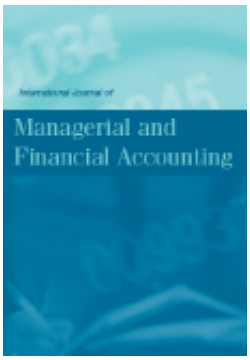

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Effect of corporate social responsibility on the stock price synchronicity in China

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Abstract: The purpose of this paper is to discover the possible relationship incurred between corporate social responsibility (CSR) and stock price synchronicity in China. A regression model is constructed for the empirical test on a sample of 9,787 firm-year observations from Chinese A-listed firms from 2011 to 2020. Results show a positive relationship between CSR and stock synchronicity, which is robust to alternative variables and have no multi-collinearity problem. This study can guide investors and managers in socially responsible investment decision making in the Chinese stock market.

Keywords: corporate social responsibility; CSR; stock price synchronicity; China.

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1 Introduction

This study aims to discover the possible relationship incurred between corporate social responsibility (CSR) and stock price synchronicity in China. The CSR scores of the sample listed companies are retrieved from the Bloomberg database. This study uses the R^2 of Durnev et al.'s (2001) model to measure the stock price synchronicity. Synchronicity can help us compare a firm's stock in the whole industry and the market. As the stock price synchronicity increases, the firm information the stock price becomes less specific.

We conduct our research for a number of reasons. First, CSR is a business approach that emphasises the importance of the interests of all stakeholders by fulfilling social responsibility, which includes perspectives of the economy, society, and the environment. Given several severe business scandals in China, the government and corporations themselves attempt to establish new regulations on corporation ethics to regain customer trust (Lin, 2010). At present, CSR is becoming increasingly important in a corporation's strategy (Grant Thornton, 2008). Literature widely discusses how CSR influences a company's financial performance (FP) with different approaches (e.g., Flammer, 2015; Benkraiem et al., 2021; Kim et al., 2021; Cheng et al., 2011; Salewski and Zülch, 2014). In addition, the close relationship between CSR and a corporation's stock performance has been proven. However, research still has much room to discover the strategic value of CSR to corporations and the society.

Second, previous literature mainly examines how CSR affects the corporation's FP (e.g., Benkraiem et al., 2021; Kim et al., 2021; Cheng et al., 2011; Salewski and Zülch, 2014). Previous findings provide a functioning model and the tools to help in further investigation (KLD Research & Analytics, Inc., 2006), such as for the measurement of CSR criteria (e.g., KLD index). Despite the considerable research on this topic, literature mainly focuses on developed countries, markets, or those with developing needs. Thus, the data and samples are mainly from the USA or Europe. However, the results are convincing and prompt explorations on whether the methods may also apply to other economic entities.

Third, take China, with one of the largest developing stock markets, as an example. Unlike countries such as the US with a stock market that has a comparatively low stock price synchronicity, China has the second largest stock price synchronicity (Lin et al., 2015). Thus, the stock prices of Chinese listed companies are highly affected by that of the entire stock market.

Fourth, what happens in the stock prices of Chinese listed companies when ethical policies are established? Several scholars convey similar doubts. A study in Saudi Arabia found an opposite function of CSR to company performance, indicating a slight relationship between CSR and the market (Ajina et al., 2019). This situation may also occur in China, as a developing country with comparatively low awareness of CSR, wherein stock prices may react differently when such policies are implicated in the local stock market. As such, the present study mainly focuses on discovering the relationship between CSR and stock price synchronicity in China.

The sample of 9,787 observations from all Chinese A-share listed companies during the period of 2011–2020 shows supporting evidence that the CSR policy has a positive effect on the firm's stock price synchronicity in the Chinese market. Thus, a more socially responsible company can have less specific informative stock in China. To test

the reliability of this result, several methods are used on the robustness tests. We first calculate the VIF to examine possible problems of multi-collinearity, then apply the alternative method to explore whether the relationship remains tenable even with changed variables. Finally, we remove one variable with considerable influence on the dependent variables to examine the above results. The VIF shows no issues of multi-collinearity among the variables. After applying alternative method, the result remains the same as our main regression at a high significance level. Other variables also show the same results, indicating that changing or deleting variables do not affect the main findings, which are therefore robust.

The contributions of this study are as follows. First, the relationship between stock price and CSR in the Chinese stock market is examined. In countries that are seldom selected in similar research, the above relationship can provide evidence of actual situations in a specific area. Second, the results are meaningful for corporation managers who apply long-term social and ethical policies. Findings can help them learn whether CSR can or cannot pay back the company with long-term benefits and to make wiser management decisions. Third, this study can provide information to investors, government, and supervision departments to help them realise the business logic behind CSR to make better decisions in building a balanced business and social values for society (Windsor, 2001).

Fourth, existing literature explores the effect of CSR on stock price synchronicity but mainly in countries with developed stock market. As such, the present study selects China as the research object to discover the possible relation between CSR and stock price synchronicity and its mechanism. The relationship between company performance and CSR has been widely examined, but very few studies focus on the CSR policy impact on the stock prices of Chinese listed companies. China's stock market is not yet well developed, and has a larger stock price synchronicity compared with those in other countries. This phenomenon is rare in developed stock markets such as the US. Thus, to explore how CSR affects a developing stock market such as in China is of high significance.

Finally, the findings provide interesting implications to academics practitioners and regulators who are interested in discovering ESG score and firm information in terms of stock price. The results also provide insights to regulators and the board of directors on future growth opportunities for the company's information environment and the country.

The rest of this paper is arranged as follows. Section 2 discusses the previous related literature on this topic and develops hypotheses based on previous findings. Section 3 presents the methodology and the data and sample that are selected to examine the hypothesis. Section 4 shows the statistics and empirical results. Section 5 runs the robustness test to verify the results. Section 6 provides the conclusions.

2 Literature review and hypothesis development

2.1 Corporate social responsibility

CSR was first introduced by Howard Bowen, an US economist, in his book called *Social Responsibilities of the Businessman* (1953). There, CSR is defined as a fundamental morality that a company should implement for the society. Moir (2001) presented a more specific identification of this concept and classified CSR actions into six categories in the

business background: workplace, which represents the employees; marketplace, which represents the customers and suppliers; environment; community; ethics, and human rights. As globalisation progresses, CSR also increases in importance. The integration of CSR policy in business becomes necessary (Scherer and Palazzo, 2008), and its effect has attracted much research attention.

Various scholars have attempted to discover the business value of CSR in real life, and found evidence of its effects on a firm's FP. Thus, a positive attitude is mainly held regarding CSR's contribution to firm performance. Vergalli and Poddi (2009) believe that although its initial increase in costs, CSR can eventually bring higher profits due to the reputation effect. As such, the positive influence is not only found in operating activities. Companies that apply a high CSR policy face fewer strains in accessing financing (Cheng et al., 2012). However, other studies found negative relationships rather than positive. Barnea and Rubin (2005) found that CSR may cause conflicts among shareholders because insiders may induce firms to over-invest in CSR and bear minor costs. Others were concerned about the risk that CSR may bring to the bank industry (Wang et al., 2021), such as that of the stock price crash due to increasing socially responsible activities. In China, research on CSR also has an interesting outcome with varying conclusions. Amadi and Zhao (2020) find a negative relationship between CSR and a firm's FP using the DID analysis, but found an opposite result with another method. From the stakeholder theory perspective, CSR has a significant and positive impact on specific industries in the Chinese market. These different outcomes call for further research to seek a clearer mechanism in more specific areas.

The CSR discussed in this study focuses on observable results. The most common measure of a firm's CSR score is through the term ESG (Clark and Viehs, 2014), which stands for Environmental, social, and corporate governance, considering factors on the natural world, people relationship, and business operations, respectively. After evaluating the above factors, a score is provided and is widely accepted as the metric to assess the CSR.

Chouaibi et al. (2022) found that the strengths ESG increase the firm value and the weaknesses decrease it. Chouaibi et al. (2022) analyses whether environmental disclosure (ED) practiced by firms listed on the ESG index affects their FP using the moderating effect of social and ethical practices. They found a positive and significant relationship between ED and FP. Chouaibi et al. (2021b) investigates the effect of CSR and executive incentive compensation based on the achievement of sustainability goals on the implicit cost of equity. They found that CSR activities lower the cost of equity capital; hence, these activities are important to shareholders' investment and financing decisions.

2.2 Stock price synchronicity

In evaluating a stock market, synchronicity is essential. This aspect shows the degree that a specific firm's stock return moves with that of the whole stock market (Morck et al., 2000). Stock price changes are often influenced by systemic, industry, and firm-specific characteristics (Roll, 1988). Synchronicity is the index to measure the influence of the market and industry, typically measured by calculating the R^2 of a market model (Roll, 2008). Generally, the stock price in an efficient market must fully reflect the company information (Malkiel and Fama, 1970); that is, a high synchronicity shows less stock information while low synchronicity implies more stock information from an individual

company (Gul et al., 2010). This concept appealed to various researchers. Roll (1988) finds that specific company information causes the stock price movement. The stock price synchronicity has long been verified as interrelated with the management strategy. For example, CSR can have a negative effect on stock price synchronicity (Kim et al., 2014) by helping the management cover undesirable information and thus increase the risk of future stock crashes. The gender diversity in a company is also proven to positively affect the stock price, causing greater informativeness and indicating less stock price synchronicity (Gul et al., 2011). The studies show that the decision making at the management level does affect the stock price synchronicity, which can be used as a strategy such as in applying CSR policy.

2.3 How CSR affects stock price synchronicity

To find the effect of CSR can cause in a more specific area, various scholars attempt to examine the stock price synchronicity, which is also close to our topic. Jia et al. (2020) found that CSR can insure the stock price risk through the natural experiment. In the East Asian emerging market, similar findings show that CSR has a positive effect in preventing the stock price crash risk (Lee, 2016). Similar to our study, Benkraiem et al. (2021) examined the relationship between CSR and stock price synchronicity and found negative results. These studies also show several methods and different background settings that we can apply.

2.4 Hypothesis development

China's stock market is known to have the second-largest stock price synchronicity worldwide. How can such stock price synchronicity be affected when companies begin to apply CSR policies? As stated above, previous studies provide different results that CSR may have a negative or positive relationship with stock performance (Lee, 2016; Jia et al., 2020; Benkraiem et al., 2021). In China, given the present study setting, the stock price synchronicity is not yet mature and the above relationships are still unknown.

Previous conclusions also vary on the effect of CSR on a company's stock price synchronicity. Benkraiem et al. (2021) believes the CSR can cause a negative impact on the stock price synchronicity, because companies applying high-level CSR policy can certainly increase the stock information. This phenomenon is more evident in well-governed and competitive companies. On this basis, we present the hypothesis that:

H1 Chinese listed companies with high CSR scores have a negative relationship with stock price synchronicity in China.

Other scholars believe that CSR can exert a positive effect on companies' stock price synchronicity. Dai et al. (2018) reported not only a significant positive relationship between the two above factors, but also that CSR can improve the efficiency of stock marketing pricing. However, the effect of CSR makes also differs under varying closure motivations. On this basis, we present the second hypothesis that:

H2 Chinese listed companies with high CSR scores have a positive relationship with stock price synchronicity in China.

Notably, although most scholars have found the effect of CSR, others believe that such effect is insignificant. A meta-analysis from Margolis et al. (2009) shows "no apparent

relationship between CSR and the company's FP." Thus, we present the third hypothesis that:

H3 The CSR score is irrelevant to a firm's stock price synchronicity in China.

3 Methodology

3.1 Data and sample

To discover the relationship between CSR and the Chinese stock price synchronicity, we select all companies listed in the A-share market in China as the sample. The data are derived from 2011 to 2020. Companies in the financial industry (industry code: I), labelled with 'ST*/ST' (special treatment), and with missing important information are excluded. The entire observation year's objects are 9,787, from the CSMAR, Bloomberg, and WIND databases. CSMAR and WIND have the most complete and organised information, including those needed in the Chinese stock market such as fundamental financial indexes, and are thus selected as our data sources to examine the model.

3.2 CSR measure

The CSR scores of the sample listed companies are retrieved from the Bloomberg database. Bloomberg in the year 2018 has applied its method to more than 9,000 companies in over 70 countries, and is thus used to measure the CSR score in this study. The key topics that Bloomberg choose to evaluate the overall ESG scores have an extensive ranges, including 900 fields such as air quality, climate change, and water energy management. All the evaluating factors are gained from authorised sources, such as the firm's annual and CSR reports. Bloomberg evaluates the ESG score, which is mainly focused on three pillars: environment (33%), social (33%), and governance (33%). The detailed measure ratios of topics are shown below.

- Environment category (33%): Air quality 4.78%, climate 4.7%, ecological impact 4.79%, energy 4.73%, material 4.74%, supply chain 4.79%, and water 4.79%.
- Social category (33%): Community 5.53%, diversity 5.49%, ethics 5.57%, health 5.58%, human capital 5.55%, and supply chain 5.54%.
- Governance category (33%): Audit risk and oversight 4.17%, board composition 4.16%, compensation 4.16%, diversity 4.17%, independence 4.18%, nominations and governance oversight 4.18%, sustainability 4.18%, and governance tenure 4.18%.

3.3 Stock price synchronicity measure

This study uses the R^2 of Durnev et al.'s (2001) model to measure the stock price synchronicity. The regression model is exhibited below:

$$r_{i,t} = \beta_0 + \beta_1 r_{m,t} + \beta_2 r_{l,t} + \varepsilon_{i,t} \quad (1)$$

In the model, $r_{i,t}$ refers to the weekly individual stock return rate, $r_{m,t}$ is weekly market return, and $r_{l,t}$ is the industrial stock return in a week. The industrial selection of $r_{l,t}$ is based on China Securities Regulatory Commission s industrial classification standard.

We use R^2 to estimate the stock price synchronicity. Roll (1988) provides the formula as expressed below:

$$Synchronicity = \log\left(\frac{R^2}{1-R^2}\right) \tag{2}$$

Synchronicity can help us compare a firm's stock in the whole industry and the market. As the stock price synchronicity increases, the firm information the stock price becomes less specific.

3.4 Empirical model

In this section, we use the regression model to measure CSR's impact on stock price synchronicity in China (Benkraiem et al., 2021), as exhibited below:

$$\begin{aligned} SYNC_{i,t} = {} & \beta_0 + \beta_1 CSR_{i,t} + \beta_2 ROA_{i,t} + \beta_3 LEV_{i,t} + \beta_4 MTB_{i,t} + \beta_5 SIZE_{i,t} \\ & + \beta_6 AGE_{i,t} + \beta_7 VOL_{i,t} + \beta_8 LIQ_{i,t} + \beta_9 Year\_FE_t \\ & + \beta_{10} Industry\_FE_t + \varepsilon_{i,t}. \end{aligned} \tag{3}$$

In the model, i is the firm selected and t is the time, *Synchronicity* is the dependent variable and *CSR* is the independent variable. Following previous research (Benkraiem et al., 2021; Ben-Nasr and Cosset, 2014; Gul et al., 2011; He et al., 2013), a few control variables are added in the model to ensure that the research can focus on exploring the relationship between *Synchronicity* and *CSR*:

1 *ROA*, abbreviation of *return on asset*, is also the ratio of net income to the firm's assets. This ratio shows the firm profitability. A positive *ROA* is expected to reduce the informative content of stock price (Gul et al., 2011).

2 *LEV*, the ratio of a firm's liability to the asset, shows the financial stability of a company. A high ratio of *LEV* indicates a high risk of the company for investors. The *LEV* has a negative relationship with the informative content of a company's stock (Ben-Nasr and Cosset, 2014).

3 *MTB*, the market-to-book ratio of a firm's equity, is used to measure the growth opportunity of companies. A firm with high growth opportunities can have a less informative stock (Gul et al., 2011). *MTB* has a positive relationship with *Synchronicity*.

4 *SIZE* is the market value of the firm's total asset. According to the prior research (He et al., 2013), as the *SIZE* of a company increases, the less specific information is disclosed. This means the *SIZE* has a positive relationship with *Synchronicity*.

5 *AGE* is the number of years a company has operated since its IPO. Companies with greater experience can capitalise more information in stock price (Gul et al., 2011). Thus, *AGE* and *Synchronicity* have a negative relationship.

6 *VOL*, the use and limits of volatility, is also the mean value of the daily stock returns in the year and can reflect a firm's risk. As the *VOL* of stock price increases, the

company informativeness decreases (He et al., 2013) Thus, the *VOL* and *Synchronicity* has a positive relationship.

7 *LIQ*, the liquidity of a firm, refers to the convivence of converting an asset into cash or its equivalents. Firms with high liquidity can be more informative (Chan et al., 2013). Thus, *LIQ* and the *Synchronicity* have a negative relationship.

All of the variables above are based on data from Chinese listed companies in the most recent decade (2011–2020).

4 Empirical results

4.1 Descriptive statistic and correlation matrix

The present model includes 9,787 firm-year observations, which can be categorised into 21 industries. Table 1 shows the descriptive statistic of the sample. The average *ROA* is 4.62%, and the companies have high to low leverage. The maximum *leverage* is 0.99 and the minimum is 0.031. The average *MTB* is 1.692. The *SIZE*, which is the book value of the companies' assets, has an average of 23.1. The *AGE*, or years of the company since its first IPO, has an average of 13. The maximum *AGE* is 30, and the minimum is 0, which indicates that we choose both young and mature companies. The *average daily return volatility* (*VOL*) is 0.000574. The *liquidity ratio of the company* (*LIQ*), which is the total current asset divided by total liability, has an average of 2.079.

Table 2 shows the correlation between variables, such as coefficients between variables of interest and control variables. Generally, all correlations are below 0.5, indicating no multi-collinearity problem.

4.2 Relationship between CSR and synchronicity

The model is applied in three different ways. First, we explore the relationship between CSR and stock price synchronicity. The results show an *R*-square of 0.229 at 1% significance, which indicates a positive relationship between variables. Second, the relationship is examined without considering the fixed effect. The result does not fit the model, and the relationship has a low significance, indicating the importance of the fixed effect. Third, the regression result shows an *R*-square of 0.298, and the independent variable *ESG* has a *p-value* of 0.033, which is less than 0.05. The result matches the model and the variables have a significant relationship. The coefficient of *ESG* is 0.0028, and shows a positive relationship between the CSR and SYN. The result supports the hypothesis.

The result of the first regression shows a strong positive relationship between CSR and the firm's stock price synchronicity with 1% significance. The coefficient of CSR is 0.0115, which indicates a relevance with synchronicity. After the failure trail in the second regression, the importance of the fixed effect is noted and it is then added into the regression. The third regression shows a significant positive relationship between CSR and synchronicity, but the significance level decreased from 1% to 5%. The coefficient of *ESG* is 0.0028. The result verifies our second hypothesis, similar to those of Dai et al. (2018) but different from Benkraiem et al. (2021). Table 3 shows the regression results.

Table 1 Descriptive statistics of the sample companies

Stats	*SYN*	*ESG*	*ROA*	*LEV*	*MTB*	*SIZE*	*AGE*	*VOL*	*LIQ*
N	9,787	9,787	9,787	9,787	9,787	9,787	9,787	9,787	9,787
Mean	–0.289	20.74	0.0462	0.477	1.692	23.10	13.01	0.000574	2.079
SD	0.936	7.015	0.0629	0.201	1.855	1.292	6.679	0.00199	3.577
Max	2.371	64.11	0.244	0.990	19.44	26.25	30	0.0172	190.9
Min	–6.906	1.240	–0.415	0.0310	0.101	20.45	0	–0.00968	0.0568
Skewness	–0.780	1.439	–0.931	–0.0822	3.122	0.371	0.0387	1.190	22.94
Kurtosis	4.734	6.468	10.73	2.203	18.04	2.707	2.051	8.048	944.0

Notes: This table shows the descriptive statistics of variables, where *SYN* stands for the stock price synchronicity, which shows the degree of informativeness of a stock. The *ESG* is one measurement to determine the degree of CSR policy a form applies. *ROA* is the abbreviation of return on asset, is the ratio of net income to the total asset the firm's own. *LEV* is the ratio of a firm's total liability to the total asset, which shows how financially stable a company is. *MTB* is the market-to-book ratio of a firm's equity, and is used to measure the growth opportunity of companies. *SIZE* is the market value of the firm's total asset. *AGE* is the number of years a company has experienced since its IPO. *LIQ* is also the firm's liquidity, refers to the convivence of converting an asset into cash or cash equivalents. The sample consists of 9,787 firm-year observations from Chinese A-listed firms from 2011 to 2020.

Table 2 Correlation coefficients between variables

	SYN	*ESG*	*ROA*	*LEV*	*MTB*	*SIZE*	*AGE*	*VOL*	*LIQ*
SYN	1								
ESG	0.0785	1							
ROA	–0.0535	–0.0182	1						
LEV	0.0540	0.145	–0.430	1					
MTB	–0.160	–0.204	0.405	–0.502	1				
SIZE	0.169	0.434	–0.0801	0.529	–0.465	1			
AGE	0.0516	0.171	–0.173	0.244	–0.262	0.267	1		
VOL	–0.202	–0.0193	0.162	–0.0454	0.411	–0.0688	–0.0730	1	
LIQ	–0.0410	–0.110	0.157	–0.405	0.258	–0.228	–0.145	0.00670	1

Notes: *ESG* is the key independent variable. *SYN* is the key dependent variable. *ROA*, *LEV*, *MTB*, *SIZE*, *AGE*, *VOL*, and *LIQ* are the control variables. The sample consists of 9,787 firm-year observations from Chinese A-listed firms from 2011 to 2020.

4.3 Relationship between other variables and synchronicity

Most of the coefficients of other variables also fit previous findings (Benkraiem et al., 2021; Ben-Nasr and Cosset, 2014; Gul et al., 2011; He et al., 2013). Compared with the previous findings, the control variables show a similar relationship with dependent variables. The ROAs, size, and the listed age of the company show a positive relationship with the stock price synchronicity. Here, size shows a vital significance at 1% level, indicating a positive relationship with synchronicity. Thus, for a large company, less information is capitalised into their stock. In addition, the result shows that the listed age

has a different relationship with prior findings. This may be caused by the varying investment environments of the research, where the present study focuses on the Chinese stock market but previous studies concentrate on the US stock market. The results also show that the liquidity, volatility, leverage, and market-to-book ratio have a negative relationship with stock price synchronicity. Unlike previous research (He et al., 2013) where volatility has a positive relationship with the stock rice synchronicity, we found a different result that may be caused by the different measures used. In previous research, volatility stands for the yearly standard deviation of the daily stock return while we select the average value of stock's daily return. Both these variables are designed to measure a company's risk.

Table 3 Regression analysis on the effect of CSR on stock price synchronicity

Variables	*(1) sole relationship*	*(2) without fixed effect*	*(3) main regression*
ESG	0.0115***	0.0000	0.0028**
	(*t* = 9.00)	(0.0034)	(*t* = 2.1327)
ROA		–0.5022***	0.1557
		(–2.8994)	(*t* = 0.8526)
LEV		–0.4070***	–0.4745***
		(–6.2186)	(*t* = –7.4681)
MTB		–0.0143**	–0.0390***
		(–2.0634)	(*t* = –5.1961)
SIZE		0.1333***	0.1207***
		(13.4922)	(*t* = 12.1506)
AGE		–0.0008	0.0052***
		(–0.5272)	(*t* = 3.4870)
VOL		–83.2147***	–115.2296***
		(–16.0494)	(*t* = –16.4671)
LIQ		–0.0056**	–0.0066***
		(–2.0026)	(*t* = –3.5010)
Constant	–0.3346***	–3.0581***	–2.7425***
	(–3.39)	(–14.6959)	(*t* = –12.1793)
Observations	9,787	9,787	9,787
R-squared	0.229	0.069	0.298

Notes: *SYN* means the stock price synchronicity, which shows informative degree of a stock. The *ESG* is one measurement to determine the degree of CSR policy a form applies. *ROA* is the abbreviation of return on asset, is the ratio of net income to the total asset the firm's own. *LEV* is the ratio of a firm's total liability to the total asset, which shows how financially stable a company is. *MTB* means the market to book ratio of a firm's equity, is used to measure the growth opportunity of companies. *SIZE* is the market value of the firm's total asset. *AGE* is the number of years a company has experienced since its IPO. *LIQ* is also the liquidity of a firm, refers to the convivence of converting an asset into cash or cash equivalents. The sample consists of 9,787 firm-year observations from China A-listed firms during the period of 2011 to 2020. ***, **, and * indicate two-tail significance level at the 1%, 5%, and 10%, respectively.

4.4 Why did the significance level drop?

To determine the significance of the CSR effect on the dependent variable, we verify its relationship with each variable. The result shows that *SIZE* has a significant impact on synchronicity, and then we verify the relationship between only one each of dependent, independent, and control variables. The regression result shows that *SIZE* has a vital significance to the stock price synchronicity (dependent variable). When *SIZE* becomes the only control variable, the *ESG* influence on synchronicity becomes insignificant. The result brings the hypothesis that the *SIZE* may have a considerable effect on the dependent variable, which covers part of *ESG* influence and reduces its significance level when control variables are included. To test for robustness without this huge effect, we exclude *SIZE* to determine the relationship between the *ESG* and synchronicity. Table 4 shows the regression result verifying the impact of *SIZE* on the independent variable. In the next section, the robustness test is carried out by altering the variables and verifying the multi-collinearity to determine the significance of the findings.

Table 4 Regression analysis on the impact of *SIZE* on the independent variable

Variables	*SIZE only*	*ESG and SIZE*
ESG		0.0008 (0.5542)
SIZE	0.1226***	0.1207*** (15.0593)
Constant		–3.0941*** (–17.7529)
Observations	9,786	9,787
R-squared	0.029	0.029

Notes: This table presents the relationship among *CSR*, *SIZE*, and stock price synchronicity. *ESG* is one measurement to determine the degree of CSR policy a form applies. *SIZE* is the market value of the firm's total asset. I selected a sample consists of 9,787 firm-year observations from China A-listed firms over the period from 2011 to 2020. ***, **, and * indicate two-tail significance level at the 1%, 5%, and 10%, respectively.

5 Robustness tests

5.1 Tests of multi-collinearity (VIF)

To examine the multi-collinearity of our test, the paper first calculates the *VIF* value for the variables. The highest *VIF* value among the variables is 2.64, and the average of *VIF* is 1.92, which indicates no multi-collinearity problem in this study. Table 5 shows the detailed *VIF* value for each variable.

5.2 Alternative method

To examine the result from the regression model, the alternative method is applied to change a different variable related to the subject. The alternative variable selected is return on equity (*ROE*) to replace *ROA*. In the previous model, the variable *ROA* is more focused on the profitability of the entire company, and is replaced with *ROE* to increase the specificity. This ratio shows the profitability of the owner's equity and indicates the

return in more direct and specific ways. After changing the control variable, the model with the alternative method is shown below:

$$SYNC_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 ROE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 MTB_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 AGE_{i,t} + \beta_7 VOL_{i,t} + \beta_8 LIQ_{i,t} + \beta_9 Year\_FE_t + \beta_{10} Industry\_FE_t + \varepsilon_{i,t}. \quad (4)$$

Table 5 Tests of multi-collinearity

Variables	*VIF*	*1/VIF*
ESG	1.40	0.711753
ROA	1.67	0.600094
LEV	2.64	0.378845
MTB	2.43	0.411578
SIZE	2.39	0.418161
AGE	1.47	0.680456
VOL	2.11	0.474884
LIQ	1.28	0.782442
Mean VIF	1.92	

Table 6 Regression analysis of the effect on the relationship between CSR and stock price synchronicity with alternative variable

Variables	*Coefficients*
ESG	0.0029** (t = 2.1764)
ROE	0.1028 (t = 1.2885)
LEV	–0.4607*** (t = –7.5874)
MTB	–0.0390*** (t = –5.3193)
SIZE	0.1177*** (t = 11.8586)
AGE	0.0053*** (t = 3.5692)
VOL	–116.5257*** (t = –16.6610)
LIQ	–0.0065*** (t = –3.3855)
Constant	–2.6868*** (t = –11.8910)
Observations	9,783
R-squared	0.299

Notes: *SYN* is the stock price synchronicity, which shows the degree of informative a stock is. The *ESG* is one measurement to determine the degree of CSR policy a form applies. *ROE* means the return on equity. *LEV* is the ratio of a firm's total liability to total asset, which shows how financially stable a company is. *MTB* is the market to book ratio of a firm's equity, is used to measure the growth opportunity of companies. *SIZE* is the market value of the firm's total asset. *AGE* is the number of years a company has experienced since its IPO. *LIQ* is also the firm's liquidity, refers to the convivence of converting an asset into cash or cash equivalents. I selected a sample consists of 9,787 firm-year observations from China A-listed firms from the time period of 2011 to 2020. ***, **, and * indicate two-tail significance level at the 1%, 5%, and 10%, respectively.

The regression result using the alternative method shows an *R*-square of 0.299, and the independent variable *ESG* has a *p-value* of 0.030, which is less than 0.05. Thus, the result matches the model and indicates a significant relationship among the independent and dependent variables. The coefficient of *ESG* is 0.0029, which still offers a positive relationship with synchronicity. After applying the alternative method, the coefficients of other variables show that the relationships do not change compared with the empirical test results. Therefore, the results are sufficient to verify the accuracy of the assumed relationships. Table 6 shows the detailed results with the alternative method.

Table 7 Regression analysis on the effect of CSR and stock price synchronicity without *SIZE*

Variables	*Without SIZE*
ESG	0.0085*** (t = 6.7610)
ROA	0.7823*** (t = 4.3680)
LEV	–0.1396** (t = –2.3652)
MTB	–0.0624*** (t = –8.3340)
AGE	0.0052*** (t = 3.4373)
VOL	–113.6073*** (t = –16.1051)
LIQ	–0.0049** (t = –2.5276)
Constant	–0.2980*** (t = –2.9308)
Observations	9,787
R-squared	0.287

Notes: *SYN* is the stock price synchronicity, which shows a stock's informative degree. The *ESG* is one measurement to determine the degree of CSR policy a form applies. *ROA* is the abbreviation of return on asset, is the ratio of net income to the total asset the firm's own. *LEV* is the ratio of a firm's liability to the asset, which shows how financially stable a company is. *MTB* stands for the market to book ratio of a firm's equity, is used to measure the growth opportunity of companies. *AGE* is the number of years a company has experienced since its IPO. *LIQ* is also the firm's liquidity, refers to the convivence of converting an asset into cash or cash equivalents. I selected a sample consists of 9,787 firm-year observations from Chinese A-listed firms from 2011 to 2020. ***, **, and * indicate two-tail significance level at the 1%, 5%, and 10%, respectively.

5.3 Deleting variable SIZE

To further verify the relationship between CSR and synchronicity, we exclude the control variable that has a more substantial impact on the dependent variable. The variable *SIZE* is therefore selected. As such, the relationship between CSR and synchronicity may become less significant. After removing *SIZE*, the regression model is shown below:

$$SYNC_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 ROA_{i,t} + \beta_3 LEV_{i,t} + \beta_4 MTB_{i,t} + \beta_5 AGE_{i,t} + \beta_6 VOL_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 Year\_FE_t + \beta_9 Industry\_FE_t + \varepsilon_{i,t}. \quad (5)$$

The regression result shows that *ESG* has a positive impact on synchronicity at a 1% significant level, indicating a more significant effect than in our empirical result. All the relationships between the variables (including controls) remain unchanged. A significant positive relationship between CSR and stock price synchronicity remains, providing strong evidence to support the hypothesis. Table 7 shows the detailed result after removing an influential variable.

6 Conclusions

The effect of CSR policy on companies' stock prices is widely reported. Several studies show that firms with high CSR scores can have less stock price synchronicity (Benkraiem et al., 2021), while others state otherwise. The difference in results is based on the distinction among the stock market in countries. In emerging Eastern Asian stock market, research shows a positive relationship between the CSR policy and a firm's stock price synchronicity (Lee, 2016). On the basis of previous findings, we develop a separate study on the impact of CSR policy on the stock price synchronicity in China.

The sample of 9,787 observations from all Chinese A-share listed companies during the period of 2011–2020 shows supporting evidence that the CSR policy has a positive effect on the firm's stock price synchronicity in the Chinese market. Thus, a more socially responsible company can have less specific informative stock in China. To test the reliability of this result, several methods are used on the robustness tests. We first calculate the VIF to examine possible problems of multi-collinearity, then apply the alternative method to explore whether the relationship remains tenable even with changed variables. Finally, we remove one variable with considerable influence on the dependent variables to examine the above results. The VIF shows no issues of multi-collinearity among the variables. After applying alternative method, the result remains the same as our main regression at a high significance level. Other variables also show the same results, indicating that changing or deleting variables do not affect the main findings, which are therefore robust.

The findings present practical uses in real life for investors and managers. First, the result supports that applying CSR policy may not attract investors in China to provide less informative stocks. Thus, managers need to re-evaluate the usefulness of investing in social responsibility due to having less informative stocks. Second, the socially responsible investor can become more cautious in making investment decisions due to the CSR policy that leads to less informative stocks.

This study also has a few limitations. First, the focus is on the Chinese stock market, which causes the result to be less reliable when applied in other countries' stock markets. Second, the study only attempts to determine how stock price synchronicity is related to the CSR policy, but not the reason behind the findings. Third, the relationship between CSR and stock price synchronicity is not explored within a specific industry. CSR in particular sectors, such as the manufacturing industry, may have a different relationship with stock price synchronicity.

Future research can extend this topic by determining the effect of implementing CSR policies on stocks in a specific industry. Such topic is worth exploring because different industry strategies may respond differently when CSR policy is applied. Second, future research can seek the reason for the present results, and for the different relationships found in other countries' stock markets. Third, future research can divide CSR into more specific aspects, such as environment and governance, then determine how these can affect stock price synchronicity. Thus, more precise results on which aspect of CSR highly affects the stock price synchronicity can be attained.

References

Ajina, A.S., Japutra, A., Nguyen, B., Syed Alwi, S.F. and Al-Hajla, A.H. (2019) 'The importance of CSR initiatives in building customer support and loyalty: evidence from Saudi Arabia', *Asia Pacific Journal of Marketing and Logistics*, Vol. 31 No. 3, pp.691–713 [online] https://doi.org/10.1108/APJML-11-2017-0284.

Amadi, C. and Zhao, Q. (2020) *Corporate Social Responsibility and Financial. Performance: The Stakeholder Theory Perspective*, 4 October [online] http://dx.doi.org/10.2139/ssrn.3919004.

Barnea, A. and Rubin, A. (2005) 'Corporate social responsibility as a conflict between owners', *Social Performance Metrics Conference*, Haas Center for Responsible Business [online] https://escholarship.org/uc/item/4v06w78s.

Benkraiem, R., Boubaker, S. and Saeed, A. (2021) 'How does corporate social responsibility engagement affect the information content of stock prices?', *Managerial and Decision Economics*, 22 September, pp.1–24 [online] https://doi.org/10.1002/mde.3452.

Ben-Nasr, H. and Cosset, J.C. (2014) 'State ownership, political institutions, and stock price informativeness: evidence from privatization', *Journal of Corporate Finance*, Vol. 29, pp.179–199 [online] https://doi.org/10.1016/j.jcorpfin.2014.10.004.

Chan, K., Hameed, A. and Kang, W. (2013) 'Stock price synchronicity and liquidity', *Journal of Financial Markets*, Vol. 16, No. 3, pp.414–438.

Cheng, B., Ioannou, I. and Serafeim, G. (2011) 'Corporate social responsibility and access to finance', *Strategic Management Journal*, 19 May, Vol. 35, No. 1, pp.1–23 [online] http://dx.doi.org/10.2139/ssrn.1847085.

Cheng, F.C., Gul, F.A. and Srinidhi, B. (2012) 'Stock price informativeness, analyst coverage and economic growth: evidence from emerging markets', Paper presented at the *25th Australasian Finance and Banking Conference* [online] https://dx.doi.org/10.2139/ssrn.2132058.

Chouaibi, S., Chouaibi, J. and Rossi, M. (2022) 'ESG and corporate financial performance: the mediating role of green innovation: UK common law versus Germany civil law', *EuroMed Journal of Business*, Vol. 17, No. 1, pp.46–71 [online] https://doi.org/10.1108/EMJB-09-2020-0101.

Chouaibi, S., Rossi, M., Siggia, D. and Chouaibi, J. (2021a) 'Exploring the moderating role of social and ethical practices in the relationship between environmental disclosure and financial performance: evidence from ESG companies', *Sustainability*, Vol. 14, No. 1, p.209.

Chouaibi, Y., Rossi, M. and Zouari, G. (2021b) 'The effect of corporate social responsibility and the executive compensation on implicit cost of equity: evidence from French ESG data', *Sustainability*, Vol. 13, No. 20, p.11510.

Clark, G.L. and Viehs, M. (2014) *The Implications of Corporate Social Responsibility for Investors: An Overview and Evaluation of the Existing CSR Literature*, 17 August [online] https://ssrn.com/abstract=2481877 or http://dx.doi.org/10.2139/ssrn.2481877.

Dai, J., Lu, C., Yang, Y. and Zheng, Y. (2018) 'Is the social responsibility information disclosed by the companies really valuable? – evidence from Chinese stock price synchronicity', *Sustainability*, Vol. 10, No. 10, p.3578 [online] https://doi.org/10.3390/su10103578.

Durnev, A., Morck, R.K., Yeung, B.Y. and Zarowin, P. (2001) *Does Greater Firm-Specific Return Variation Mean More or Less Informed Stock Pricing?*, 21 May [online] https://ssrn.com/abstract=272287 or http://dx.doi.org/10.2139/ssrn.272287.

Flammer, C. (2015) 'Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach', *Management Science*, Vol. 61, No. 11, pp.2549–2568 [online] https://doi.org/10.1287/mnsc.2014.2038.

Grant Thornton (2008) *Corporate Social Responsibility: A Necessity Not A Choice*, International Business Report, Grant Thornton.

Gul, F.A., Kim, J.B. and Qiu, A.A. (2010) 'Ownership concentration, foreign. shareholding, audit quality, and stock price synchronicity: evidence from China', *Journal of Financial Economics*, Vol. 95, No. 3, pp.425–442 [online] https://doi.org/10.1016/j.jfineco.2009.11.005.

Gul, F.A., Srinidhi, B. and Ng, A.C. (2011) 'Does board gender diversity improve the informativeness of stock prices?', *Journal of Accounting and Economics*, Vol. 51, No. 3 [online] https://doi.org/10.1016/j.jacceco.2011.01.005.

He, W., Li, D., Shen, J. and Zhang, B. (2013) 'Large foreign ownership and stock price informativeness around the world', *Journal of International Money and Finance*, Vol. 36, pp.211–230 [online] https://doi.org/10.1016/j.jimonfin.2013.04.002.

Jia, Y., Gao, X. and Julian, S. (2020) 'Do firms use corporate social responsibility to insure against stock price risk? Evidence from a natural experiment', *Strategic Management Journal*, Vol. 41, No. 2, pp.290–307 [online] https://doi.org/10.1002/smj.3107.

Kim, Y., Li, H. and Li, S. (2014) 'Corporate social responsibility and stock price crash risk', *Journal of Banking and Finance*, 18 February, forthcoming [online] https://ssrn.com/abstract=2397629.

Kim, Y., Park, M.S. and Wier, B. (2012) 'Is earnings quality associated with corporate social responsibility?', *The Accounting Review*, Vol. 87, No. 3, pp.761–796 [online] https://doi.org/10.2308/accr-10209.

KLD Research & Analytics, Inc. (2006) *Getting Started with KLD Stats and KLD's Ratings Definitions*, KLD Research & Analytics, Inc., Boston, Massachusetts.

Lee, S. (2016) 'How can companies succeed in forming CSR reputation?', *Corporate Communications: An International Journal*, Vol. 21, No. 4, pp.435–449, https://doi.org/10.1108/CCIJ-01-2016-0009.

Lin, K.J., Karim, K. and Carter, C. (2015) 'Why does China's stock market have highly synchronous stock price movements? An information supply perspective', *Advances in Accounting*. Vol. 31 [online] https://doi.org/10.1016/j.adiac.2015.03.006.

Lin, L.W. (2010) 'Corporate social responsibility in China: window dressing or structural change', *Berkeley J. Int'l L.*, Vol. 28, p.64.

Malkiel, B.G. and Fama, E.F. (1970) 'Efficient capital markets: a review of theory and empirical work', *The Journal of Finance*, Vol. 25, No. 2, pp.383–417, DOI. 10.1111/j.1540-6261.1970.tb00518.x.

Margolis, J.D., Elfenbein, H.A. and Walsh, J.P. (2009) *Does it Pay to Be Good … and Does it Matter? A Meta-Analysis of the Relationship between Corporate Social and Financial Performance*, 1 March [online] http://dx.doi.org/10.2139/ssrn.1866371.

Moir, L. (2001) 'What do we mean by corporate social responsibility?', *Corporate Governance*, Vol. 1, No. 2, pp.16–22 [online] https://doi.org/10.1108/EUM0000000005486.

Morck, R., Yeung, B. and Yu, W. (2000) 'The information content of stock markets: why do emerging markets have synchronous stock price movements?', *Journal of Financial Economics*, Vol. 58, Nos. 1–2, pp.215–260.

Roll, R. (1988) 'R^2', *The Journal of Finance*, Vol. 43, pp.541–566.

Salewski, M. and Zülch, H. (2014) *The Association between Corporate Social Responsibility (CSR) and Earnings Quality – Evidence from European Blue Chips,* Working Paper, HHL, Leipzig, Working Paper Series No. 112, 7 January.

Scherer, A.G. and Palazzo, G. (2008) 'Globalization and corporate social responsibility', in Crane, A., McWilliams, A., Matten, D., Moon, J., Siegel, D. (Eds.): *The Oxford Handbook of Corporate Social Responsibility*, pp.413–431, Oxford University Press [online] https://ssrn.com/abstract=989565.

Vergalli, S. and Poddi, L. (2009) *Does Corporate Social Responsibility Affect The Performance of Firms?*, FEEM Working Paper, No. 52.2009, 5 August [online] http://dx.doi.org/10.2139/ssrn.1444333.

Wang, K.T., Liu, S. and Wu, Y. (2021) 'Corporate social activities and stock price crash risk in the banking industry: international evidence', *Journal of International Financial Markets, Institutions and Money*, August, forthcoming [online] https://ssrn.com/abstract=3914544.

Windsor, D. (2001) 'The future of corporate social responsibility', *The International Journal of Organizational Analysis*, Vol. 9, No. 3, pp.225–256 [online] https://doi.org/10.1108/eb028934.