

## Investor Financial Literacy and Stock Price Synchronicity: A Cross-Country Study

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### Abstract

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In the past few decades, policymakers have increasingly viewed investor financial literacy as the critical backbone of financial market stability worldwide. This study therefore focuses on the impacts of the financial knowledge of investors on stock price synchronicity in an international setting. We argue that firm-specific information capitalized into stock prices is affected by both corporate disclosure (the supply side) and investor interpretation of the information disclosed (the demand side). Financial literacy can enhance how investors understand financial statements and corporate disclosure, and therefore likely contributes to reducing stock price synchronicity. We find that stock price synchronicity is more serious in countries with low levels of investor financial literacy. Our empirical analysis also suggests that this effect is more pronounced for firms in countries with weaker shareholder protection. This result shows that there is a substitution effect between investor financial literacy and legal protection.

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**Keywords:** Stock Price Synchronicity; Investor Financial Literacy; Information Asymmetry; Legal Protection

### 1. Introduction

In recent years, many organizations, which range from community interest groups, government agencies, grassroots consumer groups, major banking companies to other organizations, have been focusing a great deal on financial literacy. This also holds true for investors, whose financial literacy plays an important role in the stock market. Investors who have different levels of financial literacy will respond differently to information disclosed by the same corporation. If they are well educated with adequate financial knowledge, they are more likely to identify and recognize potential misbehaviors of corporate insiders. Educated investors are also more capable of understanding the different disclosed documents and investment-related information. They are able to fully maximize financial information and less likely to be misled by the distorted earnings reported by corporations. Their capability constitutes as a source of pressure to managers and compels self-discipline. Hence, investor financial literacy can also serve as a corporate governance tool to alleviate agency costs, or in the words of Mishkin (2008): “better economic policy-making could be made by better-informed citizenry”.

The understanding that better-educated countries have better governments is an empirical regularity acknowledged in both dictatorships and democracies. This is most likely because educated individuals are more inclined to voice their dissatisfaction on the misconduct of government officials and better behavior from officials evolves from frequent complaints. Among the different countries surveyed at the individual-level in the World Justice Project<sup>3</sup>, most of the official misconduct is reported by those who are better educated (Botero, Ponce, and Shleifer 2013). Other survey data on reporting crime and corruption in this project also confirm this phenomenon. Therefore, the complaints of citizens could be the operative mechanism that explains for the correlation between the quality of government and education.

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<sup>3</sup> See <https://worldjusticeproject.org/> for detail.

There are schools of studies in the literature that investigate the role of institutions on corporate behavior and suggest that institutional owners are better educated and informed, and therefore have advantages in acquiring and processing information. These more educated and informed shareholders can reduce the perceived benefits of managing earnings. Collins, Gong and Hribar (2003) indicate that whether the valuation implications of accruals would be differentially reflected by share prices depends on the sophistication of the investor, and firms with investors who have high levels of investment sophistication present stock prices that more accurately reflect accruals. The evidence here suggests that educated investors can at least partially recognize the distorted incentives of managers. Thus earnings management is less efficacious in countries with high levels of financial literacy.

The disclosure theory states that the ability of investors to use disclosed information depends on the characteristics of the investors (e.g., Hirshleifer and Teoh 2003; Bloomfield 2002). Investors who are more sophisticated might be inclined to seek more public information (Fischer and Verrecchia 1999; Bushman, Gigler and Indjejikian 1996; Kim and Verrecchia 1994). Malmendier and Shanthikumar (2007) find that large (more sophisticated) traders react to both analyst recommendation updates and their earnings forecast updates. However, small (less sophisticated) traders react to the former only. When there is available information, sophisticated information processors (investors) are inclined to learn more (Fischer and Verrecchia 1999; Bushman et al. 1996; Indjejikian 1991). Thus, when exposed to certain kinds of public activities, investors who are more sophisticated might have the advantage of information.

In this paper, we investigate whether financial literacy, which improves the ability and skills of investors to interpret information that is disclosed by different corporations, reduces stock price synchronicity. Morck, Yeung and Yu (2000) conclude that emerging markets have synchronous stock price movements. Furthermore, in and Myers (2006) indicate that stock price synchronicity is due to corporate opacity. However, we argue that corporate opacity is only one factor, because the capability of investors to interpret and understand the information provided by firms, financial analysts, as well as newspapers all need to be taken into consideration. The previous literature has shown that sophisticated shareholders react more quickly and decisively to firm information. Hand (1990) proposes that the price of a firm's stock is determined by unsophisticated investors with little knowledge about accounting, while at other times, the price is determined by marginal investors, who are adept at comprehending and interpreting accounting data. Investors in countries that have better financial literacy are inclined to be more sophisticated and therefore the stock prices there are likely to be set by these investors. Their financial literacy means that they have advantages in acquiring and processing information. We suggest that financial literacy may enhance the capability of investors to interpret corporate information, and therefore there is inclusion of firm specific information into stock prices. We hypothesize that stock price synchronicity is more pronounced in countries where investors are not financially literate.

This study contributes to the literature in two ways. First, we add to the literature on stock price synchronicity. Previous studies have only focused on the supply side of corporate information (corporate disclosure, analyst forecasts, etc.) (Kim and Shi 2012; Piotroski and Roulstone 2004; Gelb and Zarowin 2002). However, we argue that corporate opacity is only one side of synchronicity. There is also the capability of investors to interpret and understand the information provided by firms, financial analysts, as well as newspapers. Specifically, we explore how the financial ability and skills of investors help them in interpreting the information disclosed by corporations. We find that stock price synchronicity is more pronounced in countries with a lower level of investor financial literacy. Second, we investigate the combined effects of financial literacy and legal investor protection. We find that financial literacy plays a more pronounced role in countries where investors are not well protected, thus indicating a substitution effect of financial literacy on the legal protection of investors.

This paper is organized as follows. The main hypotheses are developed in Section 2. The sample and methodology are described in Section 3. Section 4 presents the descriptive statistics and empirical results. In Section 5, we provide a summary and conclude the paper.

## **2. Hypothesis Development**

## 2.1 Investor financial literacy and stock price synchronicity

The disclosure theory states that the ability of investors to use disclosed information differs among investors (e.g., Hirshleifer et al. 2003; Bloomfield 2002) and investors who are more sophisticated might prefer to learn more from communal information (Fischer and Verrecchia 1999; Bushman et al. 1996; Kim and Verrecchia 1994).

Malmendier and Shanthikumar (2007) found that large (more sophisticated) traders react to both analyst recommendation updates and their earnings forecast updates. However, small (less sophisticated) traders react to the former only. There are therefore variations in the ability to exploit the information disclosed by companies or analysts. Sophisticated information processors are also inclined to learn more from available information (Fischer and Verrecchia 1999; Bushman et al. 1996; Indjejikian 1991). Thus, when exposed to certain kinds of public activities, investors who are more sophisticated might have the advantage of information.

Morck et al. (2000) affirm that emerging markets have synchronous stock price movements. Furthermore, in and Myers (2006) indicate that stock price synchronicity is due to corporate opacity. However, we argue that corporate opacity is only one factor, because the capability of investors to interpret and understand the information provided by firms, financial analysts, as well as newspapers all need to be taken into consideration. The previous literature has shown that sophisticated shareholders react more quickly and decisively to firm information. Hand (1990) proposes that the price of a firm's stock is determined by unsophisticated investors with little knowledge about accounting, while at other times, the price is determined by marginal investors, who are adept at comprehending and interpreting accounting data. Investors in countries that have better financial literacy are inclined to be more sophisticated and therefore the stock prices there are likely to be set by these investors. Their financial literacy means that they have advantages in acquiring and processing information. We suggest that financial literacy may enhance the capability of investors to interpret corporate information, and therefore stock prices are influenced by firm specific information. Based on the discussion above, we make the following hypothesis.

H1: Stock price synchronicity is more pronounced in countries with lower levels of investor financial literacy.

## 2.2 Investor financial literacy and shareholder legal protection: Substitution or complementation?

In countries with poor shareholder protection, corporate insiders are less likely to disclose private information, firms are usually opaque (Bushman, Piotroski, and Smith 2004) and earnings quality is often low (Leuz, Nanda, and Wysocki 2003). Hence, stock price synchronicity is higher in countries with little shareholder protection (Jinand Myers 2006). However, if shareholders are well educated in finance and accounting, they may have a better understanding on the poor earnings quality in weak legal environments. They are less likely to be fooled by entrenched insiders and more likely to recognize the real intentions of managers. Equipped with better financial knowledge, these investors likely have the ability to protect themselves from false information. We argue that financial knowledge is more important and financial literacy plays a substitution role in corporate governance in countries with insufficient investor protection. We therefore hypothesize that:

H2: The effect of investor financial literacy on stock price synchronicity is more pronounced for firms in countries where investor rights are not well protected.

## 3. Data and Research Design

### 3.1 Data

Our sample consists of listed firms from 42 economies over the period of 2000 to 2011. The corporate financial data are collected from *Worldscope*, stock return data from *Datastream* and analyst following data from *I/B/E/S*. We omit financial firms (those with *SIC* codes between 6000 and 6999 and observations with negative total assets). In order to prevent outliers and extreme values from distorting the results, we winsorize the observations that are not within the 1st and the 99th percentiles. This results in a basic sample of 78,154 firm-year observations from 42 economies.

### 3.2 Measurements of stock price synchronicity and financial literacy

#### 3.2.1 Stock price synchronicity

Following Morck et al. (2000), stock price synchronicity (*SYNCH*) is defined as follows.  $SYNCH = \ln(R_i^2 / (1 - R_i^2))$  (1)

$R^2$  is obtained from the following regression:

$$r_{i,t} = \alpha_1 + \beta_{1,i} r_{ind,t} + \beta_{2,i} r_{m,t} + \varepsilon \quad (2)$$

Where  $r_{i,t}$  is the weekly return of firm  $i$ ,  $r_{ind,t}$  is a two-digit *SIC* industry value-weighted return, and  $r_{m,t}$  is a market-value-weighted return. The regression statistic for Equation (2),  $R^2$ , measures the percentage of the variation in the weekly returns of stock  $i$ , explained by the domestic market return, and the market return.  $(1 - R^2)$  measures how much firm-specific stock returns vary.

### 3.2.2 Financial literacy

Following Jappelli (2010) and Jappelli and Padula (2013), we use an education in finance (*EDU\_FIN*) and financial skills (*FIN\_SKI*) taken from the IMD World Competitiveness Yearbook (WCY) to measure investor financial literacy<sup>4</sup>. The WCY indices are drawn from country experts and responses of business managers, rather than on standardized surveys of individuals. Yet, recent evidence provided by Jappelli (2010) and Jappelli and Padula (2013) show that the ranking of economies in this survey is largely consistent with other surveys that provide detailed information at the individual level, which increases confidence in the WCY indicators as reasonable proxies for investor literacy.

Table 2 shows the measures of the investor literacy index: *EDU\_FIN* and *FIN\_SKI* of the 42 countries in this paper. The median index of *EDU\_FIN* is 6.469, with the highest median index value of 8.603 for Finland and the lowest median index value of 3.694 for China. The median index of *FIN\_SKI* is 6.974, with again, the highest median index value of 8.297 for Finland and lowest median index value of 4.351 for Indonesia. As documented in Jappelli (2010), there is substantial heterogeneity of financial competence across countries.

### 3.3 Research Design

To investigate the relationship between investor financial literacy and stock price co-movement, we adopt the following model, which is similar to that in Eun, Wang and Xiao (2015).

$$SYNCH = \alpha + \beta_1 FL + \beta_2 RADI + \beta_3 SDGrowth + \beta_4 MVA + \beta_5 LEV + \beta_6 SDROA + \beta_7 AbnAccru + \beta_8 CLHLD + \beta_9 RD\_SALE + \beta_{10} SDSALE + \beta_{11} Analyst + Year\ and\ Industry\ Dummies + error\ term \quad (3)$$

The main variable of interest is financial literacy (*FL*). We predict that the coefficient of *FL* and  $\beta_1$ , would be negative. This model entails a battery of firm- and country-level controls that may affect stock price synchronicity. We use the market value of equity at fiscal year end to measure firm size. Market value is classified into 10 quantile categories in each country. The quantile value is used to measure firm size (*MVA*). Moreover, higher leverage reduces the liquidity of firms (Chen, Goldstein and Jiang 2011) and stock price synchronicity shows a significant relationship with leverage (Kim and Shi 2012). Thus, this paper includes leverage, which is measured by total debt over total assets. This model also includes profitability, which is measured by return on assets (*ROA*), equal to the net income before extraordinary items scaled by total assets. The *SDROA* is 3-year standard deviation of the *ROA*. Previous studies suggest that the primary sources of firm-specific information are accounting earnings, and one of the potential reasons for different stock price synchronicities across firms is the different amount of accounting earnings information that might be reflected in stock price (LaFond, Lang and Skaife 2007). We control for abnormal accruals (*AbnAccru*), which are defined as the actual total accruals minus predicted total accruals. Boubaker, Mansali, and Rjiba (2014) find that stock price synchronicity increases with excessive control from ultimate controlling shareholders.

<sup>4</sup> The indicators are calculated from a survey of senior business leaders from different business communities in the countries of question, and merged with data extracted from international organizations. Proportional to the GDP of each country, the sample size is about 4000 business leaders in 55 countries. The sample reflects the classification of industry by sector: services, manufacturing and primary. The survey questions are targeted to top and middle managers who generally have international experience and horizons, and employed in local and foreign corporations in the country examined (e.g., Jappelli 2010).

The respondents are asked to assess statements related to different investor literacy indices, on a 0-10 scale. The statement that pertains to 'an education in finance' is whether an education in finance meets the needs of the business economy. The survey also includes a 'financial skills' question, which asks for an evaluation of the statement: 'Financial skills are readily available'. The IMD World Competitiveness Yearbook (WCY) aggregates all of the responses by country to provide an overall score each for education in finance, and financial skills. The data show that the two investor literacy indices vary substantially across countries.

We include closely held block holdings (*CLHLD*), which represent the proportion of shares that are closely held block holdings at the end of the fiscal year. The standard deviation of sales (*SDSALE*) is the 3-year standard deviation of net sales.

The ratio of research and development expenses to sales (*RD\_SALE*) is included as well. We also include the Revised Anti-Director Index (*RADI*) developed by Djankov et al. (2008). The *RADI*, which is modified after the original Anti-Director Index of La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), measures the strength of control rights granted by the law to outside shareholders, which ranges from one (weak shareholder rights) to five (strong shareholder rights). Higher index values imply that outsiders have greater protection and are less likely to be expropriated by insiders. Table 2 also shows the *RADI* values for the 42 countries. The median is 3.5, with the highest *RADI* value of 5 for Singapore and the lowest *RADI* value of 1 for China. Volatility in GDP growth, which is measured with the standard deviation of growth in GDP per capita measured in nominal US dollars from 1995-2011, is found in this study. The data on GDP growth are taken from the World Bank database.

Meanwhile, stock price synchronicity increases with greater analyst coverage (Chan and Hameed 2006). Thus, this paper also includes analyst following (*Analyst*), which is equal to  $\ln(1 + \text{Number of analyst followings})^5$ .

## 4. Empirical Results

### 4.1 Descriptive statistics

The descriptive statistics of stock price synchronicity, financial literacy and other control variables are presented in Table 3. For example, the mean (median) value of *SYNCH* is  $-1.619$  ( $-1.588$ ). The mean (median) value of insider ownership (*CLHLD*) is  $0.413$  ( $0.407$ ). The mean and median value of analyst followings (*Analyst*) is  $1.855$  and  $1.792$ , respectively. Table 4 reports the cross-sectional correlation matrix for variables used in the empirical tests. The *FL* measure is significantly and negatively correlated with *SYNCH*, as expected in H1. The correlations between *RADI* and *SYNCH*, and between *SDROA* and *SYNCH* are significantly negative. The correlation between *EDU\_FIN* and *FIN\_SKI* is relatively high, which suggests that they are consistent for measuring financial literacy. These correlations approximately indicate that financial literacy is negatively associated with stock price synchronicity.

### 4.2 Stock price synchronicity and financial literacy

Table 5 presents the results of the regression that address the effects of financial literacy on stock price synchronicity. The dependent variable is *SYNCH*. In Column (1), the coefficient of *EDU\_FIN* is  $-0.146$ , and negatively and statistically significant at the 5% level. In Column (2), the coefficient *FIN\_SKI* is  $-0.231$ , and negatively and statistically significant at the 1% level. These results suggest that stock price moves in a synchronized manner in countries with lower levels of investor financial literacy. This finding is consistent with the aforesaid hypothesis that stock price synchronicity is more pronounced in countries with lower levels of investor financial literacy.

Most of the firm-level controls have the predicted signs in the literature. In particular, the market value (*MVA*) is positively correlated with stock price synchronicity, which suggests that stock prices tend to fluctuate among high market value countries. This implies that there is more stock price co-movement when countries have lower levels of investor financial literacy. Moreover, stock price synchronicity is positively associated with volatility in GDP growth (*SDGrowth*), and negatively correlated with *AbnAccru*, the proportion of shares (*CLHLD*) and net sales (*SDSALE*). The regression results demonstrate that there is a negative and significant association between financial literacy and stock price synchronicity. In other words, when the level of financial literacy is higher, stock price synchronicity is reduced.

### 4.3 Financial literacy and investor protections: Complementation or substitution?

The importance of shareholder protection in corporate governance that has been documented by a significant body of empirical work, and the importance of financial literacy which has been advocated by a growing body of work, lead to an interesting question at this end, which is to ask about the combined effects of these two factors.

<sup>5</sup> The inclusion of analyst followings will reduce our sample by about 40% because of data limitation. Therefore, we include analyst followings in a robustness test.

Specifically, if financial literacy plays a role in corporate governance, does it complement or replace shareholder protection or do both have independent effects on synchronicity? When managers of companies act in their own interest, the rights attached to securities become critical. Investors have the power to extract the returns on their investment from managers due to these rights. Shareholders can vote out directors who do not pay them, so they can receive dividends. Moreover, creditors have the power to repossess collateral, so they can get paid. Investors will not be able to get paid without these rights. Securities are issued within the legal rules of a jurisdiction. The rights attached to securities therefore depend on the legal rules of a jurisdiction (La Porta et al. 1998). To determine whether financial literacy complements or replaces legal institutions, we partition the sample into sub-samples of strong or weak investor protection based on the median of *RADI* (3.5) and rerun the model. Table 6 presents the results.

Table 6 presents the effect of financial literacy on synchronicity under strong and weak legal protection of investors. In Column (1), the coefficient of *EDU\_FIN* is -0.271, and significant at the 5% level in countries with weak legal institutions. However, in Column (2), the coefficient of *EDU\_FIN* is -0.146 and significant at the 5% level in countries with strong legal institutions. The difference in *EDU\_FIN* is -0.125 (significant at the 1% level). In Column (3), the coefficient of *FIN\_SKI* is -0.490, and significant at the 1% level in countries with weak legal institutions. However, in Column (4), the coefficient of *FIN\_SKI* is -0.143 and significant at the 5% level in countries with strong legal institutions. The difference in *FIN\_SKI* is -0.347 (significant at the 1% level). These results suggest that a negative correlation between financial literacy and synchronicity is found in environments with both weak and strong investor protection. However, when legal institutions are not in place to protect and support outside investors, the effect of investor literacy on synchronicity is more pronounced, thus indicating that investor literacy replaces legal institutions in corporate governance.

#### 4.4 Controlling for analyst followings

Chan and Hameed (2006) find that greater analyst coverage increases stock price synchronicity. In this section, we include the number of analyst followings (*Analyst*) into our basic regression model. The regression result is shown in Table 7. Table 7 shows that the coefficients of financial literacy are both significantly negative in Columns (1) and (2). Specifically, in Column (1), the coefficient of *EDU\_FIN* is -0.118, and significant at the 5% level. In Column (2), the coefficient of *FIN\_SKI* is -0.207, and significant at the 1% level. This finding indicates that the inclusion of analyst coverage does not affect our main result in Table 5. Furthermore, the coefficients of *Analyst* are both positive and significant in the two columns, which is consistent with Chan and Hameed (2006) in that securities that are covered by more analysts include more (less) market-wide (firm-specific) information.

#### 5. Conclusion

This paper explores the determinants of stock price synchronicity from the perspective of investor financial literacy across various countries. Previous studies have indicated that stock price synchronicity may be affected by many factors, such as culture, shareholder protection, market value, etc. We argue that investors who are very financially literate are more likely to understand investment-related information, which contributes to the inclusion of firm specific information into stock prices. Furthermore, if there is limited firm information, investors who are more financially literate have better ability to analyze and predict firm performance. The effect of investor financial literacy on stock price synchronicity is more pronounced for firms that are more opaque to investors.

In this paper, comprehensive measures of financial literacy are applied in regression models to conduct analyses. Using data from 42 countries during the period between 1999 and 2011, we find that stock price synchronicity is reduced in countries with better financial literacy. This finding is robust after controlling for analyst followings and alternative measures of financial literacy. Furthermore, a negative effect of financial literacy on stock price synchronicity is found in countries with weak and strong legal protection of investors. However, when legal institutions are not in place to protect and support outside investors, the role of investor literacy in corporate governance becomes more important. In other words, investor literacy replaces legal institutions in corporate governance. Thus, this study has further contributed to the understanding of the relationship between stock price synchronicity and financial literacy.

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**Table 1 Definition of Variables**

Variable	Code	Description
Panel A: Country level variables		
Education in Finance	<i>EDU_FIN</i>	Calculated from scoring of statement: 'An education in finance meets the needs of the business economy', according to senior business leaders among different business communities in each country. Jappelli (2010), Jappelli and Padula (2013) and Giofre (2017)
Financial Skills	<i>FIN_SKI</i>	Calculated by surveying senior business leaders on evaluation of following sentence: 'Financial skills are readily available'. Giofeé (2017)
Revised Anti-director Index	<i>RADI</i>	Strength of rights of control legally granted to outside shareholders; ranges from one (weak shareholder rights) to five (strong shareholder rights). Djankov et al. (2008)
GDP Growth Volatility	<i>SDGrowth</i>	Measured by standard deviation of growth in GDP per capita in nominal US dollars. Source: World Bank database.
Panel B: Firm level variables		
Stock Price Synchronicity	<i>SYNCH</i>	Equal to $\ln [R^2/(1-R^2)]$ from the following regression: $r_{i,t} = \alpha_1 + \beta_{1,i} r_{ind,t} + \beta_{2,i} r_{m,t} + \varepsilon$
Firm Size	<i>MVA</i>	Logarithm of total market value in US dollars at year end.
Leverage	<i>LEV</i>	Ratio of total liabilities divided by total assets at year end.
Standard Deviation of ROA	<i>SDROA</i>	Three year standard deviation of ROA. ROA is net income before extraordinary items divided by total assets at fiscal year-end.
Abnormal Accruals	<i>AbnAccru</i>	Actual total accruals minus predicted total accruals of firm i in year t.
Closely Held Block Holdings	<i>CLHLD</i>	Proportion of shares that are closely held block holdings as of end of fiscal year.
Research and Development to Sales Ratio	<i>RD_SALE</i>	Research and development expenses divided by sales.
Standard Deviation of Sales	<i>SDSALE</i>	Three year standard deviation of net sales.
Analyst Followings	<i>Analyst</i>	Equal to $\ln (1 + \text{analyst\_num})$ , analyst number is analysts making forecast for fiscal year's earnings.



**Table 2 Summary of Descriptive Statistics of Country-level Variables**

N refers to number of observations. All variables are defined in Table 1.

<b>Country</b>	<b>N</b>	<b>EDU_FIN</b>	<b>FIN_SKI</b>	<b>RADI</b>
Argentina	50	6.133	6.361	2
Australia	3,074	8.038	8.000	4
Austria	218	7.069	6.984	2.5
Belgium	283	7.212	7.091	3
Brazil	137	6.056	6.056	5
Canada	639	7.450	7.488	4
Chile	494	7.333	7.448	4
China	2,165	3.694	4.566	1
Colombia	52	6.914	6.986	3
Czech Republic	71	5.488	7.364	4
Denmark	484	7.477	7.625	4
Finland	495	8.603	8.297	3.5
France	2,240	6.575	6.964	3.5
Germany	2,116	5.126	6.558	3.5
Greece	106	5.588	5.771	2
Hong Kong	3,404	6.500	7.364	5
Hungary	69	6.182	6.000	2
India	1,270	6.437	7.079	5
Indonesia	1,269	3.719	4.351	4
Ireland	227	7.615	7.519	5
Israel	359	7.545	7.628	4
Italy	702	4.244	5.174	2
Japan	8,370	4.408	5.309	4.5
South Korea	5,032	4.571	5.306	4.5
Luxembourg	35	6.649	7.105	2
Malaysia	3,235	6.876	7.055	5
Mexico	101	4.558	5.029	3
The Netherlands	659	6.548	6.419	2.5
New Zealand	248	6.538	6.923	4
Norway	455	7.692	7.179	3.5
The Philippines	508	6.417	7.320	4
Poland	250	4.022	5.222	2
Russia	86	5.241	5.412	4
Singapore	2,095	7.688	7.813	5
South Africa	865	4.720	4.579	5
Spain	15	6.235	6.343	5
Sweden	759	7.179	7.119	3.5
Switzerland	914	7.013	7.205	3
Taiwan	2,345	5.887	6.611	3
Thailand	340	5.379	5.690	4
United Kingdom	6,597	5.325	6.049	5
United States	25,321	6.891	7.627	3
<b>Median</b>	<b>501.5</b>	<b>6.469</b>	<b>6.974</b>	<b>3.5</b>

**Table 3 Summary of Descriptive Statistics of Firm-level Variables**

This table contains descriptive statistics for variables used in this study. All variables are defined in Table 1.

Variable	N	Mean	P25	P50	P75	Standard Deviation
<i>SYNCH</i>	78154	-1.619	-2.801	-1.588	-0.507	1.881
<i>MVA</i>	78154	6.327	4.000	7.000	9.000	2.734
<i>LEV</i>	78154	0.137	0.003	0.080	0.218	0.163
<i>SDROA</i>	78154	0.111	0.015	0.036	0.087	0.259
<i>AbnAccru</i>	78154	0.007	-0.063	0.013	0.085	0.265
<i>CLHLD</i>	78154	0.413	0.209	0.407	0.603	0.251
<i>SDSALE</i>	78154	0.161	0.046	0.094	0.188	0.207
<i>RD_SALE</i>	78154	0.058	0.000	0.000	0.018	0.238
<i>Analyst</i>	47725	1.855	1.099	1.792	2.565	0.864

**Table 4 Pearson's Correlation**

This table presents the Pearson's correlation coefficients between variables. All variables are defined in Table 1.

	<i>SYNCH</i>	<i>EDU_FIN</i>	<i>FIN_SKI</i>	<i>RADI</i>	<i>SDGrowth</i>	<i>MVA</i>	<i>LEV</i>	<i>SDROA</i>	<i>AbnAccru</i>	<i>CLHLD</i>	<i>SDSALE</i>	<i>LE D_S</i>
<i>EDU_FIN</i>	-0.016											
<i>FIN_SKI</i>	-0.053	0.961										
<i>RADI</i>	-0.025	-0.293	-0.352									
<i>SDGrowth</i>	0.136	-0.022	-0.054	0.196								
<i>MVA</i>	0.446	0.033	0.022	0.033	-0.081							
<i>LEV</i>	0.080	0.158	0.161	-0.117	-0.027	0.122						
<i>SDROA</i>	-0.126	0.101	0.116	-0.043	-0.043	-0.235	-0.050					
<i>AbnAccru</i>	0.012	0.013	0.006	-0.003	-0.053	0.067	-0.033	-0.106				
<i>CLHLD</i>	-0.084	-0.192	-0.241	0.130	0.174	-0.126	-0.095	-0.059	0.021			
<i>SDSALE</i>	-0.122	0.081	0.080	-0.009	0.010	-0.202	-0.071	0.285	-0.010	0.025		
<i>RD_SALE</i>	-0.090	0.104	0.129	-0.094	-0.060	-0.113	-0.061	0.263	-0.049	-0.115	-0.024	
<i>Analyst</i>	0.377	0.160	0.159	-0.134	-0.046	0.610	0.140	-0.106	0.009	-0.236	-0.109	-0.022

**Table 5 Stock Price Synchronicity and Financial Literacy**

This table presents the regression results of stock price synchronicity on proxies of financial literacy. All variables are defined in Table 1. All specifications are estimated with standard errors clustered by country (measured at 2-digit SIC code level). Standard errors are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at 10%, 5% and 1% levels (two-tailed), respectively.

Independent Variable	(1) Financial Literacy = <i>EDU_FIN</i>	(2) Financial Literacy = <i>FIN_SKI</i>
<b>Financial Literacy</b>	<b>-0.146**</b> <b>(0.058)</b>	<b>-0.231***</b> <b>(0.059)</b>
<i>RADI</i>	-0.192** (0.088)	-0.212*** (0.076)
<i>SDGrowth</i>	0.245*** (0.038)	0.244*** (0.039)
<i>MVA</i>	0.348*** (0.025)	0.345*** (0.024)
<i>LEV</i>	0.0184 (0.184)	0.0641 (0.176)
<i>SDROA</i>	-0.112 (0.098)	-0.0926 (0.091)
<i>AbnAccru</i>	-0.0419* (0.025)	-0.0413* (0.024)
<i>CLHLD</i>	-0.651*** (0.150)	-0.707*** (0.144)
<i>SDSALE</i>	-0.266*** (0.097)	-0.237** (0.093)
<i>RD_SALE</i>	-0.112 (0.111)	-0.0831 (0.101)

<i>Constant</i>	-1.981*** (0.598)	-1.221** (0.581)
N	78,154	78,154
R-squared	0.351	0.357

**Table 6** Splitting Sample Based on Median of *RADI*

This table presents the regression results of stock price synchronicity on proxies of financial literacy in sub-samples with high and low legal protection. All variables are defined in Table 1. All specifications are estimated with standard errors clustered by country (measured at 2-digit SIC code level). Standard errors are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at 10%, 5% and 1% levels (two-tailed), respectively.

Independent Variable	Financial Education= <i>EDU_FIN</i>		Financial Education= <i>FIN_SKI</i>	
	<i>RADI</i> <=3.5 (1)	<i>RADI</i> >3.5 (2)	<i>RADI</i> <=3.5 (3)	<i>RADI</i> >3.5 (4)
<b><i>Financial Literacy</i></b>	<b>-0.271**</b> <b>(0.101)</b>	<b>-0.146**</b> <b>(0.058)</b>	<b>-0.490***</b> <b>(0.047)</b>	<b>-0.143*</b> <b>(0.072)</b>
<i>SDGrowth</i>	0.206** (0.076)	-0.192** (0.088)	0.187*** (0.043)	-0.192** (0.088)
<i>MVA</i>	0.380*** (0.025)	0.245*** (0.038)	0.376*** (0.022)	0.245*** (0.038)
<i>LEV</i>	-0.222** (0.092)	0.348*** (0.025)	-0.0784 (0.100)	0.348*** (0.025)
<i>SDROA</i>	0.00771 (0.055)	0.0184 (0.184)	0.0402 (0.039)	0.0184 (0.184)
<i>AbnAccru</i>	-0.0503* (0.028)	-0.112 (0.098)	-0.0558* (0.029)	-0.112 (0.098)
<i>CLHLD</i>	-0.831*** (0.256)	-0.0419* (0.025)	-1.046*** (0.285)	-0.0419* (0.025)
<i>SDSALE</i>	-0.187 (0.161)	-0.651*** (0.150)	-0.123 (0.128)	-0.651*** (0.150)
<i>RD_SALE</i>	-0.0317 (0.079)	-0.266*** (0.097)	0.0157 (0.046)	-0.266*** (0.097)
<i>Constant</i>	-1.195 (0.727)	-0.112 (0.111)	0.679 (0.411)	-2.961*** (0.784)
N	39,335	38,819	39,335	38,819
R-squared	0.408	0.309	0.428	0.311
Difference on <i>Financial Literacy</i>			-0.347	
P-value of difference on <i>Financial Literacy</i>			0.000	

**Table 7 Stock Price Synchronicity and Financial Literacy Controlled for Analyst Followings**

This table presents the regression results of stock price synchronicity on proxies of financial literacy after controlling for analyst followings. All variables are defined in Table 1. All specifications are estimated with standard errors clustered by country (measured at 2-digit SIC code level). Standard errors are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at 10%, 5% and 1% levels (two-tailed), respectively.

Independent Variable	Financial Literacy= <i>EDU_FIN</i>	Financial Literacy= <i>FIN_SKI</i>
<b>Financial Literacy</b>	<b>-0.118**</b> <b>(0.058)</b>	<b>-0.207***</b> <b>(0.066)</b>
<i>RADI</i>	-0.153 (0.092)	-0.184* (0.094)
<i>SDGrowth</i>	0.256*** (0.038)	0.257*** (0.038)
<i>MVA</i>	0.301*** (0.023)	0.302*** (0.023)
<i>LEV</i>	-0.055 (0.273)	-0.0025 (0.271)
<i>SDROA</i>	0.0415 (0.100)	0.0734 (0.096)
<i>AbnAccru</i>	-0.0416 (0.046)	-0.0381 (0.048)
<i>CLHLD</i>	-0.384** (0.185)	-0.459** (0.183)
<i>SDSALE</i>	-0.316*** (0.105)	-0.287*** (0.098)
<i>RD_SALE</i>	-0.0532 (0.110)	-0.0204 (0.101)
<i>Analyst</i>	0.344*** (0.083)	0.346*** (0.081)
<i>Constant</i>	-1.886** (0.715)	-1.089 (0.838)
N	47,725	47,725
R-squared	0.325	0.331