinary items (Compustat name: **IB**) deflated by average total assets

TA *TCA* - *DEPN*

DEPN Depreciation and amortization (Compustat name: **DP**) deflated by average total assets

ΔREV The change in revenues (Compustat name: **SALE**) deflated by average total assets

PPE Property plant and equipment (Compustat name: **PPEGT**) deflated by average total assets

AQ The standard deviation of the residual terms of the following model from t-5 to t-1:

$$TCA_{it} = \alpha_t + \beta_{1t} CFO_{it-1} + \beta_{2t} CFO_{it} + \beta_{3t} CFO_{it+1} + \beta_{4t} \Delta REV_{it} + \beta_{5t} PPE_{it} + \varepsilon_{it} . \quad (1)$$

Equation (1) is estimated by the 48 Fama-French industry groups.

Variables for Vector Autoregression Model

r	The natural logarithm of one plus annual realized stock return less one plus 30-day Treasury bill rate, demeaned by the 48 Fama-French industry groups
roe	The natural logarithm of one plus return on equity less one plus 30-day Treasury bill rate, demeaned by the 48 Fama-French industry groups
bm	The natural logarithm of the ratio of book value of equity to market value of equity, demeaned by the 48 Fama-French industry groups

Returns

Rf	Annualized one-month Treasury bond rate
Rret-Rf	Annual realized excess stock returns less annualized Treasury bond rate
Eret-Rf	Annual expected excess returns as the estimated value of the following regression model: $r_{t+1} = \alpha_1 r_t + \alpha_2 roe_t + \alpha_3 bm_t + \eta_{1t+1}$. Estimation is performed by the 48 Fama-French industry groups.
-*Nr_est*	Discount rate shocks estimated by the VAR model. The VAR model is $\mathbf{z}_{t+1} = \mathbf{\Gamma}\mathbf{z}_t + \boldsymbol{\eta}_{t+1}$ where $\mathbf{z}'_t = (r_t, roe_t, bm_t)$, $\mathbf{\Gamma}$ is a 3 by 3 coefficient matrix, and $\boldsymbol{\eta}'_{t+1} = (\eta_{1t+1}, \eta_{2t+1}, \eta_{3t+1})$ is the residual vector. $-Nr\_est = \exp(-\boldsymbol{\lambda}'_1\boldsymbol{\eta}_t) - 1$ where $\boldsymbol{\lambda}'_k = \mathbf{e}'_k \rho \mathbf{\Gamma}(\mathbf{I} - \rho\mathbf{\Gamma})^{-1}$ and $\mathbf{e}'_k = (0, ..., 1, ..., 0)$.
Ne_rsd	Residually calculated cash flow shocks. $Ne\_rsd = \exp((\mathbf{e}_1 + \boldsymbol{\lambda}_1)'\boldsymbol{\eta}_t) - 1$
-*Nr_rsd*	Residually estimated discounted factor shock. $-Nr\_rsd = \exp(-(\mathbf{e}'_2 - \mathbf{e}'_1 + \boldsymbol{\lambda}'_2)\boldsymbol{\eta}_t) - 1$
Ne_est	Cash flow shocks estimated by the VAR model. $Ne\_est = \exp(Ne_t = (\mathbf{e}'_2 + \boldsymbol{\lambda}'_2)\boldsymbol{\eta}_t) - 1$.

Firm Characteristics

RAQ	The annual decile rank of AQ
ME	market value of equity (in million dollars)
lnME	The natural logarithms of *ME*
RME	The annual decile rank of *ME*
B/M	Book value of equity to market value of equity
ln(B/M)	The natural logarithms of *B/M*
R(BM)	The annual decile rank of *B/M*
Beta	Estimated beta of the market model calculated with monthly returns of the previous 5 years.

Returns on Factor-Mimicking Portfolios

R^{AQ}	The annual return on the *AQ* factor-mimicking portfolio in percentage.
R^{Mkt}-Rf	The annual excess return on the market portfolio in percentage.
R^{HML}	The annual return on the size factor-mimicking portfolio following the calculation of Fama and French (1993).
R^{SMB}	The annual return on the book-to-market factor-mimicking portfolio following the calculation of Fama and French (1993).

Variables for Expected Market Premium

R_m	Returns on market portfolio
DIV	The dividend yield, calculated as total cash dividends payment of entire Compustat database for the recent year divided by the total market value of all the firms in Compustat database of the previous year
DEF	The default spread, defined as the difference between the yield of 10-year Treasury bonds and the yield of 1-year Treasury bonds
TERM	The term spread, defined as the difference between the yield of AAA rate

corporate bonds and the yield of BAA rate corporate bonds

TB 30-day Treasury bill rate

Market Condition Variable

Recession 1 if annualized expected market premium is in the fourth quartile, 0 otherwise. Annualized expected market premium is calculated by compounding monthly expected market premium for the previous 12 months. Monthly market premium is the estimated value of the following monthly regression model:

$$R_{m\omega} = \delta_0 + \delta_1 DIV_{\omega-1} + \delta_2 DEF_{\omega-1} + \delta_3 TERM_{\omega-1} + \delta_4 Rf_{\omega-1} + \varepsilon_{m\omega}.$$

Essay 3.

Financial Flexibility and Expected Returns:

Vector Autoregression Approach

1. Introduction

Unlike the assumption of traditional finance theories (Merton and Modigliani 1961), capital markets in reality are not perfect. The frictions of external financing in imperfect capital markets cause the deviation of firm investments from the optimal level and timing when firms rely on external capital (Almeida et al. 2011; Denis 2011). Thus, the independence from external financing, i.e. financial flexibility, would affect firm valuation and stock returns. Prior studies on this issue are not complete because of the misclassification of cash assets and debts and the use of imprecise proxies for expected returns. This study reexamines the association between financial flexibility and stock returns by improving the measures of prior studies.

Financial flexibility is "*the ability of a firm to respond in a timely and value-maximizing manner to unexpected changes in the firm's cash flows or investment opportunity set*" (Denis 2011). Financially flexible firms can alleviate financial constraints or prevent underinvestment, which will critically influence firm operations and future performance. As a consequence, financial flexibility is likely to be related to firm risks and expected cash flows, which are inputs of firm valuation.

Among several aspects of financial flexibility, this study focuses on two measures, cash holdings and financial leverage, because these measures represent the effect of the firm's decisions on asset management and financing. In addition, these two measures have practically no measurement errors, compared to other aspects of financial flexibility from financial statements, i.e. payout policy (Brav et al. 2005; Bonaimé et al. 2014). Therefore these measures can accurately represent the firm's decisions on financial flexibility with small measurement errors.

Prior studies on the valuation impact of these two measures are incomplete. Regarding financial leverage, asset pricing theory predicts a positive association between expected return and financial leverage. Empirical studies, however, find limited evidence of a positive relation (Bhandari 1988), or instead find a significantly negative relation (e.g. Penman et al. 2007). A potential explanation for these empirical findings is the inappropriate use of the proxy for financial leverage. Based on the assumption that cash holdings is negative debts, prior studies on leverage calculate leverage by using net debts, which is total debts less cash holdings, as the numerator.[35] However, firms reserve cash assets for precautionary motives (Kim et al. 1998; Acharya et al. 2007), which means that firms hold internal cash to meet unexpected demands of capital as well as to repay debts. This practical inconsistency between cash assets and debts could cause measurement errors in the traditional proxy for financial leverage.[36] In the same vein, because of the concept of negative debts and the assumption of perfect capital markets, not many studies have found the association between cash holdings and expected returns except in rare examples as in Simutin (2010). Moreover, these studies use realized returns as their proxy for expected returns under the assumption that the differences between realized returns and expected returns, i.e. unexpected returns, can be canceled out in long time series because their economic nature is noise with no systematic information or no persistence.[37]

This study reinvestigates the influence of financial flexibility on stock returns by improving the measures for expected returns and financial flexibility. I separate cash holdings from debts to construct the proxies for asset liquidity and financial leverage. Furthermore, this study uses an alternative proxy for expected returns to avoid the potential bias from information shocks in realized returns. My proxy for expected

[35] For example, Penman et al. (2007) or Zingales (1998) use net debt, i.e. total debts less cash assets as the numerator of their leverage measures for their main tests.
[36] This does not imply that cash and debt borrowing is totally separable at the conceptual level. Recently, Harford et al. (2014) show that cash holdings increase as refinancing risk increases, which is consistent with traditional point of view that cash is negative debt.
[37] In this article, I use unexpected returns and information shocks interchangeably. Following the framework of Campbell (1991), I divide information shocks into two components: cash flow shocks and discount rate shocks.

returns is estimated using a vector autoregression (VAR) process with three inputs of prior periods: stock returns, return on common equity (ROE), and book to market ratio (Callen and Segal 2010; Campbell 1991; Vuolteenaho 2002).

Descriptive statistics show that a significant portion of realized returns is not explained by the information of prior years, implying the possibility that the difference between realized returns and expected returns cannot be canceled out in asset pricing tests. Furthermore, both cash holdings and leverage are significantly and positively correlated with both realized returns and expected returns, implying that the traditional concept of cash holdings as negative debt is not legitimate in asset pricing tests.

Firm-level pooled regression analyses show that the decile rank of cash holdings is positively related to both realized excess returns and expected excess returns, which is consistent with the argument that higher risk induces more cash holdings because of the hedging motivation of firms, (Simutin 2010). In addition, cash holdings are positively related to residually calculated discount rate shocks or cash flow shocks. Financial leverage has no significant relation with realized excess returns, whereas expected excess returns are positively related to financial leverage. This is consistent with the prediction of asset pricing theory. In addition, highly levered firms are more likely to experience economic events that are damaging to firm value. I further examine the aggregate effect of cash holdings and financial leverage on expected returns. First, I include the decile rank of cash holdings and the decile rank of financial leverage in the same regression model. All results are consistent with previous results, and the associations between returns and cash holdings or financial leverage are practically not affected by the inclusion of both decile ranks of cash holdings and financial leverage in the same model. Furthermore, I investigate the aggregate effect of cash holdings and financial leverage by using the aggregate measure of financial flexibility (*FinFlex*) from Biddle et al. (2009). The results show that the aggregate financial flexibility measure is positively related to both realized returns and expected returns. To clarify that the results explained above are not affected by cross-sectional correlations, I reexamine these results with a Fama-MacBeth regression. The results are qualitatively consistent with the results from the pooled regression, though the significance of the test becomes weaker.

The fact that both cash holdings and financial leverage are positively related to expected returns implies that cash holdings should be treated independently from debts. If cash holdings are treated as negative debts, cash holdings and financial leverage should have the opposite effect on expected returns. Therefore the reason that studies on leverage find a negative relation between realized return and the proxies for leverage could from inaccurate proxies for leverage. The results from the tests that apply the measure of aggregate financial flexibility support this conjecture. Conceptually the aggregate financial flexibility measure is inversely related to net debts because it is the scaled sum of the decile rank of cash holdings and the decile rank of the inverse value of financial leverage. Hence, the positive coefficient of the aggregate financial flexibility measure is conceptually equivalent to the negative relation between returns and the financial leverage calculated with net debts.

In additional tests, I examine how market conditions influence the results of prior tests. If the results are driven by risks, the results should be stronger in the years when economic down turn is expected. I rerun the regression analysis and include expectations on future macroeconomic conditions. Using the model of Petkova and Zhang (2005), I calculate the annualized expected market premium. Then, I classify years that have an expected market premium larger than the 75th percentile as the recession periods and examine the positive relation between the proxies of financial flexibility and expected returns. The relations found in previous regressions become stronger when a market down turn is expected. This reassures that the results of my main tests are due to the risk premium for firm risks.

My study has several contributions to the literature. First, this study finds robust evidence of the positive association between leverage and expected returns, as asset pricing theory predicts. Prior empirical studies on this relation have only found limited evidence, or even a negative association which is contrary to the theoretical prediction. The findings of this study resolve one of the inconsistencies between theory and empirical evidence. Second, this study suggests an alternative proxy for expected returns. Empirical studies use realized returns as the proxy for expected returns under the maintained assumption that realized returns are composed of expected returns and unsystematic temporal noise. As Elton (1999) argues, realized returns could have information contents that are significant both in amount and persistency. The use of realized returns as the proxy for expected returns could bias asset pricing tests, which is a potential reason for the inconclusive empirical test results for asset pricing tests on bankruptcy risk (e.g. Dichev 1998). This is because distressed firms could experience negative information shocks due to discontinued investments or failure to meet financial obligations. Such information shocks could cancel out the evidence of the risk premium for default risk. Moreover, the findings of this study support the argument that cash holdings should not treated as the opposite to debt in pricing tests. Despite the inconsistencies in the concept of cash as negative debt and cash assets in reality, finance literature has used net debts, i.e. debts less cash holdings, as the numerator of their measure of financial leverage. The results of my study imply that empirical studies should be more careful in the definition of financial leverage because the factors that determine the level of cash assets and borrowings are not the same.

Section 2 summarizes prior studies and develops the hypotheses. Empirical designs are explained in Section 3, and Section 4 presents the main empirical results. Section 5 supplements the results in Section 4 with additional tests. Section 6 concludes the overall findings.

2. Motivation and Hypothesis Development

2.1. Financial Flexibility

Unlike the traditional assumption of perfect capital markets (Merton and Modigliani 1961), firms in in actual capital markets experience significant market frictions in external financing (Denis 2011). Under the assumption of perfect capital markets, external financing is not a critical issue for firm activities. However, in the imperfect capital markets, the market friction in financing activities could hinder a firm's operating activities. Thus, when the market friction is severe, firms prefer short term, low-risk investment projects to high net present value investment projects because it would be difficult to finance such long-term projects (Almeida et al. 2011). To avoid potential under-investment problems, firms reserve "*the ability of a firm to respond in a timely and value-maximizing manner to unexpected changes in the firm's cash flows or investment opportunity set,*"[38] which is financial flexibility. Financially flexible firms can protect profitable investment projects from the threat of financial constraints, which can be beneficial for firm value.

The management of financial flexibility affects several items in the financial statements. As for assets, cash holdings are the most important indicator of financial flexibility because cash holdings are the resources with the least financing frictions. For this reason, firms hold cash for precautionary motives (e.g., Kim et al. 1998; Opler et al. 1999; Bates et al. 2009). On the right-hand side of financial statements, the level of debts indicates another aspect of financial flexibility because additional debt financing is difficult when the existing debt level is high. In addition to their importance as the indicators for financial flexibility, cash holdings and debts can be measured accurately, unlike other proxies of financial flexibility. For these reasons, this paper investigates the

[38] Denis (2011), p667.

influence of financial flexibility on expected returns by using the level of cash holdings and financial leverage as the proxies for financial flexibility.

Prior articles on cash holdings find that the risks that a firm faces affect the level of cash holdings. Because product market competition threatens the sustainability of future cash flows, firms increase the slack in financing ability to mitigate predation risks in product markets. As financial flexibility provides firms with the tools to compete in product markets, firms are expected to increase their financial flexibility when the level of product market competition is higher. Morellec et al. (2013) examine the relation between cash holdings and product market competition with an analytical model, and find that that cash holdings increase as product market competition becomes intense. Palazzo (2012) investigates the influence of a firm's risk on cash holdings with an analytical model. In this model, a firm's cash holdings are expected to increase with the covariance between market cash flows and the firm's future cash flow from assets in place. Supporting these theoretical conjectures, Haushalter et al. (2007) and Morellec et al. (2013) find that the cash holdings are positively related to the proxies of market competition. Hoberg et al. (2014) find that firms that are heavily influenced by their competitors are likely to have large cash holdings.

With the adequate amount of cash holdings, firms can be successful in product market competitions. Frésard (2010) finds that cash holdings are related to the increase of future market share and future return on assets (ROA). In addition, with the market-to-book ratio as the proxy for firm value, cash holdings are found to affect a firm's future valuation positively.[39] Mikkelson and Partch (2003) examine the performance of firms that hold large cash assets persistently. They find that the performance of firms holding a large amount of cash assets is comparable or better than the performance of

[39] The interpretation of market-to-book ratio is twofold. It could be a proxy for the value of growth options (Ohlson 1995), or the inverse of firm risk (Fama and French 1992).

peer firms, implying that cash holdings helps firms to maintain the optimal investment level.

The determinants of the level of debts and the impact of debts are popular research topics. Although debts are not homogeneous as debts vary in contractual details, the level of debt generally indicates the default risk of a firm and the limit of additional borrowings. The level of debt, i.e. financial leverage, also affects a firm's product market activities and valuation, as well as its cash holdings. Myers (1977) points out that the level of borrowing affects firm value through its influence on future investment decisions. The paper asserts that firms are likely to forgo potentially positive net present value investment projects when the existing debt is large, which reduces the value of the growth options of the firm. In addition to the lower valuation, the amount of existing debt affects the long term survival of firms. Zingales (1998) investigates the deregulation of the trucking industry of the U.S. from 1978 to 1979 and finds that firms with a low level of leverage are more likely to survive within five years after the passage of deregulation.[40] Zingales (1998) also finds that firms with high leverage could not endure the product market competition because of underinvestment. This paper concludes that the underinvestment of highly levered firms is what makes firms exit the market. The results of Zingales (1998) are consistent with the findings of several other studies on leverage and product market competition (Phillips 1995; Chevalier 1995a, 1995b; Kovenock and Phillips 1997). In sum, a high level of financial leverage is expected to increase the firm's default risk and decrease product market performance.

[40] The study uses net debt, i.e. debt less cash holdings, to calculate leverage. Thus, the overall results are the joint effect of leverage and cash holdings.

2.2. The Relation between Cash Holdings and Debts

Empirical studies on debts generally use net debts, i.e. total debts less cash and short term investments, as the numerator of the proxy for financial leverage, based on the assumption that cash is equivalent to negative debts.[41] The assumption is useful in explaining the dynamics between cash holdings and debts, especially when firms have difficulty in debt financing. For example, Harford et al. (2014) argue that firms hold cash assets to mitigate the refinancing risk from short term borrowings. In the same vein, Acharya et al. (2012) find that cash holdings and credit risks have a positive relation, implying that firms manage the level of cash holdings considering the default risk from financial leverage. Furthermore, from an instrumental variable regression, they also find that short-term default risk is mitigated by the cash holdings that are determined by investment opportunities and the managers' private costs. However, the results also show that long-term default risks increase with cash holdings.

Despite the role of cash holdings in mitigating default risk, cash holdings are not the opposite of debts regarding the firm's management of financial flexibility. Cash holdings can be utilized to mitigate the time gap between capital needs and cash inflows. Acharya et al. (2007) show that cash holdings can be utilized to move future cash flows to the current period, which can be useful for protecting profitable investment projects that the firm currently has. This role as a hedge tool is not necessarily related to debts. Supporting this argument, McLean (2011) shows that firms issue shares to reserve cash assets. Although McLean (2011) focuses on share issuance, this study also supports the argument that cash holdings mitigate the time gap between capital needs and cash

[41] The capital from preferred stocks is also classified as a part of total borrowings. However, equity capital from preferred stocks and debt capital have different risks. For example, dividends for preferred stocks can be postponed; however, the delay of interest payments is a violation of the debt contract which can cause the disciplinary actions of debt holders against the firm and firm managers. Thus I exclude equity capital from preferred stocks from the measure of financial leverage.

inflows.[42] In addition, the study also shows that cash holdings need not be tied to debts since share issuance, not debt issuance, can be utilized to reserve internal cash. This argument suggests that cash holdings and debts should be examined separately to observe the influence of financial flexibility.

2.3. Financial Flexibility and Stock Returns

The influence of cash holdings on firm operations would impact valuation. Faulkender and Wang (2006) investigate the influence of financial constraints on the value of cash holdings by examining the relation between the change in cash holdings and stock returns. They find that cash holdings become more valuable in financially constrained firms than in unconstrained firms. The results also show a positive relation between existing cash holdings and future stock returns. Simutin (2010) examines how previous excess cash holdings affect future realized returns, and finds a positive relation. Furthermore, the results show that a large excess cash balance is related to a high market beta, low stock return performance in down turns, large future investments, and a low return on assets, implying that firms hold more cash to protect their risky growth options. Based on these results, the paper concludes that the positive relation between excess cash holdings and stock returns is because of the risks regarding the firm's growth options. In other words, risky firms are likely to maintain liquid assets.

Although prior studies, e.g. Faulkender and Wang (2006) and Simutin (2010), report a positive relation between (excess) cash holdings and realized returns, the valuation impact of cash holdings is not comprehensively examined because realized returns are an aggregate of subcomponents from different economic origins. Campbell (1991)

[42] Acharya et al. (2007) specifically focus on the relation between debt issuance and cash holdings, but their implication can also be connected to McLean (2011) because shareholders also require payouts in the form of dividends or stock repurchase in the future, although the contractual details are different from interest payments.

suggests a framework to decompose realized returns into three components depending on the economic origins: expected returns, cash flow shocks, and discount rate shocks. Expected returns are originated from known risks, and the two information shocks, i.e. cash flow shocks and discount rate shocks, are related to updates in firm valuation. Cash flow shocks are the change in the present value of expected cash flow and discount rate shocks are from changes in the risk profile of the firm. Most prior studies on the relation between cash holdings and returns do not do not apply this framework to distinguish the origins of stock returns.[43] In other words, the positive relation between cash holdings and stock returns can be driven by both existing risks and unexpected economic events.

The theory on asset pricing predicts a positive relation between risk and expected returns. Cash holdings could decrease the risks of financial constraints and default. If this is the case, the positive relation can be driven by information shocks because cash holdings would have a negative relation with expected returns. To the best of my knowledge, there is no study directly relates cash holdings and information shocks to explain stock returns.

Because financial leverage is expected to increase default risk by enlarging the volatility of profitability, traditional finance theory expects a positive relation between financial leverage and expected returns. However, the evidence that supports the positive relation between financial leverage and stock returns from empirical tests is limited (Fama and French 1992; Johnson 2004; Bhandari 1988).[44] On the contrary, several studies report a negative association between financial leverage and stock

[43] As a rare example, Palazzo (2012) distinguishes expected returns and realized returns by using the implied cost of equity in the regression of cash holdings on the proxy for expected returns. However, the research question is the influence of risks on cash holdings, which is opposite to the research question of this study.
[44] Fama and French (1992) find a positive coefficient on market leverage (log of total book assets divided by market value of equity), but find a negative coefficient on book leverage (log of total book assets divided by book value of equity).

returns (Fama and French 1992; Penman et al. 2007; George and Hwang 2010; Gomes and Schmid 2010).

Recent studies attempt to explain why empirical evidence finds a negative relation between stock returns and financial leverage instead of a positive relation. A potential explanation is that liability is endogenously determined by the level of the firm's risks. Since market frictions could induce underinvestment, firms are likely to manage their levels of borrowing strategically, considering overall firm risks and market frictions (George and Hwang 2010; Titman and Wessels 1988; Korajczyk and Levy 2003; Faulkender and Petersen 2006; Faulkender et al. 2012; Kayhan and Titman 2007). In this case, high leverage could indicate that the level of firm risk is low. By applying an analytical model, George and Hwang (2010) argue that high risk firms optimally choose low leverage to reduce default risk, which can explain the negative relation between stock returns and financial leverage. Similarly, Gomes and Schmid (2010) show that the firm's risks affect the level of leverage and stock returns as well, by using numerical analyses. If firms determine their leverage considering the risks they face, financial leverage would be an indicator of financial stability or of the managers' optimistic expectations about the firm's financial flexibility. Consequently, stock returns would be negatively associated with financial leverage.

Alternatively, *ex post* economic events could cause negative shocks because financially levered firms tend to suffer from underinvestment and constraints in their operations (Myers 1977; Zingales 1998). Since the constraints in operations can damage both future cash flows and financial stability, financial leverage could cause both cash flow shocks and discount rate shocks that are damaging to firm value. As it is with studies on cash holdings, most studies on the relation between financial leverage and stock returns also conduct their empirical tests with realized returns as the proxy for expected returns. Thus, the potential influence of information shocks on the tests cannot be ruled out from the explanations for the inconsistency between empirical findings and the theory on the relation between financial leverage and the proxy for expected returns.

2.4. Hypothesis Development

In imperfect capital markets, market friction could cause financial constraints by impeding the external financing of the firm. Because financial constraints limit the firm's operating activities, financially constrained firms experience an increase of default risks and decrease of growth options. Cash holdings provide firms with financial flexibility, which can suppress the negative effects of financial constraints (e.g. Kim et al. 1998; Opler et al. 1999). More importantly, the friction in external financing is closely related to macroeconomic conditions. Therefore financial constraints are, at the least, partly associated to overall capital market conditions. In other words, financial constraints are associated with the stock's systematic risks. If this is the case, cash holdings could be negatively associated with future stock returns by mitigating the systematic risks of firms. Alternatively, since cash holdings can be utilized to mitigate the potential risks of financial constraints, firms exposed to systematic risks would choose to reserve large amounts of cash holdings (Acharya et al. 2012). Thus, cash holdings could be positively associated with expected returns because the level of cash holdings is an indicator of firm risks. Thus, the relation between expected returns and cash holdings is twofold.

Since financial leverage increases default risks, asset pricing theory predicts that financial leverage will be positively associated with expected returns. Alternatively, to avoid potential default, firms in imperfect capital markets would strategically manage their level of leverage (George and Hwang 2010). The result of the management of financial leverage would lead to a negative relation between financial leverage and default risk. Under this scenario, expected returns would be related to financial leverage negatively.

In summary, financial flexibility can be associated with expected returns in both directions. High financial flexibility, i.e. large cash holdings and/or low leverage, could be negatively related to expected returns by decreasing default risk. Alternatively, firms that are financially constrained and have a high probability of default could choose to maintain more financial flexibility, which results in a positive relation between financial flexibility and expected returns. Since both conjectures are reasonable, I propose my hypothesis about the relation between financial flexibility and expected stock return in the null form.

H1: Expected returns are not associated with financial flexibility.

3. Research Design

3.1. Vector Autoregression Return Decomposition

This study uses the firm level return decomposition method in Vuolteenaho (2002) to calculate expected returns by modifying the framework of Campbell (1991). This method decomposes realized returns into three components: expected returns, cash flow shocks, and discount factor shocks. Vuolteenaho's (2002) decomposition method assumes a vector autoregressive relation among the determinants of returns, which is expressed as the following vector autoregression model (VAR)

$$\mathbf{z}_{t+1} = \mathbf{\Gamma}\mathbf{z}_t + \boldsymbol{\eta}_{t+1}. \quad (1)$$

Vector $\mathbf{z}_t$ has k elements that include the stock return of year t (r_t), return on equity of year t (roe_t), and other determinants that affect stock returns and/or return on equity. In addition to r_t and roe_t, I also include book-to-market ratio (bm_t) as a proxy of aggregate risk (Fama and French 1992, 1993; Jegadeesh and Titman 1993).[45] Thus, equation (2) is estimated with the following model:

$$\begin{pmatrix} r_{t+1} \\ roe_{t+1} \\ bm_{t+1} \end{pmatrix} = \begin{pmatrix} \alpha_1 & \alpha_2 & \alpha_3 \\ \beta_1 & \beta_2 & \beta_3 \\ \gamma_1 & \gamma_2 & \gamma_3 \end{pmatrix} \begin{pmatrix} r_t \\ roe_t \\ bm_t \end{pmatrix} + \begin{pmatrix} \eta_{1t+1} \\ \eta_{2t+1} \\ \eta_{3t+1} \end{pmatrix}. \quad (2)$$

Estimation of equation (2) is the same as estimating these three equations separately:

$$\begin{aligned} r_{t+1} &= \alpha_1 r_t + \alpha_2 roe_t + \alpha_3 bm_t + \eta_{1t+1} \\ roe_{t+1} &= \beta_1 r_t + \beta_2 roe_t + \beta_3 bm_t + \eta_{2t+1} \\ bm_{t+1} &= \gamma_1 r_t + \gamma_2 roe_t + \gamma_3 bm_t + \eta_{3t+1} \end{aligned} \quad (2a)$$

Therefore, the estimated expected return of t+1 is calculated as

$$\hat{r}_{t+1} = \widehat{\alpha}_1 r_t + \widehat{\alpha}_2 roe_t + \widehat{\alpha}_3 bm_t . \quad (3)$$

I measure annualized stock returns by compounding monthly stock returns from July of year t to June of year t+1.[46] Additional details regarding the estimation follow Callen and Segal (2010). Appendix A describes details of the derivation of VAR decomposition models.

The unique advantage of the VAR return decomposition method is that the impact of surprises in the elements of vector $\mathbf{z}_t$ can be estimated by the VAR structure (Greene 2008). With the estimated companion matrix ($\mathbf{\Gamma}$), I calculate cash flow shocks and earnings shocks from the impulse-response relation of the VAR model. Once a type

[45] All three elements of $\mathbf{z}_t$ In Vuolteenaho (2002) and this study are in the log-linear form.

[46] I define the point of measurement following Fama and French (1993). I use the most recent accounting information available before the end of December of year t to calculate variables of year t. Market related information, e.g. stock returns or market value of equity, are measured at June of year t+1. For example, in the case of firms whose fiscal year ends on December 31, book to market of year 2000 is calculated using book value of equity at the end of year 2000 and market value of equity at the end of June 2001. The difference in measurement points are to ensure that accounting information is fully reflected in stock prices.

of shock is estimated, the other shock is calculated residually. Hence, information shocks can be measured by two methods depending on which shock is estimated first. Campbell (1991) suggests calculating discount shocks directly with the residuals of stock returns using the companion matrix, and then assigning the remaining part to cash flow shocks. Using equation (1) and (2), discount rate shock and cash flow shocks are expressed as these equations:

$$-Nr_t = -\boldsymbol{\lambda}_1'\boldsymbol{\eta}_t \tag{4}$$

and $$Ne_t = (\mathbf{e}_1 + \boldsymbol{\lambda}_1)'\boldsymbol{\eta}_t \tag{5}$$

where $\mathbf{e}_k' = (0,...,1,....,0)$ and $\boldsymbol{\lambda}_k' = \mathbf{e}_k'\rho\boldsymbol{\Gamma}\left(\mathbf{I} - \rho\boldsymbol{\Gamma}\right)^{-1}$

Alternatively, cash flow shocks can be calculated first. In this case, discount factor shocks include the remaining elements.

$$Ne_t = (\mathbf{e}_2' + \boldsymbol{\lambda}_2')\boldsymbol{\eta}_t \tag{6}$$

and $$-Nr_t = -(\mathbf{e}_2' - \mathbf{e}_1' + \boldsymbol{\lambda}_2')\boldsymbol{\eta}_t \tag{7}$$

I calculate the shocks with both methods to check the robustness of my tests.

Estimated expected returns from the VAR process have several differences from the proxies for expected returns in prior studies. First, unlike realized returns, expected returns calculated by the VAR process address the concern that realized returns have significant information shocks. Regarding this point, my method is similar to the one of Ogneva (2012). In addition, as another widely used expected return proxy, the implied cost of equity is not effective in resolving the bias from information shocks in stock prices.[47] Second, compared to implied cost of equity methods, this method does not require an assumption on the long term growth rate (Easton et al. 2002; Nekrasov and

[47] Studies using the implied cost of equity frequently include variables for forecast bias or variables to control the volatility of stock returns. However, the main reason of controlling those variables is not to correct information shocks, but to correct non-linearity.

Ogneva 2011). Third, this method is free from the bias in analyst forecasts (Mohanram and Gode 2013).

Estimation of expected returns by VAR has several limitations as well. First, the VAR model depends on a limited number of factors in the estimation of expected returns. The literature on asset pricing tests has suggested several potential risk factors that are not included in this method. Although prior returns or book-to-market are widely accepted proxies for aggregated risks, the VAR approach cannot rule out the possibility of bias from correlated omitted variables.[48] Second, the sensibility of the expectation to prior information could vary over time depending on several economic environments. Despite such limitations, the VAR decomposition approach has significant advantages. Hou et al. (2012) show that the regression-based approach can be successfully applied in estimating expected returns despite limitations that are similar to those of the VAR approach. Though the research focus of their study is different from mine, Hou et al. (2012) indirectly show that a time-series regression approach can explain a significant portion of the valuation process. Furthermore, the VAR approach is widely used in separating unexpected returns from realized returns in the literature.

3.2. Regression Model

To test the hypothesis of this study, the proxies for expected returns are regressed on the variables of interest ($FinancialFlexiblity_t$) and control variables. The regression model is

$$Ret_{t+1} - R_f = \alpha + \beta_1 FinancialFlexiblity_t + \beta_2 Beta_t + \beta_3 \ln ME_t + \beta_4 \ln(B/M)_t + \varepsilon_{t+1} \qquad (8)$$

The dependent variable ($Ret_{t+1} - R_f$) is the proxy for expected excess return. I use two

[48] Lewellen (2014) shows that the elements in my VAR model are reliable in predicting future returns. However, most of the return volatility is not explained by these determinants.

types of returns as the dependent variable: realized excess returns (*Rret-Rf*) and expected excess returns (*Eret-Rf*). Three measures of financial flexibility are used in the regression tests: decile of cash holdings (*RCASH*), decile of market leverage (*RLEV*), and a combined measure of the two (*FinFlex*). *RCASH* and *RLEV* are the decile rank of cash holdings and financial leverage, respectively. The value of cash holdings is calculated as cash and short term investments divided by the market value of equity. Financial leverage is sum of short term debt and long term debt divided by the market value of equity.[49] Decile ranks are measured by year and 2-digit SIC codes to avoid biases from industry characteristics. The sum of the decile rank of cash holdings, *RCASH*, and the decile rank of the inverse of financial leverage is linearly transformed to take a value between 0 and 1, and is defined as *FinFlex* (Biddle et al. 2009). To control known risk factors, I include market beta (*Beta*), the natural logarithm of market equity (*lnME*), and the natural logarithm of the book-to-market ratio (*ln(B/M)*). Detailed definitions of variables are discussed in the appendix. To examine whether financial flexibility affects information shocks, I also regress four measures of information shocks, *Ne_rsd*, *Ne_est*, *–Nr_est*, or *–Nr_rsd*, on the same independent variables of model (4).

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[49] The definition of leverage in this study is different from the definitions of prior studies in two points. First, most studies calculate leverage with net debt, i.e. total borrowings less cash holdings. Second, total borrowings of prior studies generally include the value of preferred stock. However the total borrowing of this study does not. As Acharya et al. (2007) pointed out, the role of cash in firms' financing is not limited to the payment of debts. Firms hold cash to secure their operational decisions from financial constraints. Empirical studies on cash holdings find a negative relation between book leverage and cash holdings (e.g. Opler et al. 1999; Harford et al. 2008). If cash is used only to repay debts, the relation should be positive. The negative relation implies the possibility that the level of cash holdings and leverage is at least partly managed for the same goal, which is the management of financial flexibility. In other words, if firms need more financial flexibility, they reserve more cash but reduce debt. As for the second difference, equity from preferred stock is not included because equity capital from preferred stocks is different from borrowings or equity capital from common stocks. Dividend payments to shareholders of preferred stocks can be postponed when the firm reports net loss, but interest payments cannot be avoided without default. Because default risk is in the center of the conjecture on the return-leverage relation, preferred stocks is excluded from the calculation of liability.

4. Empirical Analyses and Results

4.1. Sample and Descriptive Statistics

This study is based on U.S. stock market data. Financial statements data and stock market data are acquired from the Compustat database and the Center for Research in Security Prices (CRSP) database, respectively. To merge financial statement data and stock market data, I use CUSIP header as the identifier.[50] The final sample has 99,323 observations of 44 years from 1968 to 2011.

Table 1 shows the descriptive statistics of the variables. The mean and median values of *Rret-Rf* are 8.77% and 0.9%, respectively. On the other hand, the mean and median values of *Eret-Rf* are 0.45%, 0.4%, respectively. These results show that *Rret-Rf* is severely right-skewed due to information shocks. In addition, the standard deviation of *Rret-Rf* (52.6%) is much larger than that of *Eret-Rf* (7.7%), implying that *Rret-Rf* is more volatile than *Eret-Rf* because of the volatility of information shocks. The descriptive statistics of information shocks show that the difference in volatilities between *Rret-Rf* (52.6%) and *Eret-Rf* (7.7%) is due to the information shocks. Among the four shocks, -*Nr_est* has the smallest volatility (σ =19.7%), and -*Nr_rsd* has the largest volatility (σ =676.5%). -*Nr_rsd* has the largest difference between the mean and median, which means that -*Nr_rsd* is right-skewed. Information shocks are more volatile when cash flow shocks are estimated first (*Ne_est*) and discount rate shocks are calculated residually (-*Nr_rsd*), which is consistent with argument of Callen and Segal (2010). Furthermore, standard deviations of residually calculated information shocks (-*Nr_rsd* and *Ne_rsd*) are more volatile than those calculated by the impulse-response relation of VAR (-*Nr_est* and *Ne_est*). This is natural because residually calculated

[50] I use this method instead of using the merge table for Compustat and CRSP because of the limited access to the table of these two datasets.

information shocks include all of the errors in the calculation of the VAR model (Chen and Zhao 2009).

4.2. Pearson Correlation Coefficients

Pearson correlation coefficients are presented in Table 2. The correlation coefficient of *Rret-Rf* with *Eret-Rf* is 0.13. The correlations of *Rret-Rf* with information shocks are from 0.05 to 0.89, whereas, the correlations of *Eret-Rf* with information shocks are from -0.06 to 0.002. *Rret-Rf* has stronger correlation coefficients with information shocks than *Eret-Rf* because information shocks are calculated using the residuals of the regression model for estimation of *Eret-Rf*. Both *Rret-Rf* with *Eret-Rf* are positively related to *RCASH*, and the relation is stronger for *Eret-Rf*. The correlation coefficients of *RLEV* show a pattern that is similar to the coefficients of *RCASH*. Both *RCASH* and *RLEV* are negatively correlated to *-Nr_est* and *Ne_est*. The aggregate measure of financial flexibility, *FinFlex*, is positively related to *Rret-Rf*, though the relation is weak. Unlike the studies on the determinants of cash holdings (e.g. Harford et al. 2008), *RCASH* and *RLEV* are positively related, but it is only weakly correlated (ρ=0.014). A potential explanation for the difference in the sign of the correlation coefficient in this study and those in prior studies is that the numerator is different. Prior studies on the determinants of cash holdings generally use net assets, i.e. total assets less cash and cash equivalents, as the numerator.[51] The ratio of book equity to market equity (book-to-market ratio) represents several firm characteristics including firm risk and growth options. Therefore the positive sign of the correlation should not be critical. Both *RCASH* and *RLEV* are positively related to *ln(B/M)*, which implies that *RCASH* and *RLEV* could increase with firm risk (Fama and French 1992), or decrease with growth options (Ohlson 1995).

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[51] On the other hand, studies on the value of cash holdings, e.g. Faulkender and Wang (2006), deflate cash assets with market price of equity as this study does.

4.3. Returns and Measures of Financial Flexibility

Panel A of Table 3 shows the mean values of *Rret-Rf*, *Eret-Rf*, and information shocks by *RCASH*, and Figure 1 graphically displays these relations. In Panel A of Figure 1, both *Rret-Rf* and *Eret-Rf* increase with *RCASH*, and the two lines increase in a similar pattern. As in Panel B of Figure 1, the trends of information shocks by *RCASH* vary by estimation method. The trends reported in Panel B show no conclusive association between *RCASH* and information shocks except for *–Nr_rsd*. The trends in Panel B of Figure 1 support the conjecture that the positive relation between cash holdings and realized returns is mainly driven by expected returns, but not by information shocks. Although the trend is not distinct, estimated information shocks (*Ne_est* and *–Nr_est*) show a weak decreasing trend, whereas residually calculated information shocks (*Ne_rsd* and *–Nr_rsd*) are insignificantly related to *RCASH*.

Panel B of Table 3 and Figure 2 report the mean values of *Rret-Rf*, *Eret-Rf*, and information shocks by *RLEV*. Both *Rret-Rf* and *Eret-Rf* generally increase with *RLEV*. The increasing trend is more distinct with *Eret-Rf*, supporting the traditional conjecture on the positive relation between financial leverage and expected returns. Estimated information shocks (*–Nr_est* and *Ne_est*) weakly decrease with *RLEV*. However, residually calculated information shocks show an inconclusive relation with *RLEV*. In Figure 1 and Figure 2, the trends of residually calculated information shocks (*–Nr_rsd* and *Ne_rsd*) are less distinct compared to the trends of estimated information shocks (*–Nr_est* and *Ne_est*). This is probably because measurement errors are assigned to *–Nr_rsd* and *Ne_rsd*. This displays one of the limitations of the VAR decomposition approach.

4.4. Regression Analysis

The influence of financial flexibility on realized returns, expected returns and information shocks is investigated further by a pooled regression analysis of equation (8). I include indicator variables for each year to control cross-sectional correlations. The standard errors of the coefficients are adjusted for firm clusters. The results are reported in Table 4. Panel A reports the results of the regression on *RCASH*. *RCASH* has positive coefficients with both *Rret-Rf* (β= 0.371, t= 6.36) and *Eret-Rf* (β= 0.108, t= 8.70. The positive coefficients of *RCASH* in column (1) and (2) support the conjecture that cash holdings and returns are related through existing risk (Simutin 2010). If the risk mitigating role of cash holdings had a primary influence on returns, cash holdings would be associated with expected returns negatively. Thus the result supports the explanation that large cash holdings are the result of the firm's risk management (Larkin 2013). In the results of the regressions for information shocks, *RCASH* is insignificantly related to *–Nr_est* and *Ne_est*, whereas it is positively related to *–Nr_rsd* (β= 0.305, t= 6.26) and *Ne_rsd* (β= 1.403, t= 8.68). These results imply that firms with large cash balances are likely to experience positive unexpected events which cannot be explained by the determinants of the VAR model.

Panel B of Table 4 shows the results on the relation between leverage and returns. The decile rank of leverage (*RLEV*) is not significantly correlated to *Rret-Rf*, but significantly and positively correlated to *Eret-Rf* (β= 0.083, t= 6.08), as prior studies expect. Column (3) shows that *-Nr_est* is negatively associated with *RLEV* (β= -0.107, t= -4.04). Because highly levered firms have a high probability of default (Zingales 1998), the increase in the discount rate could affect firm value negatively. Highly levered firms are likely to cut investments (Campello 2003; Chevalier and Scharfstein 1996), which implies that cash flow shocks could be related to financial leverage negatively (Campello 2003; Zingales 1998). Contrary to the expectation, in column (6), estimated cash flow shocks (*Ne_est*) are positively related to *RLEV* (β= 0.286, t= 4.04). This could be due to the non-monotonic relation between financial leverage and sales. Campello (2006) finds that sales increase with financial leverage until financial leverage reaches certain critical value, from which the relation is reversed when financial leverage exceeds the threshold. Thus, the overall relation between cash flow shocks and financial leverage could be positive if the positive relation is dominant.

Under the assumption that cash holdings are negative debts, cash holdings and financial leverage are expected to be related to expected returns in opposite directions. However, Panel A and Panel B shows that *RCASH* and *RLEV* are both positively related to expected returns. To examine the combined effect of cash holdings and leverage on returns, I first include both *RCASH* and *RLEV* in the model for the regressions reported in Panel C of Table 4. The results are qualitatively the same as Panel A and B. Both cash holdings and financial leverage are positively related to expected returns. A more important point is that the coefficients in Panel C are similar to the coefficients of Panel A or Panel B in magnitude, implying that cash holdings and leverage are associated with returns independently. This is evidence that rejects the argument that cash is negative debts (Acharya et al. 2007). I further examine the influence of overall financial flexibility on returns by using the financial flexibility measure (*FinFlex*) of Biddle et al. (2009).[52] Though this measure is somewhat *ad hoc*, this is one way to examine the aggregate effect of asset liquidity and financial leverage. Since *FinFlex* is the rescaled sum of the decile rank of cash holdings and the inverse of leverage, *FinFlex* is conceptually the inverse of the traditional definition of financial leverage which is calculated by using net debts as the numerator. Panel D of Table 4 shows the results. *FinFlex* is positively and significantly related to both *Rret-Rf* (β= 4.11, t= 5.83) and

[52] *FinFlex* of this study is calculated similar to *OverI* of Biddle et al. (2009). The difference between *FinFlex* and *OverI* is the denominator of cash holdings and leverage. *OverI* is calculated by using total assets as the denominator.

Eret-Rf (β= 1.185, t= 7.52), which shows the possibility that the firm's financial flexibility is the proxy for risky growth options (Simutin 2010). As *FinFlex* is conceptually opposite to the traditional definition of financial leverage that uses net debts as numerator, the positive relations indicates that the results are consistent with the negative relation between leverage and stock returns reported in prior studies.

Combined with the results in Panel A to Panel C, the results of Panel D hints why the empirical tests of prior studies failed to find a positive relation between leverage and stock returns. First, the traditional prediction on the relation between leverage and stock returns focuses on the consequence of capital structure on risks. However firms actively manage their financial flexibility, especially when they face risk (e.g. Acharya et al. 2012; George and Hwang 2010; Gomes and Schmid 2010; Harford et al. 2014; Kim et al. 1998; Opler et al. 1999; Palazzo 2012; Simutin 2010). Therefore high leverage could indicate that the firm is financially sound to bear the leverage. Second, the subcomponents of the traditional measure of financial leverage are related to returns differently. Thus, the traditional measure of leverage, net debt, and equity capital from preferred stocks divided by the market value of equity, could incur measurement errors.

Among the four types of information shocks, residually measured information shocks are positively related to *FinFlex*. Studies on the product market effect of financial flexibility (e.g. Campello 2003, 2006; Campello et al. 2010; Chevalier 1995a, 1995b; Chevalier and Scharfstein 1996; Zingales 1998) suggest that financial flexibility significantly influences decisions on operations such as price setting, investment decisions, or payout policies. Financial flexibility provides more options for competing in product markets, and thus, financially flexible firms are more likely to experience positive information events than financially constrained firms. This could reduce the discount rate by decreasing uncertainty or increase expected future cash flows. Because of the structure of VAR decomposition, these events cannot impact estimated information shocks, *Ne_est* or *–Nr_est*, unless these effects are captured by the predictor variables of the VAR model. The effects of unexpected economic events that are not captured by predictor variables are allocated to residually measured information shocks, *Ne_rsd* or *–Nr_rsd*.

To check that the results in Table 4 are robust to the cross-sectional correlation, I further examine the results in Table 4 with Fama-McBeth regressions. Panel A of Table 5 reports the results of Fama-McBeth regressions for *Rret-Rf* and *Eret-Rf*. The results in Panel A of Table 5 are generally identical with the results in Table 4. Panel B of Table 5 shows the results of the regressions of estimated information shocks on measures of financial flexibility and control variables. Compared to the results in Table 4, although the significance of coefficients is generally weaker, the results are qualitatively consistent. Panel C of Table 5 shows results of the regressions of residually calculated information shocks on measures for financial flexibility and control variables. Similar to Panel B, these results also confirm the results of Table 4, though the significance is generally weaker than Table 4. Additionally, I reexamine the results in Table 5 after adjusting for the serial correlation among the standard errors of coefficients with the Newey-West method. Untabulated results are still robust until time lag is assumed up to 2 years.

5. Additional Tests

In this section, I conduct the tests considering the macroeconomic conditions examined in prior studies. The theory on asset pricing states that the risk premium increases in recession periods. If the positive relation between expected returns and measures for financial flexibility is due to the reward for risks, bad market conditions will amplify this positive relation. If this is the case, the results in previous regression will be stronger in recession periods. Alternatively, because financial flexibility is more important when external financing is scarce (Campello et al. 2011), the positive relation between expected returns and financial flexibility could be weaker in recession periods. Testing these conflicting conjectures can supplement the interpretation of the analyses in this study.

To test this conjecture, I divide sample period by market conditions. Prior studies such as Fama (1981) and Petkova and Zhang (2005) argue that realized market return is a noisy measure of market conditions for asset pricing tests because realized market returns include several information events that market participants cannot expect *ex ante*. Following their argument, I use expected market return to determine recession periods. First, based on the method of Petkova and Zhang (2005), I estimate monthly expected market risk premium with this model by month:

$$R_{m\omega} = \delta_0 + \delta_1 DIV_{\omega-1} + \delta_2 DEF_{\omega-1} + \delta_3 TERM_{\omega-1} + \delta_4 Rf_{\omega-1} + \varepsilon_{m\omega}. \quad (9)$$

The dependent variable, R_{mt} is excess market returns for month t. *DIV*, *DEF*, *TERM*, and *TB* are the dividend yield, the default spread, the term spread, and the one-month Treasury bill rate for month t, respectively. The expected market premium is calculated as

$$\hat{R}_{m\omega} = \hat{\delta}_0 + \hat{\delta}_1 DIV_{\omega-1} + \hat{\delta}_2 DEF_{\omega-1} + \hat{\delta}_3 TERM_{\omega-1} + \hat{\delta}_4 Rf_{\omega-1} \quad (10)$$

I calculate annualized expected market premium for year t by compounding monthly expected market premium from July of year t to June of year t+1. If the prior year's annualized market return is less than the 25^{th} decile of annualized market returns among the sample periods, I classify the year as an economic down turn and define *Dnturn* as 1. For the remaining years, *Dnturn* is 0.

I modify the analysis in Table 4 by including *Dnturn* and the interaction term between *Dnturn* and the proxies for financial flexibilities. Table 6 shows the results of pooled regression with interaction terms.[53] In Table 6, the interaction term between *Dnturn* and *RCASH* is insignificantly associated with *Rret-Rf*, but significantly related to *Eret-Rf* (β= 0.105, t= 5.69). These results support the interpretation that a firm's cash holdings indicate the risky firm's preference of liquidity in order to maintain financial flexibility (Simutin 2010). The interaction terms of *RLEV* have positive coefficients for both *Rret-Rf* (β= 0.996, t= 8.33) and *Eret-Rf* (β= 0.121, t= 6.25). These positive coefficients support the interpretation of the results on *RLEV* that financial leverage increases default risks. In column (7) and (8), the interaction terms of *FinFlex* and *Dnturn* are negatively related to both *Rret-Rf* (β= -11.485, t= -7.56) and *Eret-Rf* (β= -0.451, t= -2.14), implying that financial flexibility mitigates the increase of risk premiums in economic downturns. Overall, the results support the interpretation on the results of this study.

6. Conclusion

This study examines the relation between returns and proxies for financial flexibility. By using a VAR return decomposition method, I decompose realized returns into estimated expected returns and information shocks. The results of this paper are mainly from the regression of estimated expected returns on the measures of financial flexibility. I draw the following conclusions from these results. First, risky firms prefer asset liquidity, which induces a positive relation between cash holdings and expected returns. Second, by using the proxy for financial leverage that is calculated with total debts, instead of net debts, as the numerator, I find a positive relation between financial leverage and estimated expected returns. This result is consistent with the prediction of the traditional financial theory on default risks. Third, by using an aggregate measure of

[53] Because of the cross-sectional correlations among returns, the Fama-McBeth regression is a better regression method. However, the by-year estimation of Fama-McBeth regression makes the comparison across periods impossible. Thus, for this analysis I rely on firm-level pooled regression.

financial flexibility that includes both cash holdings and financial leverage, I find that the aggregate measure of financial flexibility is positively related to my proxy for expected returns. Because the aggregate measure of financial flexibility is conceptually the inverse of the traditional proxy for leverage, my results suggest that prior studies find a negative relation between leverage and the proxy of returns because of the error in the proxy for financial leverage. As Acharya et al. (2007) argue, cash holdings are not necessarily the same as negative debts. These results become stronger in recession periods, which supports the interpretation of the empirical results.

However, this study also has the following limitations. First, the return decomposition method in my study fully depends on a limited numbers of determinants. Those determinants may not be the only ones that affect expected returns. Thus, my proxy for expected returns cannot fully reflect all expectations. Second, because the calculation of the proxy for expected returns entirely relies on the VAR model, the validity of my proxy depends on the validity of VAR model. For example, if the actual sensitivity of returns to the determinants in the autoregressive model is not stable over time, this study is not legitimate. Despite these limitations, my decomposition method is based on reasonable theory and the findings of prior studies. Therefore, despite such limitations, the results of this paper and their implications are reasonable and contribute to the literature.

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Table 1. Descriptive Statistics

	Avg.	STD	10%	25%	50%	75%	90%
Rret-Rf	8.772	52.553	-46.804	-24.475	0.936	31.233	70.299
Eret-Rf	0.445	7.696	-8.707	-4.131	0.416	5.140	9.838
-Nr_est	1.699	19.730	-17.022	-8.647	-0.408	8.652	20.530
Ne_rsd	8.549	42.766	-37.758	-17.795	3.410	27.582	58.500
-Nr_rsd	14.010	676.538	-34.900	-18.818	-1.631	19.194	50.444
Ne_est	7.866	52.906	-29.568	-10.278	5.620	21.888	42.059
RCASH	5.520	2.823	2.000	3.000	6.000	8.000	9.000
RLEV	5.511	2.827	2.000	3.000	6.000	8.000	9.000
FinFlex	0.500	0.227	0.222	0.333	0.500	0.667	0.833
Beta	1.187	0.753	0.367	0.723	1.113	1.561	2.084
lnME	11.734	2.177	9.013	10.107	11.569	13.231	14.651
ln(B/M)	-0.378	0.925	-1.481	-0.952	-0.392	0.152	0.656

The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Table 1 reports the descriptive statistics for the variables in the analyses. *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. –*Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. –*Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively. *RCASH* is the industry-year decile rank of cash holdings, which is cash and short-term investments divided by the market value of equity. *RLEV* is industry-year decile rank of total debts, which is the sum of long-term debts and short-term debts, divided by the market value of equity. *FinFlex* is ((*RCASH*-1)+(10-*RLEV*))/18, the sum of *RCASH* and the decile rank of the inverse of total debts divided by the market value of equity, rescaled to vary between 0 and 1. *Beta* is the beta of the market model calculated with monthly returns for the previous 5 years. *ME* is the market value of equity in million dollars. *B/M* is the book value of equity to the market value of equity. *lnME* and *ln(B/M)* are the natural logarithms of *ME* and *B/M*.

Table 2. Pearson Correlation Coefficients

	Rret-Rf	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*	*RCASH*	*RLEV*	*FinFlex*	*Beta*	*lnME*
Eret-Rf	0.1343*	1									
-Nr_est	0.4139*	-0.0164*	1								
Ne_rsd	0.8915*	-0.0405*	0.0832*	1							
-Nr_rsd	0.0501*	0.0021	0.1440*	0.0188*	1						
Ne_est	0.3514*	-0.0630*	-0.0489*	0.4671*	-0.0332*	1					
RCASH	0.0344*	0.2305*	-0.0069*	0.0041	0.0054	-0.0289*	1				
RLEV	0.0172*	0.2314*	-0.0249*	-0.0053	-0.0025	-0.0133*	0.0141*	1			
FinFlex	0.0121*	0.005	0.0122*	0.0108*	0.0081*	-0.0013	0.6410*	-0.6179*	1		
Beta	-0.0139*	-0.0851*	0.0197*	-0.0058	0.0059	-0.0051	0.0675*	-0.0563*	0.1491*	1	
lnME	-0.0337*	-0.3476*	0.0245*	0.0088*	-0.0066*	0.0720*	-0.2169*	-0.1062*	-0.1091*	0.0387*	1
ln(B/M)	0.0956*	0.6318*	-0.0253*	-0.0017	-0.0116*	-0.0568*	0.3394*	0.3650*	-0.0617*	-0.1029*	-0.3856*

The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Table 2 reports Pearson correlation coefficients for the variables in the analyses. *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. *–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively *RCASH* is the industry-year decile rank of cash holdings, which is cash and short-term investments divided by the market value of equity. *RLEV* is industry-year decile rank of total debts, which is the sum of long-term debts and short-term debts, divided by the market value of equity. *FinFlex* is ((*RCASH*-1)+(10-*RLEV*))/18, the sum of *RCASH* and the decile rank of the inverse of total debts divided by the market value of equity, rescaled to vary between 0 and 1. *Beta* is the beta of the market model calculated with monthly returns for the previous 5 years. *ME* is the market value of equity in million dollars. *B/M* is the book value of equity to the market value of equity. *lnME* and *ln(B/M)* are the natural logarithms of *ME* and *B/M*.

Table 3. The Trend of Returns and Information Shocks

Panel A. Returns and Information Shocks by the Decile Rank of Cash Holdings

RCASH	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
1	5.409	-1.716	2.070	7.104	7.078	8.814
2	6.506	-1.487	1.906	8.059	5.757	9.562
3	7.658	-1.160	1.666	8.970	7.767	9.412
4	7.964	-0.641	1.559	8.766	8.166	8.919
5	8.172	-0.460	1.534	9.107	9.626	9.417
6	8.918	0.263	1.823	8.768	10.350	8.300
7	10.207	0.919	1.737	9.483	13.573	7.863
8	10.137	1.601	1.692	8.597	15.413	6.892
9	10.948	2.943	1.555	8.304	18.576	4.843
10	11.551	4.240	1.336	8.124	17.291	4.545

Panel B. Returns and Information Shocks by the Decile Rank of Leverage

RLEV	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
1	8.047	-0.919	2.707	8.106	15.021	8.083
2	7.781	-1.766	2.705	8.895	14.638	8.310
3	7.898	-1.635	2.179	8.948	11.349	8.648
4	8.039	-0.972	1.967	8.853	9.404	8.831
5	7.358	-0.435	1.357	8.160	8.679	8.570
6	8.829	0.396	1.060	9.130	8.132	8.350
7	9.732	1.100	1.068	9.160	9.526	8.014
8	9.662	1.992	1.070	8.399	9.889	7.256
9	10.034	3.075	0.599	8.311	11.373	6.625
10	10.339	3.840	2.300	7.254	16.142	5.906

The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Panel A (Panel B) of Table 3 reports the mean values of returns and information shocks according to the decile rank of cash holdings (leverage). *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. –*Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. –*Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively *RCASH* is the industry-year decile rank of cash holdings, which is cash and short-term investments divided by the market value of equity. *RLEV* is industry-year decile rank of total debts, which is the sum of long-term debts and short-term debts, divided by the market value of equity.

Table 4. Pooled Regression

Panel A. Returns on Cash Decile

VARIABLES	(1) *Rret-Rf*	(2) *Eret-Rf*	(3) *-Nr_est*	(4) *Ne_rsd*	(5) *-Nr_rsd*	(6) *Ne_est*
RCASH	0.371***	0.108***	-0.012	0.305***	1.403***	0.089
	(6.36)	(8.70)	(-0.49)	(6.26)	(8.68)	(1.27)
Beta	-0.739***	-0.424***	0.844***	-0.853***	5.957***	-1.236**
	(-3.32)	(-9.57)	(8.53)	(-4.44)	(9.89)	(-2.09)
lnME	0.177**	-0.307***	-0.120***	0.245***	-4.300***	1.303***
	(2.23)	(-10.02)	(-2.91)	(3.52)	(-19.69)	(11.26)
ln(B/M)	2.807***	4.287***	-0.624***	-1.695***	-6.952***	-3.512***
	(13.30)	(34.53)	(-6.85)	(-9.16)	(-10.34)	(-10.39)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99,323	99,323	99,323	99,323	99,323	99,323
Adj R-sq.	0.180	0.452	0.093	0.131	0.025	0.038

Panel B. Returns on Leverage Decile

VARIABLES	(1) *Rret-Rf*	(2) *Eret-Rf*	(3) *-Nr_est*	(4) *Ne_rsd*	(5) *-Nr_rsd*	(6) *Ne_est*
RLEV	-0.076	0.083***	-0.107***	0.101**	0.282*	0.286***
	(-1.30)	(6.08)	(-4.04)	(2.04)	(1.91)	(4.04)
Beta	-0.586***	-0.375***	0.833***	-0.719***	6.565***	-1.185**
	(-2.65)	(-8.51)	(8.43)	(-3.77)	(10.79)	(-1.97)
lnME	0.110	-0.329***	-0.115***	0.185***	-4.569***	1.278***
	(1.40)	(-10.97)	(-2.81)	(2.67)	(-20.33)	(10.88)
ln(B/M)	3.294***	4.295***	-0.502***	-1.500***	-5.827***	-3.781***
	(15.32)	(33.65)	(-5.25)	(-7.83)	(-9.55)	(-12.15)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99,323	99,323	99,323	99,323	99,323	99,323
Adj R-sq.	0.180	0.452	0.093	0.130	0.024	0.038

Panel C. Returns on Cash Decile & Leverage Decile

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
RCASH	0.367***	0.122***	-0.028	0.326***	1.474***	0.133*
	(6.26)	(9.75)	(-1.10)	(6.62)	(9.33)	(1.94)
RLEV	-0.024	0.101***	-0.111***	0.147***	0.491***	0.305***
	(-0.40)	(7.29)	(-4.15)	(2.93)	(3.41)	(4.39)
Beta	-0.739***	-0.426***	0.845***	-0.855***	5.950***	-1.240**
	(-3.31)	(-9.62)	(8.54)	(-4.45)	(9.89)	(-2.10)
lnME	0.177**	-0.307***	-0.120***	0.245***	-4.301***	1.302***
	(2.23)	(-10.06)	(-2.91)	(3.51)	(-19.69)	(11.27)
ln(B/M)	2.841***	4.144***	-0.467***	-1.903***	-7.646***	-3.945***
	(12.49)	(32.59)	(-4.62)	(-9.35)	(-11.15)	(-11.45)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99,323	99,323	99,323	99,323	99,323	99,323
Adj R-sq.	0.180	0.453	0.093	0.131	0.025	0.038

Panel D. Returns on Leverage Decile

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*-Nr_est*	*Ne_rsd*	*-Nr_rsd*	*Ne_est*
FinFlex	4.112***	1.185***	0.327	2.335***	9.692***	0.876
	(5.83)	(7.52)	(1.05)	(3.97)	(4.83)	(0.98)
Beta	-0.767***	-0.432***	0.824***	-0.829***	6.117***	-1.237**
	(-3.44)	(-9.71)	(8.30)	(-4.30)	(10.13)	(-2.07)
lnME	0.184**	-0.305***	-0.112***	0.231***	-4.383***	1.302***
	(2.29)	(-9.85)	(-2.67)	(3.28)	(-19.55)	(11.21)
ln(B/M)	3.309***	4.432***	-0.628***	-1.310***	-5.209***	-3.395***
	(16.33)	(34.86)	(-7.14)	(-7.42)	(-8.90)	(-11.29)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99,323	99,323	99,323	99,323	99,323	99,323
Adj R-sq.	0.180	0.452	0.093	0.130	0.025	0.038

The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Table 4 shows the results of pooled regressions of realized excess returns, expected excess returns and information shocks on the variables of interests and control variables. The variables of interest of Panel A, B, C and D are *RCASH*, *RLEV*, *RCASH* and *RLEV*, and *FinFlex*, respectively. *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. *–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively *RCASH* is the industry-year decile rank of cash holdings, which is cash and short-term investments divided by the market value of equity. *RLEV* is industry-year decile rank of total debts, which is the sum of long-term debts and short-term debts, divided by the market value of equity. *FinFlex* is ((*RCASH*-1)+(10-*RLEV*))/18, the sum of *RCASH* and the decile rank of the inverse of total debts divided by the market value of equity, rescaled to vary between 0 ando 1. *Beta* is the beta of the market model calculated with monthly returns for the previous 5 years. *ME* is the market value of equity in million dollars. *B/M* is the book value of equity to the market value of equity. *lnME* and *ln(B/M)* are the natural logarithms of *ME* and *B/M*. The table reports coefficients and its statistical significance. *, **, *** denote two-tailed significance at the 10%, 5%, and 1% level, respectively. Firm-cluster adjusted t-statistics are in the parentheses.

Table 5. Fama-MacBeth Regression

Panel A. Regressions for Realized Returns and Expected Returns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*
RCASH	0.363**	0.129***			0.374**	0.126***		
	(2.17)	(6.77)			(2.50)	(7.32)		
RLEV			-0.091	0.092***	-0.058	0.092***		
			(-0.62)	(5.09)	(-0.46)	(5.93)		
FinFlex							4.032	1.263***
							(1.54)	(7.56)
Beta	-1.202	-0.230***	-1.044	-0.258***	-1.128	-0.272***	-1.098	-0.226***
	(-1.00)	(-2.99)	(-0.85)	(-3.44)	(-0.95)	(-3.70)	(-0.96)	(-2.82)
lnME	0.253	-0.231***	0.161	-0.254***	0.239	-0.231***	0.241	-0.234***
	(0.51)	(-4.65)	(0.32)	(-5.51)	(0.48)	(-4.70)	(0.49)	(-5.00)
ln(B/M)	2.447***	4.555***	2.944***	4.565***	2.501***	4.412***	2.958***	4.748***
	(3.32)	(32.64)	(4.95)	(33.07)	(3.73)	(34.45)	(4.82)	(30.79)
Constant	4.851	4.460***	8.484	4.985***	5.298	3.994***	5.005	4.616***
	(0.65)	(6.27)	(1.16)	(7.92)	(0.73)	(5.54)	(0.64)	(6.87)
Observations	99,328	99,328	99,328	99,328	99,328	99,328	99,328	99,328
Avg. R-sq.	0.050	0.386	0.050	0.384	0.052	0.389	0.052	0.383
No. of groups	44	44	44	44	44	44	44	44

Panel B. Regressions for Estimated Information Shocks

VARIABLES	(1) *-Nr_est*	(2) *Ne_est*	(3) *-Nr_est*	(4) *Ne_est*	(5) *-Nr_est*	(6) *Ne_est*	(7) *-Nr_est*	(8) *Ne_est*
RCASH	-0.029	0.136*			-0.016	0.185**		
	(-0.57)	(1.73)			(-0.35)	(2.41)		
RLEV			-0.097*	0.206*	-0.080	0.209*		
			(-1.85)	(1.82)	(-1.59)	(1.82)		
FinFlex							-0.110	2.181
							(-0.14)	(1.59)
Beta	0.473	-0.953	0.557	-0.925	0.532	-0.947	0.467	-0.890
	(1.10)	(-0.97)	(1.30)	(-0.94)	(1.27)	(-0.97)	(1.10)	(-0.90)
lnME	-0.085	1.251***	-0.080	1.191***	-0.081	1.229***	-0.072	1.252***
	(-0.72)	(5.49)	(-0.65)	(5.13)	(-0.67)	(5.37)	(-0.59)	(5.45)
ln(B/M)	-0.953***	-4.256***	-0.871***	-4.335***	-0.857***	-4.550***	-1.021***	-4.039***
	(-4.29)	(-7.51)	(-4.24)	(-8.28)	(-4.14)	(-7.80)	(-4.68)	(-8.07)
Constant	1.322	-8.672***	1.615	-8.400***	1.606	-9.897***	1.089	-9.072***
	(0.75)	(-2.93)	(0.98)	(-2.80)	(0.99)	(-3.32)	(0.55)	(-2.75)
Observations	99,323	99,323	99,323	99,323	99,323	99,323	99,323	99,323
Avg. R-sq.	0.031	0.035	0.032	0.036	0.034	0.037	0.032	0.036
No. of groups	44	44	44	44	44	44	44	44

Panel C. Regressions for Residually Calculated Information Shocks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	*-Nr_rsd*	*Ne_rsd*	*-Nr_rsd*	*Ne_rsd*	*-Nr_rsd*	*Ne_rsd*	*-Nr_rsd*	*Ne_rsd*
RCASH	1.100***	0.295**			1.242***	0.323***		
	(4.36)	(2.47)			(5.03)	(2.97)		
RLEV			0.323*	0.056	0.598***	0.081		
			(1.73)	(0.49)	(3.44)	(0.78)		
FinFlex							4.862	2.733
							(1.66)	(1.49)
Beta	3.811***	-1.163	4.387***	-1.050	3.839***	-1.120	3.984***	-1.042
	(3.25)	(-1.25)	(3.56)	(-1.12)	(3.32)	(-1.22)	(3.48)	(-1.16)
lnME	-3.579***	0.285	-3.806***	0.202	-3.565***	0.268	-3.643***	0.260
	(-8.00)	(0.80)	(-7.92)	(0.55)	(-7.91)	(0.74)	(-7.90)	(0.73)
ln(B/M)	-5.172***	-2.002***	-4.557***	-1.750***	-6.100***	-2.125***	-3.979***	-1.596***
	(-5.17)	(-3.25)	(-5.47)	(-3.21)	(-5.93)	(-3.53)	(-5.02)	(-3.03)
Constant	38.739***	3.335	45.640***	5.607	34.179***	2.900	43.571***	3.843
	(6.80)	(0.64)	(7.36)	(1.07)	(6.64)	(0.56)	(6.75)	(0.71)
Observations	99,323	99,323	99,323	99,323	99,323	99,323	99,323	99,323
Avg. R-sq.	0.032	0.038	0.033	0.038	0.035	0.040	0.032	0.040
No. of groups	44	44	44	44	44	44	44	44

The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Table 5 shows the results of Fama-MacBeth regressions of realized excess returns, expected excess returns and information shocks on the variables of interests and control variables. The dependent variables of Panel A are realized excess returns and expected excess returns. The dependent variables of Panel B are estimated cash flow shocks and estimated discount rate shocks. *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. *–Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. *–Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively *RCASH* is the industry-year decile rank of cash holdings, which is cash and short-term investments divided by the market value of equity. *RLEV* is industry-year decile rank of total debts, which is the sum of long-term debts and short-term debts, divided by the market value of equity. *FinFlex* is ((*RCASH*-1)+(10-*RLEV*))/18, the sum of *RCASH* and the decile rank of the inverse of total debts divided by the market value of equity, rescaled to vary between 0 and 1. *Beta* is the beta of the market model calculated with monthly returns for the previous 5 years. *ME* is the market value of equity in million dollars. *B/M* is the book value of equity to the market value of equity. *lnME* and *ln(B/M)* are the natural logarithms of *ME* and *B/M*. The table reports coefficients and its statistical significance. *, **, *** denote two-tailed significance at the 10%, 5%, and 1% level, respectively. Fama-MacBeth t-statistics are in the parentheses.

Table 6. Effect of Economic Condition
Regressions for Realized Returns and Expected Returns

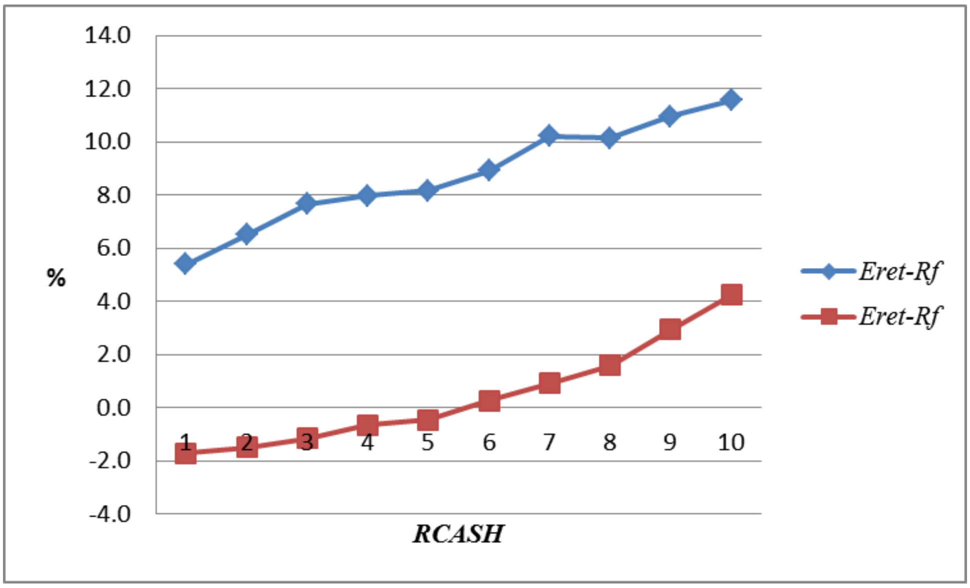
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*	*Rret-Rf*	*Eret-Rf*
RCASH	0.364***	0.083***			0.358***	0.099***		
	(5.33)	(6.32)			(5.22)	(7.43)		
RLEV			-0.305***	0.056***	-0.249***	0.074***		
			(-4.46)	(3.85)	(-3.62)	(5.09)		
FinFlex							6.594***	1.283***
							(8.00)	(7.76)
Dnturn	-0.031	0.549**	-5.321***	0.502**	-5.147***	0.059	5.742***	1.318***
	(-0.02)	(2.51)	(-3.70)	(2.24)	(-3.27)	(0.24)	(3.88)	(5.81)
*Dnturn*RCASH*	0.034	0.105***			-0.013	0.091***		
	(0.29)	(5.69)			(-0.11)	(5.03)		
*Dnturn*RLEV*			0.996***	0.121***	0.974***	0.108***		
			(8.33)	(6.25)	(8.13)	(5.67)		
*Dnturn*FinFlex*							-11.485***	-0.451**
							(-7.56)	(-2.14)
Beta	-0.738***	-0.418***	-0.656***	-0.383***	-0.803***	-0.427***	-0.889***	-0.437***
	(-3.31)	(-9.42)	(-2.97)	(-8.69)	(-3.60)	(-9.63)	(-3.97)	(-9.78)
lnME	0.177**	-0.307***	0.106	-0.330***	0.170**	-0.308***	0.185**	-0.305***
	(2.23)	(-10.05)	(1.34)	(-10.99)	(2.14)	(-10.11)	(2.31)	(-9.86)
ln(B/M)	2.802***	4.288***	3.293***	4.294***	2.854***	4.150***	3.300***	4.431***
	(13.28)	(34.60)	(15.36)	(33.70)	(12.58)	(32.76)	(16.28)	(34.85)

Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99,328	99,328	99,328	99,328	99,328	99,328	99,328	99,328
Adj R-sq.	0.180	0.452	0.180	0.452	0.180	0.454	0.180	0.452

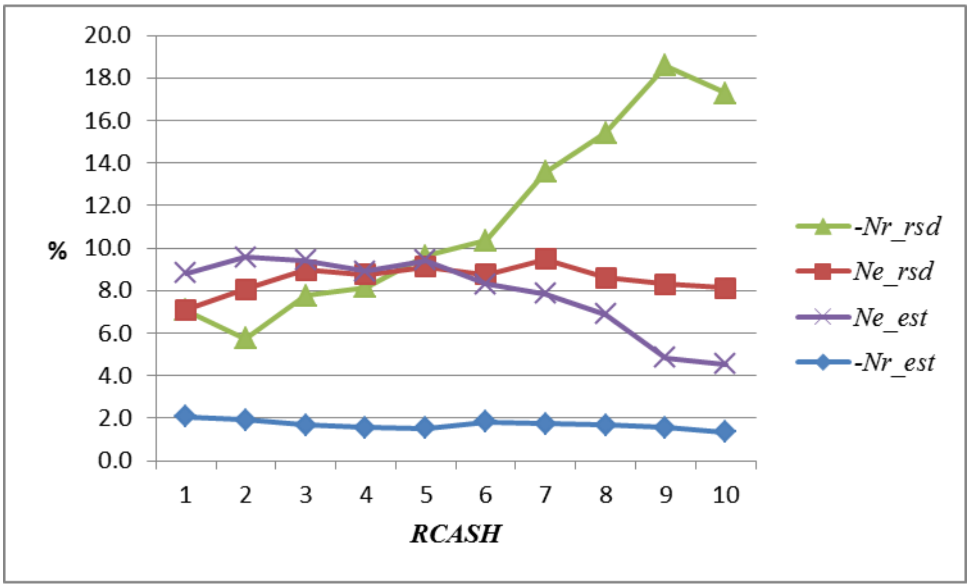
The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Table 6 shows the results of Fama-MacBeth regressions of realized excess returns, expected excess returns, and information shocks on the variables of interests and control variables. The dependent variables of Panel A are realized excess returns and expected excess returns. The dependent variables of Panel B are estimated cash flow shocks and estimated discount rate shocks. *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. –*Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. –*Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively *RCASH* is the industry-year decile rank of cash holdings, which is cash and short-term investments divided by the market value of equity. *RLEV* is industry-year decile rank of total debts, which is the sum of long-term debts and short-term debts, divided by the market value of equity. *FinFlex* is ((*RCASH*-1)+(10-*RLEV*))/18, the sum of *RCASH* and the decile rank of the inverse of total debts divided by the market value of equity, rescaled to vary between 0 and 1. *Beta* is the beta of the market model calculated with monthly returns for the previous 5 years. *ME* is the market value of equity in million dollars. *B/M* is the book value of equity to the market value of equity. *lnME* and *ln(B/M)* are the natural logarithms of *ME* and *B/M*. The table reports coefficients and its statistical significance. *, **, *** denote two-tailed significance at the 10%, 5%, and 1% level, respectively. Fama-MacBeth t-statistics are in the parentheses.

Figure 1. Return Components by Cash Holdings Decile

Panel A. Means of Realized Returns and Expected Returns



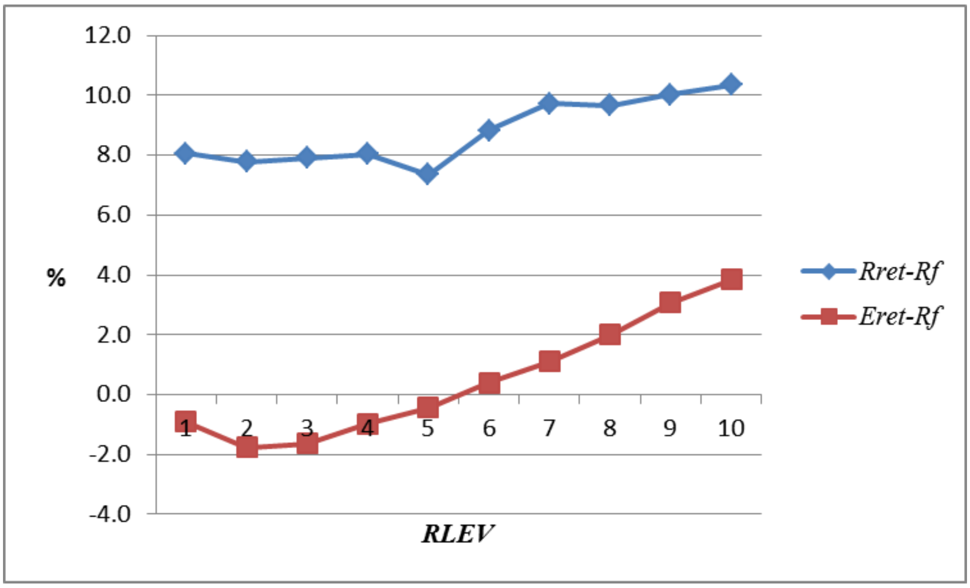
Panel B. Information Shocks



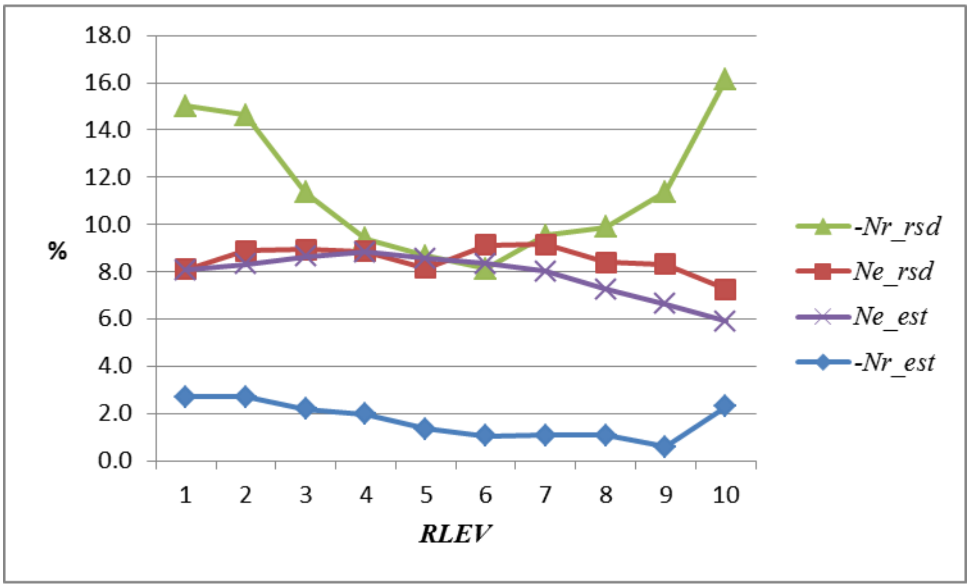
The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Figure 1 reports the trends of the mean values of realized returns, expected returns and information shocks according to the decile rank of cash holdings. Panel A reports the trends of the mean values of realized returns and expected returns. Panel B reports the trends of the information shocks. *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. –*Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. –*Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively *RCASH* is the industry-year decile rank of cash holdings, which is cash and short-term investments divided by the market value of equity.

Figure 2. Return Components by Leverage Decile

Panel A. Means of Realized Returns and Expected Returns



Panel B. Information Shocks



The final sample consists of 99,323 observations of U.S. public firms from 1968 to 2011. Figure 2 reports the trends of the mean values of realized returns, expected returns and information shocks according to the decile rank of leverage. Panel A reports the trends of the mean values of realized returns and expected returns. Panel B reports the trends of the information shocks. *Rret-Rf* is annual realized stock returns less the annualized risk free rate and *Eret-Rf* is expected excess returns estimated by the VAR model. –*Nr_est* and *Ne_est* are estimated discounted factor shocks and estimated cash flow shocks from the VAR model, respectively. –*Nr_rsd* and *Ne_rsd* are residually calculated discounted factor shocks and cash flow shocks, respectively *RLEV* is industry-year decile rank of total debts, which is the sum of long-term debts and short-term debts, divided by the market value of equity.

Appendix: Variable Definitions

Variables for the Vector Autoregression Model

r	The natural logarithm of one plus annual realized stock returns less one plus 30-day Treasury bill rate, demeaned by Fama-French 48 industry groups
roe	The natural logarithms of one plus return on equity less one plus 30-day Treasury bill rate, demeaned by Fama-French 48 industry groups
bm	The natural logarithms of the ratio of book value of equity to market value of equity, demeaned by Fama-French 48 industry groups

Proxies for Financial Flexibility

RCASH	The industry-year decile rank of cash holdings, cash and short-term investments, divided by the market value of equity
RLEV	The industry-year decile rank of total debts, i.e. the sum of long-term debts and short-term debts, divided by the market value of equity
FinFlex	*FinFlex* = ((*RCASH*-1)+(10-*RLEV*))/18, the sum of *RCASH* and the decile rank of the inverse of total debts divided by the market value of equity, rescaled to assume values between 0 and 1.

Firm Characteristics

ME	market value of equity (in million dollars)
B/M	Book value of equity to market value of equity
lnME	The natural logarithm of *ME*
B/M	Book value of equity to market value of equity
ln(B/M)	The natural logarithm of *B/M*
Beta	Estimated beta of the market model calculated with monthly returns of the previous 5 years.

Returns

Rf	Annualized one-month Treasury bond rate

Rret-Rf	Annual realized excess stock return less annualized Treasury bond rate
Eret-Rf	Annual expected excess return as the estimated value of the following regression model: $r_{t+1} = \alpha_1 r_t + \alpha_2 roe_t + \alpha_3 bm_t + \eta_{1t+1}$. Estimation is performed by Fama-French 48 industry groups.
-Nr_est	Discount rate shocks estimated by the VAR model. The VAR model is $\mathbf{z}_{t+1} = \mathbf{\Gamma}\mathbf{z}_t + \boldsymbol{\eta}_{t+1}$ where $\mathbf{z}_t' = (r_t, roe_t, bm_t)$, $\mathbf{\Gamma}$ is a 3 by 3 coefficient matrix, and $\boldsymbol{\eta}_{t+1}' = (\eta_{1t+1}, \eta_{2t+1}, \eta_{3t+1})$ is the residual vector. $-Nr\_est = \exp(-\boldsymbol{\lambda}_1'\boldsymbol{\eta}_t) - 1$ where $\boldsymbol{\lambda}_k' = \mathbf{e}_k'\rho\mathbf{\Gamma}\left(\mathbf{I} - \rho\mathbf{\Gamma}\right)^{-1}$ and $\mathbf{e}_k' = (0,...,1,....,0)$.
Ne_rsd	Residually calculated cash flow shocks. $Ne\_rsd = \exp((\mathbf{e}_1 + \boldsymbol{\lambda}_1)'\boldsymbol{\eta}_t) - 1$
-Nr_rsd	Residually estimated discounted factor shock. $-Nr\_rsd = \exp(-(\mathbf{e}_2' - \mathbf{e}_1' + \boldsymbol{\lambda}_2')\boldsymbol{\eta}_t) - 1$
Ne_est	Cash flow shocks estimated by the VAR model. $Ne\_est = \exp(Ne_t = (\mathbf{e}_2' + \boldsymbol{\lambda}_2')\boldsymbol{\eta}_t) - 1$.

Variables for Expected Market Premium

R_m	Returns on market portfolio
DIV	The dividend yield, calculated as total cash dividends payment of entire Compustat database for the recent year divided by the total market value of all firms in Compustat database of the previous year
DEF	The default spread, defined as the difference between the yield of 10-year Treasury bonds and the yield of 1-year Treasury bonds
TERM	The term spread, defined as the difference between the yield of AAA rate long-term corporate bond and the yield of BAA rate long-term corporate bond.

Market Condition Variable

Dnturn 1 if annualized expected market premium is in the fourth quartile, 0 otherwise. Annualized expected market premium is calculated by compounding monthly expected market premium for the previous 12 months. Monthly market premium is the estimated value of the following monthly regression model:

$$R_{mt} = \delta_0 + \delta_1 DIV_{t-1} + \delta_2 DEF_{t-1} + \delta_3 TERM_{t-1} + \delta_4 Rf_{t-1} + \varepsilon_{mt} \, .$$

국문초록

기대수익률에 관한 세 개의 연구

본 학위논문은 회계정보와 자본비용, 즉 기대수익률을 연결하는 세 개의 연구로 구성되었다. 자본비용은 기업가치평가의 핵심적인 부분이므로 본 학위논문의 세 연구는 회계정보가 기업가치평가에서 가지는 유용성을 지지하는 추가적인 실증적 근거를 제시한다.

첫 번째 연구는 2005 년도에 유럽 상장기업에 의무적으로 도입된 국제회계기준(International Financial Reporting Standards, IFRS)이 유럽은행의 자본비용에 미친 영향을 연구하였다. 제도적 측면을 고려하지 않은 경우 국제회계기준 도입여부는 자본비용에 유의한 영향을 보이지 않았다. 국가의 제도적 측면과 국제회계기준의 도입으로 인한 회계기준의 변화를 고려한 분석에서는 투자자 보호가 강한 국가에서 추가적 공시요구가 증가한 경우 자본비용이 감소하는 것을 발견하였다. 반면에, 은행규제의 강도가 강한 국가에서는 기존의 공시기준요건이 국제회계기준에 의해 변화하는 정도가 크면 자본비용이 증가하는 것으로 나타났다. 이러한 결과는 새로운 회계기준의 도입 및 그 영향에 국가의 제도적인 측면이 가지는 중요성을 강조하는 결과이다.

두 번째 연구는 Vuolteenaho (2002)의 vector autoregression (VAR) 모델을 이용하여 추정한 기대수익률을 활용하여, 발생액의 품질(accruals quality, *AQ*)이 시장가격에 반영(pricing)되는지의 여부를 살펴본 Ogneva (2012)의 연구를 재검토하였다. Ogneva (2012) 의 연구방법론은 두 가지 우려점을 가지고 있다.

첫째, 미래의 현금흐름에 대한 정보충격(cash flow shocks)을 비기대이익(earnings surprise)과 연관된 수익률에 한정함에 따라서 Ogneva 의 기대수익률 대용치는 상당한 양의 정보충격 (information shocks)을 포함할 것이다. 둘째, 회계정보와 주가수익률의 측정빈도가 달라짐에 따라서 정보충격의 측정에 편이가 생길 가능성이 있다. 본 연구에서는 Vuolteenaho (2002)의 VAR 모델을 이용하여 추정한 기대수익률을 활용하여 *AQ* 가 시장가격에 반영되는 위험요소(priced risk facto)임을 지지하는 결과를 발견하였다. 추가분석은 경기하락이 예상되는 기간에 *AQ* 가 시장가격에 더욱 강하게 반영됨을 보여주며, 이 결과는 본 연구의 핵심 발견을 지지한다.

세 번째 연구는 기대수익률과 재무적 유연성(financial flexibility)의 관계를 살펴보았다. 재무적 유연성의 두 지표, 현금성 자산 및 레버리지(leverage)와 기대수익률의 관계를 분석한 선행연구들은 일반적으로 현금성 자산이 부(負)의 부채(negative debts)라는 부정확한 가정하에, 부채에서 현금을 차감한 순부채(net debts)를 이용하여 레버리지를 계산하였다 (Acharya et al. 2007). 본 연구에서는 선행연구의 재무적 유연성의 대용치가 가지는 문제점을 해결하기 위하여 현금성 자산과 부채를 분리하여 재무적 유연성을 측정하였다. 본 연구는 기대수익률의 대용치를 계산하기 위하여 Vuolteenaho (2002)의 VAR 모델을 활용하였다. 실증분석결과는 기대수익률이 현금성 자산과 양의 상관관계를 가지는 것으로 나타났으며, 이는 위험한 기업이 현금성 자산의 보유를 선호함에 따라 나타나는 것으로 해석된다. 레버리지도 기대수익률과 양의 상관관계를 보였는데, 이 결과는 파산위험이 기대수익률을 높일 것으로 예측한 이론과 일치한다. 현금성 자산과 기대수익률의 상관관계는 레버리지와 기대수익률의 상관관계와 서로 독립적으로 나타났으며, 이러한

독립성은 현금을 부(負)의 부채로 보는 시각이 부적절함을 지지한다. 현금성 자산 및 레버리지의 효과를 포괄하는 종합적인 재무적 유연성 측정치와 기대수익률은 통계적으로 유의한 양의 상관관계를 보였다. 이 결과는 선행연구가 레버리지와 기대수익률 사이에 음의 상관관계를 발견한 것은 부정확한 레버리지 측정에 의한 것일 가능성을 시사한다. 재무적 유연성과 기대수익률의 관계는 특히 경기하락이 예상될 때 강하게 나타났다.

주요어: 국제회계기준 도입; 유럽은행; 법의 집행; 은행규제; 벡터 자기회귀; 주가수익률 분해; 발생액의 질; 자본비용; 기대수익률; 재무적 유연성; 현금성 자산; 레버리지; 현금흐름 충격; 자본비용 충격

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