The Effect of Financing Sources on the Usefulness of Financial Reporting Quality in Guiding Investments

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Executive Summary

This paper studies how the difference in the demand for accounting information from financing sources (i.e. shareholders and banks) affects the relation between financial reporting quality and corporate investment decisions. Ineffective monitoring and capital rationing by shareholders and banks, due to information asymmetry, may result in a lack of management's investment responses to changes in growth opportunities.

This paper argues that financial reporting can reduce these problems, and thus increase management's investment sensitivity to changes in growth opportunities.

The increase, however, depends on the effectiveness of financial reporting in reducing information asymmetry. Outside shareholders rely on extensive financial reporting to reduce information asymmetry, while bank loan officers use private communication and monitoring channels as their primary information source.

Financial reporting is thus more effective in reducing information asymmetry where outside shareholders are the main financing source.

Therefore, I create three hypotheses:

- First, financial reporting improves investment sensitivity more for industries that are equity dependent and less for debt dependent industries.

- Second, voluntary disclosure is more prevalently used in equity dependent industries than in debt dependent industries to reduce information asymmetry.

- Third, voluntary disclosure helps improve the investment sensitivity, especially for equity dependent industries.

I use data from 27 countries to test my hypotheses, and find that industries dependent on equity financing voluntarily disclose more information to satisfy the needs of shareholders, whereas the usefulness of financial reporting in improving investment sensitivity increases with the level of equity financing and decreases with the level of bank debt financing. I did not find evidence to support my third hypothesis.

I. Introduction

This study investigates how financing sources (i.e., bank debt or public equity) affect the relation between financial reporting quality and corporate investment decisions. To maximize firm value, managers should increase investments in areas with high growth opportunities, and reduce investments in areas with decreasing growth opportunities. A change in growth opportunities should thus be followed by a change in investments, and I refer to this relation as the "sensitivity" of investments to changes in growth opportunities.

However, managers' investment decisions may not always be sensitive to changes in

growth opportunities due to the following three reasons. First, because of ineffective monitoring, managers may invest in value-destructing projects for personal gains, to the detriment of stakeholders (Jensen and Meckling 1976).

Second, information asymmetry can result in a lack of financing, which in turn limits managers' responses to changes in investment opportunities, leading to a problem of adverse selection and capital rationing (Myers and Majluf 1984; Chaney et al.2012).

Financial reporting is thus more effective in reducing information asymmetry where outside shareholders are the main financing source.

Third, a country's poor financial reporting environment may conceal important information about technological, economic, and demographic changes; and without such information managers may be unaware of important changes outside their firms, and therefore miss the opportunity to use their resources to respond to these changes in the economy (Bushman and Smith 2001).

Accounting theory argues that financial reporting can reduce these three problems by providing useful information, increasing the quality of monitoring, and reducing information asymmetry between stakeholders and managers. However, the usefulness of financial reporting in improving investment sensitivity differs depending on whether major stakeholders are public shareholders or banks.

Accounting information is frequently used in financing contracts to provide information to suppliers of capital (Shleifer and Vishny 1997). Yet, differences in the monitoring and information gathering process between banks and public shareholders lead to differences in the demand for financial reporting.

Financial reporting is a major communication tool that distributes information from managers to public shareholders in the equity market. High quality financial reporting and disclosure practice reduces the cost of information acquisition, and thus reduces information asymmetry and improves shareholder monitoring.

In contrast, banks obtain information and monitor borrowers through private channels of communication, such as regular office visits and private covenant negotiation. Covenants often include customized non-GAAP calculation of financial ratios, e.g. including operating leases and under-funded pension in the calculation of debt, or removing illiquid inventories from current assets.

Relative to public shareholders' limited access to managers, banks' ability to contact and acquire information directly from managers reduces their demand for financial reporting (Bushman and Smith 2001). *My first hypothesis* thus predicts that the usefulness of financial reporting in improving investment sensitivity decreases with the level of bank debt financing.

Prior literature also argues that managers' incentives to disclose accounting information are equilibrium outcomes of the benefit and cost of financial reporting (Verrecchia 1983; Verrecchia 1990). Because private communication reduces the benefits of public disclosure for firms dependent on bank financing, *my second hypothesis* predicts that voluntary disclosure is negatively related to bank debt financing and positively related to equity financing.

My third hypothesis predicts that voluntary disclosure increases investment sensitivity, especially for firms dependent on equity financing.

The results of my empirical tests are consistent with the first two hypotheses. Using measures of financial reporting from Bushman et al. (2004), I find that financial information transparency, the CIFAR index, and audit quality increase investment sensitivity more for industries that depend on equity financing and less for industries that depend on bank debt financing.

These results suggest that in countries with poor financial reporting quality, industries dependent on bank debt financing have advantages in allocating capital over those dependent on equity financing. In countries with good financial reporting quality, industries dependent on equity financing have the advantage.

To test my second and third hypotheses, I obtain a country's minimum disclosure requirement from CIFAR following Francis et al.'s (2005) method. A firm's voluntary disclosure amount is thus the CIFAR index of the firm above the minimum disclosure requirement of its country.

Empirical results show that voluntary disclosure is higher for firms dependent on equity financing. I do not find a significant result for my third hypothesis that voluntary disclosure increases investment sensitivity.

In contrast, I find that a country's disclosure requirement which is mandated by accounting regulations improves investment sensitivity. This result is consistent with Leuz and Verrecchia's (2000) argument that commitment to disclosure, not voluntary disclosure, results in economic benefits.

This paper makes a unique contribution to the contracting theory of accounting. Financial reporting is a critical part of financing contracts and plays an important role in satisfying information demand from capital providers. This paper extends Bushman et

al.(2006), Verdi (2006), Chen et al.(2011), and Balakrishnan et al.(2014) by examining the relation between financial reporting quality and investment sensitivity in firms relying on public equity financing versus those dependent on bank financing.

Furthermore, this study complements stock market-based research, where the usefulness of accounting information in bank financing is not considered. It also helps explain why in countries like Japan, where extensive debt financing is used, levels of economic development can be high despite poor financial reporting quality.

This paper is organized as follows. Section 2 reviews related accounting, economics, and finance studies and develops the hypotheses. Section 3 discusses measurement issues and research design. Section 4 provides descriptive statistics, and section 5 shows empirical results. Section 6 concludes the paper and discusses contributions.

II. Hypothesis Development

To maximize firm value, managers should increase investments in projects with high-growth opportunities and withdraw investments from projects with low- or negative-growth opportunities. Thus, an improvement in growth opportunities should be followed by an increase in investments, and a decline in growth opportunities should be followed by a decrease in investments.[1]

However, corporate investment may not always be sensitive to changes in growth opportunities due to information asymmetry between managers and stakeholders (e.g. banks and shareholders).[2]

To the extent that accounting information reduces agency problems associated with managerial entrenchment, financial reporting should improve the sensitivity of corporate investment to growth opportunities.

Differences in the Demand for Accounting Information

However, not all financial reporting is expected to be equally effective at achieving this result. Contracting parties, such as banks and shareholders, have different demands for accounting information, and they often take different approaches to remove information asymmetry.

Boot and Thakor (1997) make a comparison between a stock market – a place where investors aggregate information to form an equilibrium price through trading – and a bank, an intermediary that collects deposits from investors and lends to firms. If investors put money directly in a stock market, they expend resources to acquire information, which gets reflected in stock prices through trading based on the costly information they collect.

A transparent financial reporting environment reduces the acquisition cost of information, and is an important condition for an efficient stock market that assumes a monitoring role through stock-based compensation contracts and takeover threats (Diamond 1984; Holmstrom and Tirole 1993; Dow and Gorton 1997).

Financial reporting is a major communication tool that distributes information from managers to public shareholders in the equity market.

On the other hand, if investors lend through a bank, they deposit money in the bank and delegate the role of borrower monitoring to the bank. As to how banks collect information about borrowers, Schumpeter (1939) describes the private communication between banks and borrowing firms as follows:

"the banker must not only know what the transaction is which he is asked to finance and how it is likely to turn out, but he must also know the customer, his business, and even his private habits, and get, by frequently 'talking things over with him,' a clear picture of the situation"

(p. 116 as quoted on p. 383 of Diamond 1984). In other words, banks gather information needed for loans mostly through private channels rather than firms' financial statements.

Banks make customized debt covenants for borrowers in different business lines. Such covenants often include non-GAAP calculation of financial ratios. For example, borrowing contracts for retailers may include operating-lease commitment to the calculation of debt.

Banks may require firms with defined benefit pension plans to subtract under-funded pension from equity when calculating leverage. Current ratio may exclude illiquid inventories for firms with long-term contracts. Non-cash items such as goodwill write-offs and stock option expenses may be excluded from net income.

Financial reporting, which is guided by GAAP, has a much less important role in debt covenants.

In conclusion, the more heavily a firm relies on bank debt financing as opposed to public equity financing, the fewer economic benefits financial reporting has in improving the firm's investment sensitivity.[3]

> **H1:** The relation between financial reporting quality and the sensitivity of corporate investment to growth opportunities decreases with bank debt financing, and increases with public equity financing

Managers' choice of disclosure is an equilibrium outcome, which is a trade-off between costs versus the benefits of

disclosure (Verrecchia, 1983; Verrecchia, 1990). Disclosure is costly to management. It requires resources to collect and verify information. It leaks information to outsiders. Managers do not want to disclose information that may subject them to more scrutiny.

Because the benefit of financial reporting for bank-dependent firms is lower, incentives for voluntary disclosure should increase with equity financing and decrease with bank debt financing (Baiman and Verrecchia 1996; Ali and Hwang 2000; Jacobson and Aaker 1993). My second hypothesis reflects this relation between voluntary disclosure and financing types:

> **H2:** Voluntary disclosure is negatively related to bank loan financing, and positively related to equity financing

The economic consequence of voluntary disclosure is an empirical question, however. Francis et al.(2005) find that firms that voluntarily disclose more have lower costs of capital. Leuz and Verrecchia (2000) argue that it is a commitment to disclosure, rather than voluntary disclosure, that reduces information asymmetry. They argue that firms may change their policy of voluntary disclosure whenever they choose to, so voluntary disclosure is less likely to be viewed by investors as a commitment to transparency.

So far, no theory can be used to predict whether voluntary disclosure improves investment sensitivity through a reduction of information asymmetry. Empirical studies need to be conducted to make this prediction.

I state my third hypothesis in an alternative form:

> **H3:** Voluntary disclosure improves investment sensitivity; and the improvement decreases with bank debt financing, and increases with public equity financing.

III. Research Design

Measurement of Corporate Investment

I adopt Wurgler's (2000) measure of investment sensitivity to growth opportunities, which reflects an industry's relative magnitude of increasing investments in periods with growing investment opportunities and withdrawing investments in periods with low growth. Wurgler measures investment opportunities as the growth rate of industry *value added* from the United Nations Industrial Development Organization (UNIDO) Industrial Statistics Database (INDSTAT).

Value added is the value of an industry's outputs, such as finished goods, less the value of inputs, such as raw materials. Industry value added is often referred to as industry GDP, and is a measure of value created during production. My investment sensitivity measure is the coefficient ($\eta_{i,c}$) from equation (1) below:

$$\ln \frac{I_{i,c,t}}{I_{i,c,t-1}} = \alpha_{i,c} + \eta_{i,c} \ln \frac{V_{i,c,t}}{V_{i,c,t-1}} \quad (1)$$

where I is *total fixed asset formation,* V is value added, i stands for industry, c stands for country, and t indexes time. Total fixed asset formation is the value of purchased and self-constructed fixed assets less the value of the sale of fixed assets. It is also available in the INDSTAT.

A high coefficient ($\eta_{i,c}$) means that an industry invests (withdraws) more in periods with high (low) value added growth. A low ($\eta_{i,c}$) means investment is less related to the growth of value added.

To eliminate the inflation effect on the regression, I adopt the method in Wurgler (2000) to first convert both value added (V) and fixed assets formation (I) into U.S. dollars, using the year-average exchange rate reported by the IMF's International Financial Statistics.

I then divide the converted fixed asset formation by the U.S. capital goods producer price index, and divide the converted value added information by the U.S. finished goods producer price index. To reduce outliers, I put a cap on both the independent and dependent variables in equation (1) at 1 and -1.

Measurement of Financial Reporting Quality

I use four variables to measure financial reporting quality. The first two – financial accounting transparency and governance transparency – are measures of corporate transparency from Bushman et al.(2004). Both variables are from a factor analysis performed on a set of proxies for production, validation, and dissemination of information.[4]

The first variable, the transparency of financial accounting information used for valuation purposes, is measured as the intensity and timeliness of disclosures and their interpretation and dissemination by analysts and media.

The second measure, a proxy for governance information transparency, is measured as the intensity of governance disclosures used by outside investors to hold management and directors accountable for their decisions.

The third measure of financial reporting quality is a country-level financial reporting index developed by the Center for International Financial Analysis and Research (CIFAR) in 1993. Many of the international finance and accounting studies use the CIFAR index as a proxy for the amount of disclosure in a country.[5]

It rates annual reports of at least three firms in a country on the basis of disclosure on 90 separate items. The average across firms of the summation of these points is the CIFAR index for that country.

The fourth measure of financial reporting quality is an estimate of a country's audit quality from Bushman et al.(2004). It is measured using the Big 6 accounting firm's market share in a country. It is assigned a value of 4 if the market share is larger than 75%, 3 if the market share is between 50% and 75%, 2 if the market share is between 25% and 50%, and 1 if the market share is below 25%.

Measurement of Voluntary Disclosure

CIFAR reports a disclosure score for each firm that it uses in calculating a country's CIFAR index. Following Francis et al.(2005), I use the lowest CIFAR score (LOWCIFAR) of all firms in a country as the minimum disclosure requirement of that country. I then calculate the raw voluntary disclosure measure (VDIS) as the CIFAR score of a firm minus its country's lowest CIFAR score. I also deflate VDIS by the lowest CIFAR of the country to test the percentage of voluntary disclosure.

Measurement of Relative Equity Dependence

I use the method in Rajan and Zingales (1998) and Francis et al.(2005) to measure an industry's innate equity and bank dependence. An endogeneity issue exists – an industry's financing needs determine and are determined by its investments and financial reporting quality. The common approach to reduce endogeneity is to use instrumental variables that are correlated with the endogenous variable (i.e. financing needs) and are not correlated with the dependent variable (i.e. investment sensitivity).

The instrumental variables in this study are U.S. equity and German bank dependence. Specifically, I use an industry's equity dependence in the U.S. to measure the industry's innate equity dependence globally, and use an industry's bank debt dependence

in Germany to measure its innate bank debt dependence globally. I then delete U.S. and German samples from the regression to avoid endogeneity in these two countries.

There are two arguments given to justify that they are good instrumental variables. First, the U.S. has a very efficient equity market and Germany has a very efficient bank system. Industries in these two countries have fewer obstacles to obtain equity or bank debt financing than in other countries. The measures from the U.S. and Germany should thus contain less noise due to market frictions.

High quality financial reporting and disclosure practice reduces the cost of information acquisition, and thus reduces information asymmetry and improves shareholder monitoring.

Second, the dependence on financing is unique to an industry to the extent that an industry's tangible asset base and growth opportunities are similar across countries. Rajan and Zingales (1995) find that firm leverage is quite similar across countries with different financial reporting and legal environments.

U.S. equity dependence measures the amount of equity needed for capital expenditure and equals the ratio of net equity issues to net capital expenditures. Net equity issues equal the amount of equity issued (Compustat item #108) minus the amount of equity repurchased (Compustat item #115). Net capital expenditure equals cash spending on capital expenditure (Compustat item #128) minus cash received from the sales of PP&E (Compustat item #107).

I follow the approach in Rajan and Zingales (1998) to minimize the effect of outliers on this measure. I first calculate a sample firm's equity dependence by dividing (1) the sum of net equity issues over the 1980s by (2) the sum of capital expenditures over the 1980s. This first step reduces outliers caused by temporal fluctuations in investment and financing within a firm.

The second step is to measure the equity dependence of an industry as the median equity dependence of all firms in that industry. Rajan and Zingales argue that the second step "prevents large firms from swamping the information from small firms; for instance, we know that IBM's free cash flow does not alleviate possible cash flow shortages of small computer firms" (p. 564).

I use an industry's dependence on bank loans in Germany to proxy for the bank dependence of the industry worldwide, because Germany is known for its well-developed banking system (Gorton and Schmid 2000). The data are from the 2005 Global Vantage database, which covers the period of 1993 to 2005.[6]

Similar to the U.S. equity calculation, I first calculate a sample firm's bank debt dependence by dividing (1) the sum of long-term and short-term borrowing from 1993 to 2005 by (2) the sum of net capital expenditure from 1993 to 2005. An industry's bank debt dependence is the median of all firms in that industry.

Long-term and short-term borrowing is calculated as the changes in long-term and short-term loans.[7] Because most German firms do not report capital expenditure, I use the change in gross fixed assets as a measure of net capital expenditure.

An industry's relative dependence on equity is calculated by subtracting its bank debt dependence from its equity dependence. Table 1 Panel A shows the results sorted by an industry's relative equity dependence. I include twenty industries in my study. Columns 1 and 2 are an industry's U.S. equity dependence (EQUITYDEP) and its German bank dependence (DEBTDEP).

Table 1 Panel A:
Equity Dependence and Debt Dependence Measures

Industry	EQUITYDEP	BANKDEP	EQUITYDEP – BANKDEP	Rank of EQUITYDEP – Rank of BANKDEP	LEVERAGE (U.S.)	LEVERAGE (Germany)
	(1)	(2)	(3)	(4)	(5)	(6)
Wearing apparel, except footwear	0.011	0.634	-0.623	-0.60	0.542	0.782
Wood products, except furniture	0.017	0.562	-0.545	-0.45	0.641	2.162
Furniture, except metal	0.000	0.396	-0.396	-0.70	0.546	1.013
Paper and products	0.005	0.390	-0.385	-0.55	0.574	0.886
Plastic products	0.068	0.449	-0.381	-0.15	0.578	1.105
Printing and publishing	0.022	0.300	-0.278	-0.10	0.448	0.273
Non-ferrous metals	0.020	0.282	-0.262	-0.10	0.711	0.553
Textiles	0.000	0.252	-0.252	-0.40	0.676	1.283
Iron and steel	0.016	0.218	-0.202	0.00	0.580	0.379
Transport equipment	0.060	0.258	-0.198	0.10	0.643	0.663
Fabricated metal products	0.007	0.203	-0.196	-0.05	0.580	0.722
Other non-metallic mineral products	0.023	0.208	-0.185	0.25	0.556	0.265
Rubber products	0.000	0.178	-0.178	-0.15	0.431	1.239
Food products	0.000	0.072	0.072	0.05	0.630	1.164
Industrial chemicals	0.093	0.096	-0.003	0.60	0.552	0.523
Beverages	0.007	-0.017	0.024	0.30	0.448	0.625
Machinery, electric	0.382	0.243	0.139	0.35	0.418	0.398
Machinery, except electrical	0.477	0.300	0.177	0.15	0.408	0.536
Professional & scientific equipment	0.986	0.043	0.943	0.85	0.343	0.403
Other chemicals	1.151	0.152	0.999	0.75	0.239	0.302
Mean	0.167	0.261	-0.094	0.008	0.527	0.764

The furniture, textiles, food, and rubber products industries have zero median equity issues. The beverage industry shows a small negative bank debt dependence, which means the industry repaid some debt over the period. All other industries have positive borrowing and equity issuance.

A country's disclosure requirement which is mandated by accounting regulations improves investment sensitivity.

Relative equity dependence is shown in column 3. The industry with the highest relative equity dependence is other chemicals (0.999)[8], followed by professional and scientific equipment (0.943), non-electric machinery (0.177) and electric machinery (0.139). The industry with the lowest relative equity dependence is wearing apparel (-0.623), followed by wood products (-0.545), and furniture (-0.396).

I also use the relative rank of the equity and bank dependence (shown in column 4), which is measured as the difference in the rank of an industry's equity dependence and bank debt dependence divided by 20, which is the number of industries in the sample.

For comparison, I present an industry's leverage from both the U.S. and German samples in columns 5 and 6. Similar to dependence measures, the leverage measure is the median leverage of all firms in that industry. A firm's leverage is its mean ratio of long-term and short-term debt to stockholder's equity.

Panel B of Table 1 shows the Pearson correlation among these measures. The correlation coefficient between leverage in the U.S. and leverage in Germany is 0.46 and significant at the 5% level. Equity dependence has a significantly negative relation with both U.S. and German leverage. Bank debt dependence is positively related to German leverage at the 5% level, but correlated with U.S. leverage only at the 15% level.

The correlation coefficient between equity dependence and bank debt dependence is -0.31, but only at the 18% level. The relatively high p-values associated with these results may be due to small sample sizes (20 industries) since the correlation coefficient is not small in magnitude. The last two rows show that correlations between my raw and rank relative equity measures and all other variables are significant with expected signs.

Table 1 Panel B:
Correlation Table of Financing Structures

	EQUITYDEP	BANKDEP	LEVERAGE (U.S.)	LEVERAGE (Germany)	EQUITYDEP – BANKDEP	Rank of EQUITYDEP – Rank of BANKDEP
EQUITYDEP	1					
BANKDEP	-0.31 (0.18)	1				
LEVERAGE (U.S.)	-0.78 (<0.01)	0.34 (0.15)	1			
LEVERAGE (Germany)	-0.39 (0.09)	0.44 (0.05)	-0.46 (0.04)	1		
EQUITYDEP – BANKDEP	0.93 (<0.01)	-0.64 (<0.01)	-0.76 (<0.01)	-0.49 (0.03)	1	
Rank of EQUITYDEP – Rank of BANKDEP	0.70 (<0.01)	-0.75 (<0.01)	-0.59 (<0.01)	-0.59 (<0.01)	0.86 (<0.01)	1

Regression Models

Regression model for the first hypothesis

My first hypothesis predicts that financial reporting quality improves investment sensitivity more for industries that depend on equity financing. I therefore add an interaction between financial reporting quality ($ACCT_c$) and relative equity dependence ($RDEP_i$) and predict the coefficient (θ_{10}) to be positive in equation (2):[9]

$$\eta_{i,c} = \theta_1 + \theta_{10} ACCT_c * RDEP_i + \theta_{11} SYNC_c * RDEP_i + \theta_{12} CRIGHTS_c * RDEP_i$$
$$+ \theta_{13} SHRIGHTS_c * RDEP_i + \theta_{14} SOE_c * RDEP_i + \theta_{15} OWNERSHIP_c * RDEP_i$$
$$+ \theta_{16} CREDITD_c * RDEP + \theta_{17} STKD_c * RDEP_i + \sum_{c=1}^{26} \delta_c CDUMMY_c \qquad (2)$$
$$\sum_{i=1}^{19} \gamma_i INDUMMY_i + \varepsilon_{i,c}$$

where $\eta_{i,c}$ is the investment sensitivity measure from equation (1), $ACCT_c$ is one of the four financial reporting quality measures described in section 3.2, i indexes industry, and c indexes country.

I include 26 country dummy variables ($CDUMMY_c$) for the 27 countries and 19 industry dummy variables ($INDUMMY_c$) for the 20 industries in my sample. I also include other control variables that may affect the investment sensitivity.

$SYNC_c$ is a proxy for the amount of information in individual stock price from Morck et al.(2000), measured as the synchronicity between a single stock return and the market return.

Low (high) synchronicity implies low (high) co-movement between an individual stock and the overall stock market, and that more (less) information about a single stock relative to market information is incorporated into its stock price. I predict θ_{11} to be negative.

$CRIGHT_c$ measures a country's legal protection of creditors as the product of creditor rights during default and rule of law. $SHRIGHT_c$ measures a country's shareholder protection as the product of anti-director index and rule of law. Both variables are from La Porta et al.(1998). I predict θ_{12} (θ_{13}) to be negative (positive) because creditor (shareholder) protection is more important for industries that depend on debt (equity) financing.

SOE_c is a country's average government involvement in economic activities reported in the Economic Freedom of the World from 1975 to 1995. Bushman et al. (2006) argue that a government's political agenda interferes with the optimal distribution of resources. I predict θ_{14} to be negative.

$OWNERSHIP_c$ is from La Porta et al.(1998). It is measured as a country's concentration

of ownership for its largest 20 companies. There are two opposing arguments about the effects of ownership concentration. Concentrated ownership increases the effectiveness of monitoring because of the controlling power of large block owners and their long-term interests in the company.

However, majority stakeholders may abuse their power in resource allocation and expropriate wealth from minority stakeholders. I therefore do not make a prediction on θ_{15}.

The more heavily a firm relies on bank debt financing as opposed to public equity financing, the fewer economic benefits financial reporting has in improving the firm's investment sensitivity.

$CREDITD_c$ ($STKD_c$) measures a country's credit (stock) market development as the ratio of domestic credit lending (stock market capitalization) to GDP. Both variables are from Wurgler (2000). I predict θ_{16} (θ_{17}) to be negative (positive) because credit (stock) market development is more important for industries that depend on debt (equity) financing.

Equation (2) can incorporate equation (1) to examine the effect that financial reporting and other variables have on investment sensitivity.

Define $GFCF_{i,c,t} = \ln \dfrac{I_{i,c,t}}{I_{i,c,t-1}}$ and $GVA_{i,c,t} = \ln \dfrac{V_{i,c,t}}{V_{i,c,t-1}}$,

the two terms from equation (1). Combining these terms with the variables from equation (2) yields:

$$GFCF_{i,c,t} = \theta_0 + \theta_1 GVA_{i,c,t} + \theta_{10} ACCT_c * RDEP_i * GVA_{i,c,t}$$
$$+ \theta_{11} SYNC_c * RDEP_i * GVA_{i,c,t} + \theta_{12} CRIGHTS_c * RDEP_i * GVA_{i,c,t}$$
$$+ \theta_{13} SHRIGHTS_c * RDEP_i * GVA_{i,c,t} + \theta_{14} SOE_c * RDEP_i * GVA_{i,c,t}$$
$$+ \theta_{15} OWNERSHIP_c * RDEP_i * GVA_{i,c,t} + \theta_{16} CREDITD_c * RDEP * GVA_{i,c,t}$$
$$+ \theta_{17} STKD_c * RDEP_i * GVA_{i,c,t} + \sum_{c=1}^{26} \delta_{1,c} CDUMMY_c * GVA_{i,c,t}$$
$$+ \sum_{c=1}^{26} \delta_{2,c} CDUMMY_c * RDEP_i + \sum_{c=1}^{26} \delta_{3,c} CDUMMY_c + \sum_{i=1}^{19} \gamma_{1,i} INDUMMY_i * GVA_{i,c,t}$$
$$+ \sum_{i=1}^{19} \gamma_{2,i} INDUMMY_i + \varepsilon_{i,c}$$

(3)

To correct for autocorrelation and heteroscedasticity, I use Generalized Method of Moments (GMM) to estimate the model.[10]

IV. Data and Descriptive Statistics

Thirty countries have data available on all four financial reporting quality measures (CIFAR, INFO, GOV, and AUDIT) and country-level control variables (CRIGHTS, SHRIGHT, SYNC, SOE, OWNERSHIP, CREDITD, and STKD). For an industry to be included, I require at least 10 years of data on industry fixed asset formation and value added data in the INDSTAT database.

Financial information transparency, the amount of disclosure, and audit quality increase management's investment sensitivity to changes in growth opportunities more for industries that rely on equity financing and less for industries dependent on bank debt financing.

For this reason, I delete Pakistan because it has fewer than 10 years of industry data. Similar to Rajan and Zingales (1998) and Beck and Levine (2002), I delete the United States and Germany to avoid endogeneity problems because they are used to calculate equity and bank dependence, which may affect

and be affected by investment in the dependent variable. My final sample consists of 27 countries.

V. Empirical Results

Test of the First Hypothesis

Table 2 presents regression results for equation (3) using GMM. Each of the four panels shows the results for each financial reporting quality measure and contains four regressions using four different relative equity dependence measures (RDEP):

(1) equity dependence minus debt dependence;

(2) the rank of equity dependence minus the rank of debt dependence;

(3) the inverse of the U.S. leverage; and

(4) the inverse of the German leverage.

Interaction terms with industry and country dummy variables are included in the regression, but not reported.

Panel A shows the results using financial information transparency (INFO). The coefficients on the interactions of INFO, RDEP, and the log of value added growth (GVA) are significantly positive in all four regressions using four different RDEP measures. This provides evidence that the level of financial

information transparency improves investment sensitivity more for industries with higher equity dependence.

Most interactions with institutional variables are not significant. When the ranked RDEP is used in column 2, the coefficient on the interaction involving creditor protection (CRIGHTS) is significantly negative, implying that creditor protection increases investment sensitivity more for industries that depend on bank debt financing.

In columns 1 and 3, the coefficient on the interaction including shareholder protection (SHRIGHTS) is significantly positive, indicating that shareholder protection is more useful for industries that depend on equity financing.

Table 2: The Effect of Relative Equity Dependence on the Relation Between Financial Reporting Quality and Capital Allocation Efficiency

Results are reported for the following equation using GMM. Interactions with dummies are included in the regression but not reported. One-tailed p-value is reported in the parentheses if there is a predicted sign, two-tailed otherwise.

Panel A:
INFO as the proxy for financial reporting quality

	Predicted Sign	Relative Equity Dependence (RDEP)			
		EQUITYDEP – DEBTDEP	Rank of EQUITYDEP – Rank of DEBTDEP	1/U.S. LEVERAGE	1/GERMAN LEVERAGE
Column No.		(1)	(2)	(3)	(4)
GVA*INFO*RDEP	+	0.1769 (0.023)	0.1911 (0.018)	0.1252 (0.021)	0.1589 (<0.001)
GVA*SYNC*RDEP	–	0.0390 (0.978)	0.0270 (0.930)	0.0278 (0.989)	0.0162 (0.988)
GVA*CRIGHTS*RDEP	–	-0.0460 (0.216)	-0.0838 (0.068)	-0.0041 (0.459)	0.0085 (0.630)
GVA*SHRIGHTS*RDEP	+	0.0888 (0.057)	0.0390 (0.236)	0.1017 (0.006)	0.0054 (0.416)
GVA*SOE*RDEP	?	-0.0317 (0.437)	-0.0486 (0.175)	-0.0234 (0.399)	0.0046 (0.775)
GVA*OWNERSHIP*RDEP	?	0.5361 (0.272)	0.6862 (0.135)	0.3018 (0.405)	0.2701 (0.212)
GVA*CREDITD*RDEP	–	0.1204 (0.760)	0.0849 (0.699)	-0.0162 (0.444)	0.0726 (0.859)
GVA*STKD*RDEP	+	-0.3268 (0.859)	-0.2524 (0.815)	-0.3528 (0.940)	-0.0962 (0.765)

In Panel B, coefficients on the interaction terms including governance information transparency (GOV) are not significant except in column 2; most other interactions with institutional variables are also not significant. The results of Panel C that uses CIFAR and Panel D that uses AUDIT are similar to Panel A.

In summary, Table 2 shows that financial information transparency (INFO), the amount of disclosure (CIFAR), and audit quality (AUDIT) increase investment sensitivity more for industries that depend on equity financing.

Panel B:
GOV as the proxy for financial reporting quality

Column No.	Predicted Sign	Relative Equity Dependence (RDEP)			
		EQUITYDEP – DEBTDEP	Rank of EQUITYDEP – Rank of DEBTDEP	1/U.S. LEVERAGE	1/GERMAN LEVERAGE
		(1)	(2)	(3)	(4)
GVA*GOV*RDEP	+	0.1177 (0.196)	0.2395 (0.037)	0.0863 (0.198)	0.0630 (0.159)
GVA*SYNC*RDEP	−	0.0206 (0.885)	0.0067 (0.665)	0.0148 (0.929)	0.0004 (0.524)
GVA*CRIGHTS*RDEP	−	-0.0519 (0.220)	-0.1127 (0.042)	-0.0152 (0.378)	0.0017 (0.522)
GVA*SHRIGHTS*RDEP	+	0.0433 (0.258)	-0.0384 (0.7279)	0.0675 (0.074)	-0.0233 (0.769)
GVA*SOE*RDEP	?	-0.0374 (0.313)	-0.0601 (0.091)	-0.0263 (0.341)	-0.0017 (0.917)
GVA*OWNERSHIP*RDEP	?	0.7753 (0.116)	1.0872 (0.020)	0.4748 (0.198)	0.4277 (0.059)
GVA*CREDITD*RDEP	−	0.2414 (0.914)	0.2471 (0.943)	0.0726 (0.740)	0.1707 (0.995)
GVA*STKD*RDEP	+	-0.3799 (0.901)	-0.4235 (0.929)	-0.3800 (0.950)	-0.1061 (0.785)

Panel C:
CIFAR as the proxy for financial reporting quality

Column No.	Predicted Sign	Relative Equity Dependence (RDEP)			
		EQUITYDEP – DEBTDEP	Rank of EQUITYDEP – Rank of DEBTDEP	1/U.S. LEVERAGE	1/GERMAN LEVERAGE
		(1)	(2)	(3)	(4)
GVA*CIFAR*RDEP	+	0.0197 (0.018)	0.0185 (0.022)	0.0126 (0.026)	0.0125 (0.001)
GVA*SYNC*RDEP	−	0.0187 (0.880)	0.0070 (0.679)	0.0151 (0.939)	0.0015 (0.604)
GVA*CRIGHTS*RDEP	−	-0.0199 (0.371)	-0.0561 (0.162)	0.0123 (0.617)	0.0264 (0.848)
GVA*SHRIGHTS*RDEP	+	0.0597 (0.140)	0.0142 (0.395)	0.0856 (0.015)	-0.0104 (0.659)
GVA*SOE*RDEP	?	-0.0276 (0.480)	-0.0451 (0.209)	-0.0202 (0.458)	0.0059 (0.713)
GVA*OWNERSHIP*RDEP	?	1.0962 (0.036)	1.2242 (0.014)	0.6641 (0.088)	0.6445 (0.007)
GVA*CREDITD*RDEP	−	0.2456 (0.934)	0.2230 (0.924)	0.0689 (0.735)	0.1812 (0.997)
GVA*STKD*RDEP	+	-0.4252 (0.914)	-0.3566 (0.888)	-0.4182 (0.962)	-0.1692 (0.893)

Panel D:
AUDIT as the proxy for financial reporting quality

| | Predicted Sign | Relative Equity Dependence (RDEP) | | | |
| | | EQUITYDEP – DEBTDEP | Rank of EQUITYDEP – Rank of DEBTDEP | 1/U.S. LEVERAGE | 1/GERMAN LEVERAGE |
Column No.		(1)	(2)	(3)	(4)
GVA*AUDIT*RDEP	+	0.1022 (0.064)	0.0982 (0.073)	0.0799 (0.033)	0.0978 (0.002)
GVA*SYNC*RDEP	−	0.0326 (0.965)	0.0198 (0.877)	0.0236 (0.982)	0.0099 (0.925)
GVA*CRIGHTS*RDEP	−	-0.0558 (0.190)	-0.0932 (0.066)	-0.0230 (0.296)	-0.0163 (0.275)
GVA*SHRIGHTS*RDEP	+	0.0616 (0.133)	0.0074 (0.445)	0.0756 (0.025)	-0.0278 (0.863)
GVA*SOE*RDEP	?	-0.0115 (0.777)	-0.0330 (0.378)	-0.0077 (0.778)	0.0195 (0.262)
GVA*OWNERSHIP*RDEP	?	0.5089 (0.283)	0.6821 (0.131)	0.2574 (0.466)	0.2655 (0.227)
GVA*CREDITD*RDEP	−	0.1515 (0.823)	0.1180 (0.777)	-0.0093 (0.466)	0.0879 (0.910)
GVA*STKD*RDEP	+	-0.1967 (0.746)	-0.1337 (0.682)	-0.2365 (0.860)	0.0158 (0.454)

Tests of the second and third hypotheses

In this section I test whether firms voluntarily disclose more when they depend on equity financing. The regression model is:

$$VoluntaryDisclosure_{i,c} = \beta_0 Intercept + \beta_1 LOWCIFAR_c + \beta_2 RDEP_i + \beta_3 LOWCIFAR * RDEP_i , \qquad (4)$$

where voluntary disclosure is (1) voluntary disclosure (VDIS) and (2) VDIS deflated by the lowest CIFAR of a country (LOWCIFAR). Again, RDEP is the four measures of relative equity dependence.

Table 3 shows the results. The results using VDIS are shown in Panel A and the results using VDIS deflated by LOWCIFAR are shown in Panel B. Both panels show that voluntary disclosure is higher in countries with low disclosure requirement (LOWCIFAR) and in industries with the higher equity dependence.

The interaction effects are mostly not significant, implying that voluntary disclosure is not especially higher for industries that are equity dependent and located in low disclosure requirement regimes.

Table 3: Voluntary Disclosure
Panel A: Regression of Voluntary Disclosure

	Relative Equity Dependence (RDEP)			
	EQUITYDEP – DEBTDEP	Rank of EQUITYDEP – Rank of DEBTDEP	1/U.S. LEVERAGE	1/GERMAN LEVERAGE
Column No.	(1)	(2)	(3)	(4)
Intercept	54.140 (<.001)	49.770 (<.001)	29.163 (0.030)	53.833 (<.001)
Lowest CIFAR	-0.574 (<.001)	-0.514 (<.001)	-0.258 (0.250)	-0.537 (<.001)
RDEP	28.757 (0.010)	20.234 (0.087)	12.117 (0.064)	-0.384 (0.921)
Lowest CIFAR *RDEP	-0.363 (0.054)	-0.291 (0.151)	-0.153 (0.156)	-0.012 (0.851)

Panel B:
Regression of voluntary disclosure deflated by Lowest CIFAR

	Relative Equity Dependence (RDEP)			
	EQUITYDEP – DEBTDEP	Rank of EQUITYDEP – Rank of DEBTDEP	1/U.S. LEVERAGE	1/GERMAN LEVERAGE
Column No.	(1)	(2)	(3)	(4)
Intercept	1.578 (<.001)	1.474 (<.001)	0.919 (0.002)	1.534 (<.001)
Lowest CIFAR	-0.020 (<.001)	-0.019 (<.001)	-0.012 (0.016)	-0.019 (<.001)
RDEP	0.701 (0.003)	0.484 (0.058)	0.321 (0.022)	0.009 (0.919)
Lowest CIFAR *RDEP	-0.009 (0.025)	-0.007 (0.109)	-0.004 (0.073)	0.000 (0.743)

Tests of H3 employ equations (3), replacing financial reporting quality with voluntary disclosure measures. Table 4 uses voluntary disclosure and shows the results when voluntary disclosure is used in equation (3), the equation to test the first hypothesis. The coefficients on voluntary disclosure are not significant, but the coefficient on the lowest CIFAR is significant.

Because the lowest CIFAR proxies for a country's minimum disclosure requirement, the results indicate that the mandate by accounting authorities and regulations improves investment sensitivity more for equity-dependent industries. Table 4 is thus consistent with Leuz and Verrecchia's (2000) claim that it is the commitment to disclosure, not the voluntary disclosure itself, that results in economic benefits.

Table 4:

The Relation Between Voluntary Disclosure and Investment Sensitivity

	Predicted Sign	Disclosure Quality (ACCT)		
		VDIS	VDIS/LOWCIFAR	LOWCIFAR
GVA*ACCT*RDEP	+	-0.0548	-1.2793	0.0114
		(0.946)	(0.843)	(0.035)
GVA*SYNC*RDEP	−	-0.0489	-0.0164	0.0203
		(0.316)	(0.433)	(0.885)
GVA*CRIGHTS*RDEP	−	-0.5082	-0.4720	-0.0589
		(0.091)	(0.106)	(0.170)
GVA*SHRIGHTS*RDEP	+	0.1881	0.1553	0.0667
		(0.325)	(0.356)	(0.119)
GVA*SOE*RDEP	?	-0.4660	-0.4507	-0.0205
		(0.032)	(0.042)	(0.615)
GVA*OWNERSHIP*RDEP	?	-0.1777	-0.0400	1.0185
		(0.952)	(0.990)	(0.052)
GVA*CREDITD*RDEP	−	0.1994	0.0638	0.4483
		(0.601)	(0.530)	(0.982)
GVA*STKD*RDEP	+	-1.6878	-1.6321	-0.4490
		(0.846)	(0.836)	(0.926)
No. of observations		3076	3076	15115

VI. Conclusion

This paper investigates how financing structure affects the relation between financial reporting quality and corporate investment decisions. I find that financial information transparency, the amount of disclosure, and audit quality increase management's investment sensitivity to changes in growth opportunities more for industries that rely on equity financing and less for industries dependent on bank debt financing.

My study also indicates that although industries dependent on equity financing voluntarily disclose more information, it is not voluntary disclosure, but rather the commitment to disclosure which is mandated by accounting regulations, that results in economic benefits.

The interpretation of the results of the paper hinges on the validity of the empirical design.

First, the value added (GVA) and fixed assets investment (GFCF) data are from 1965 to 2002, while financial reporting data are time-insensitive.

The results will hold only if a country's financial reporting quality relative to other countries is very stable over time. For example, the U.S. has always had better accounting quality than Japan. Future research can be done to examine the effect of a change in accounting quality in investment sensitivity over time.

Second, the data source, Global Vantage does not separate bonds from bank loans. As a result, the calculation of bank debt dependence includes public debt. The measure of German bank dependence includes both bank debt and public debt, which creates noises in bank debt dependence. A new data source can be used in future studies to reduce the noises in the variable.

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Endnotes

[1] For example, Bagehot (1873), Tobin (1969), Hayashi (1982), and Levine (1997).

[2] See Hubbard (1998) for a complete review of the literature.

[3] In some countries banks are allowed to be shareholders. However, banks normally do not actively seek equity investment, even in Germany. Gorton and Schmid (2000) argue that the block shareholding of industrial companies by German banks is a byproduct of the banking relationship and normally happens when firms are in distress.

Banks do not actively trade on the stock market to influence stock prices. As a result, Gorton and Schmid find the equity holdings by German banks have not changed much since the early 1970s.

[4] My empirical results are robust to the use of the primitive variables, such as the disclosure intensity of important information on valuation (DISCL) and governance issues (GOVERN) from Bushman et al.(2004).

[5] For example, Rajan and Zingales (1998), Hope (2003), Francis et al. (2005), and Defond et al. (2007).

[6] Equity dependence is calculated from U.S. firms in the 1980s. Debt dependence is calculated from German firms from 1993 to 2005 in the recent Global Vantage database. I do not use U.S. data from the same period as German firms because of the Internet bubble in the late 1990s.

The internet bubble affects different industries unevenly. I find that the bubble increases the equity dependence more for the equity-dependent industries (e.g. professional and scientific equipment, other chemicals, and electric machinery). As a sensitivity test, I extend the measurement period of equity dependence to 2005.

The resulting long-period measure is highly correlated with the original short-period one, but most equity-dependent industries have large increases in the equity dependence measure. My empirical results are robust to the use of this long-period measure.

[7] Global Vantage does not separately report borrowings from banks and from public bonds. However, public bonds are still more "private" than equity in that 1) debt rating agencies use private communication with managers to obtain information and 2) underwriters of bonds privately negotiate restructuring during default.

In the U.S., Reg FD exempts the information obtained from private communication between debt rating agencies and managers from being made public. In the sensitivity analysis, I try to reduce the measurement issue.

[8] Included in the other chemical industry are mostly pharmaceutical companies.

[9] The term $RDEP_i$ is not separately included in equation (4) because the industry dummy variables ($INDUMMY_i$) already subsume the effect of $RDEP_i$. Including $RDEP_i$ will cause perfect multicollinearity (Greene 2002).

[10] OLS regression with White heteroscedasticity-corrected standard errors yields similar results.