National culture of secrecy and stock price synchronicity: Cross-country evidence

Gaganis, Chrysovalantis and Leledakis, George and Pasiouras, Fotios and Pyrgiotakis, Emmanouil

Department of Economics, University of Crete, Greece, Department of Accounting and Finance, School of Business, Athens University of Economics and Business, Greece, Montpellier Business School, France, Essex Business School, University of Essex, UK

19 January 2021

National culture of secrecy and stock price synchronicity: cross-country evidence

Chrysovalantis Gaganis[1], George Leledakis[2], Fotios Pasiouras[3*], Emmanouil Pyrgiotakis[4]

[1] Department of Economics, University of Crete, Greece

[2] Department of Accounting and Finance, School of Business, Athens University of Economics and Business, Greece

[3] Montpellier Business School, France

[4] Essex Business School, University of Essex, UK

Abstract

Stock price synchronicity has been associated with various market outcomes like the return-sentiment relations, stock liquidity, and asset pricing models. Therefore, researchers have devoted a lot of time in revealing the underlying factors that drive stock price synchronicity. Using a sample of 49 countries over the period 1990 to 2019 we find a robust association between higher cultural secretiveness and stock price synchronicity. Our results suggest that a deep-rooted country characteristic like the culture of secrecy can diminish the information environment of stock markets. The results are robust to the use of various control variables suggested in earlier studies and alternative regression techniques, including ones that address endogeneity concerns.

Keywords: Culture, Information and market efficiency, Stock price synchronicity

JEL codes: G14; G41; E71

[*] Author for correspondence. E-mail addresses: c.gaganis@uoc.gr (C. Gaganis), gleledak@aueb.gr (G.N. Leledakis), f.pasiouras@montpellier-bs.com (F. Pasiouras), e.pyrgiotakis@essex.ac.uk (E.G. Pyrgiotakis).

1. Introduction

The seminal work of Roll (1988) asserts that the extent to which stock prices move together depends on the relative degree of firm-specific and market-specific information that is incorporated into stock prices. This has generated a large volume of studies aiming to reveal those factors that drive stock price synchronicity.[1,2] Some of them focus on firm-level characteristics like large controlling shareholders (Boubaker et al., 2014), social media coverage (Ding et al., 2020), analyst coverage (Chan and Hameed, 2006), trade credit (Liu and Hou, 2019), voluntary IFRS adoption (Kim and Shi, 2012), and discretionary accruals (Hutton et al., 2009). Others, focus on country-level attributes like property rights (Morck et al., 2000), insider trading laws (Fernandes and Ferreira, 2009), political uncertainty (Doan et al., 2020), the extent of the freedom of the press (Kim et al., 2014), and the extent of financial disclosures and auditors' availability (Jin and Myers, 2006).

The present study aims to extend the literature by exploring whether and how a national culture of secrecy explains differences in stock price synchronicity across countries. This interest in secretiveness is driven by the underlying idea in all the above studies, asserting that the aforementioned firm-specific and country-specific characteristics influence stock synchronicity because of the associated opacity of the financial statements, the cost of information collection, and the dissemination of information in the market.

[1] Synchronicity is as an inverse measure of informative stock prices in which higher (lower) synchronicity refers to less (more) informative stock prices.

[2] Understanding the driving factors of this phenomenon is important for both academics and practitioners because synchronicity has been associated with various outcomes like the return-sentiment relations (Rao and Zhou, 2019), stock liquidity (Chan et al., 2013), changes in market-based measures of information-based trading in response to analyst recommendation revisions (Devos et al., 2015), and asset pricing models (Figlioli and Lima, 2019), to name a few.

Our approach is further motivated by a number of studies documenting an association between a national culture of secrecy and disclosure practices (Gray, 1988; Gray and Vint, 1995; Doupnki and Riccio, 2006), the decision to hire a Big 4 auditor (Hope et al., 2008), the probability to receive a modified audit opinion (Chen et al., 2017), corporate investment efficiency (Mazboudi and Hasan, 2018), and bank-firm relationships (Pasiouras et al., 2020). Nonetheless, none of these studies deals with stock price synchronicity. At the same time, while there exist several studies on the association between formal institutions and stock price synchronicity, informal institutions like culture have received considerably less attention in the literature. In more detail, while Eun et al. (2015) focus on the impact of the cultural dimensions of tightness and individualism on stock price synchronicity, they do not explore the role of a culture of secretiveness.

Another interesting aspect of our work is that the investigation of the culture of secrecy, which is a deep-rooted social characteristic that was formed years ago, allows us to address a point that was highlighted in Hasan et al. (2014), stating that: "*a potential drawback of the cross country studies is that firms operating in different national environments are also affected by other country specific characteristics, such as diversity of historical experience*" (p. 93).

As in past studies, we adopt Gray's (1988) conceptual framework which asserts that managers in societies with a secretive culture tend to be less transparent in their disclosure practices. In terms of our empirical analysis, we follow Hope et al. (2008) and other empirical studies (Chen et al., 2017; Mazboudi and Hasan, 2018; Pasiouras et al., 2020) and we develop an overall index of national culture of secrecy that is based on three well-known indicators of national culture introduced by Hofstede (1980). Using a large cross-country sample, we document a positive association between a

national culture of secrecy and stock price synchronicity. This finding is robust to the inclusion of numerous control variables, including other country-specific attributes that account for the dissemination of information in the economy like lack of press freedom and the strength of accounting and auditing standards.

The rest of the paper is as follows. Section 2 provides a background discussion. Section 3 presents the empirical framework. Section 4 discusses the results. Section 5 concludes.

2. Background discussion

2.1. Cross-country studies on stock price synchronicity

There exists a good number of studies that attempt to shed light on the cross-country differences in stock price synchronicity.[3] In an influential study, Morck et al. (2000) find that stock prices in economies with high per capita gross domestic product (GDP) move in a relatively unsynchronized manner. However, the addition of a variable that measures government respect for private property, renders per capita GDP insignificant in explaining stock price synchronicity. Additionally, stronger protection of public shareholders' property rights against corporate insiders is associate with lower synchronicity in the case of developed economies. Therefore, Morck et al. (2000) conclude that the degree to which a country protects private property rights affects both the extent to which information is capitalized into stock prices and the sort of information that is capitalized.

[3] Further to the studies that we discuss in the main body of the manuscript, there are also some studies that focus on the banking sector (Francis et al., 2015; Doan et al., 2020). We do not discuss them in detail, due to the specific characteristics of the banking sector, and the fact that they are more specialized, focusing for example on the role of regulations that are specific to banking institutions (e.g. Francis et al., 2015).

A more recent study by Jin and Myers (2006) argues that poor protection without opaqueness is not enough to explain high R^2s. Using stock returns from 40 stock markets from 1990 to 2001, their results confirm a strong positive association between R^2 and several measures of an opaque operating environment, related to accounting transparency, auditing activity and analysts' forecasts.[4]

Fernandes and Ferreira (2009) reveal the role of insider trading laws, by examining the relationship between a country's first-time enforcement of such laws and stock price informativeness (lack of synchronicity) in 48 countries between 1980 and 2003. They find that the enforcement of insider trading laws improves price informativeness in developed markets; however, in the case of emerging markets the enforcement of insider trading laws is associated with an insignificant change in firm-specific return variation.

Kim et al. (2014) focus on the ability of the press in a country to generate external transparency by the level of press freedom and the extent to which the press is free from state interference. Using a sample from 50 countries, they find a significant relationship between higher press freedom and lower stock price synchronicity, concluding that the freedom of the press can increase the information environment of stock markets.

Thus, as discussed in Dang et al. (2020), the findings of existing studies suggest that when countries' or firms' environments are characterized by information opacity, stock prices fail to reflect firm-specific information in a timely and precise manner, and therefore tend to co-move with the market. Kim et al. (2014) point out that the

[4] In more detail, Jin and Myers (2006) consider the following indicators of opaqueness: (i) a survey based measured from the Global Competitiveness report, revealing the availability of information and the extent to which the financial disclosure requirements are extensive and detailed, (ii) a measure of auditing activity, (iii) an indicator of the extent of key accounting variables that are included in financial statements, (iv) an opaqueness measure from PricewaterhouseCoopers, that is based on a survey of CFOs, bankers, equity analysts and local PricewaterhouseCoopers consultants, and covers corruption in government, legal protection of property and contracts, macroeconomic policies, accounting standards and business regulation, and (v) an opaqueness measure based on the diversity of analysts' forecasts.

underlying explanation for these results can be associated to two effects of transparency that they label the "information effect" and the "investor protection effect". As it concerns the first effect, the underlying idea is that transparency makes firms more informative and thus enables stock prices to incorporate more firm-specific information. Turning to the second effect, the key argument is that transparency enhances investor protection. This encourages more outside and/or perspective investors to collect private firm-specific information before they trade and thus enables stock prices to incorporate more firm-specific information.

The above discussion leads to the working hypothesis of the present study that the national culture of secretiveness, which results in a less transparent overall environment, will be positively associated with stock price synchronicity. In other words, we assert that culturally driven opacity limits the flow of firm-specific information to the market, which leads to higher return co-movement. As we discuss in the next section the national culture of secretiveness has been associated with accounting disclosures and auditing effectiveness. However, this may not be a necessary condition. In more detail, Jin and Myers (2006) approach opaqueness more broadly by asserting that it refers to the lack of information that would enable investors to observe operating cash flow and income and determine firm value. Thus, as they argue, value-relevant information, may not necessarily be the same thing as accounting detail, and they propose the use of a wider net and look for a range of proxies for opaqueness or transparency. Within this context, we believe that the culture of secrecy that is deep rooted and general indicator of the secretiveness in a society has several desirable characteristics.

2.2. Studies on the culture of secrecy

In his seminal work, Gray (1988) proposed a conceptual framework to establish a relationship between different national cultural dimensions and the development of accounting systems, the regulation of the accounting profession and attitudes towards financial management and disclosures. As it concerns secrecy (versus transparency) that is the focus of the present study, Gray (1988) defines this as "*a preference for confidentiality and the restriction of disclosure of information about the business only to those who are closely involved with hits management and financing as opposed to a more transparent, open and publicly accountable approach*" (p. 8). His conceptual model, which we discuss in more detail in Section 3.1.2, predicts a close link between secrecy and the cultural dimensions of uncertainty-avoidance, power distance and individualism, with a less important link with the dimension of masculinity also being likely.

Gray (1988) did not test empirically his theoretical model; however, follow-up empirical studies provide support to his arguments, documenting an association between the cultural dimensions identified in Gray's framework and corporate disclosure behavior across the world (Eddie, 1990; Gray and Vint, 1995; Salter and Niswander, 1995; Zarzeski, 1996).

More recent studies provide additional insights. For example, MacArthur (1999) investigates the effect of culture on the comment letters sent by accounting member bodies on the International Accounting Standards Committee's exposure draft 32, to conclude that the results strongly support the power distance, individualism, and strong uncertainty avoidance hypotheses. The likelihood of withholding material information about the firm, has led others to relate the culture of secrecy to auditing. Within this context Hope et al. (2008) document a negative association between secrecy

and the likelihood to hire a big 4 auditor, and Chen et al. (2017) report a positive relationship between secrecy and the likelihood of issuing modified audit opinions.

Mazboudi and Hasan (2018) extend the literature to consider the impact of secrecy on corporate investment efficiency. They argue that: (i) a lower level of corporate transparency reduces investors' ability to monitor managerial investment decisions and (ii) managers are expected to be, ex ante, less disciplined in their investment behavior when they operate within an environment of high information asymmetry. Therefore, Mazboudi and Hasan (2018) hypothesize that information asymmetry problems in secretive societies will enhance corporate investment inefficiency. Their empirical findings are consistent with this hypothesis. Pasiouras et al. (2020) also build their hypothesis around information asymmetry, in their case related to the lender-borrower relationship. They propose that a culture of secretiveness may influence the willingness of a firm to release sensitive information to its lenders, with implications for the firm-bank relationships.

Therefore, the above studies relate the national culture of secrecy to the disclosure of information, and in a more general context to information asymmetry problems. However, none of them investigates whether and how secrecy influences stock price synchronicity. This is surprising, given the central role of information dissemination in the studies on stock price synchronicity discussed in both the introduction and in Section 2.1., and we aim to close this gap in the literature.

3. Empirical framework

In the sub-sections that follow we first define the data selection criteria and the variables used in the analysis (sub-section 3.1), and we then discuss the methodological setting

(sub-section 3.2). Further information about the variables and their sources is available in the Appendix.

3.1. Data selection

Our dataset includes stock return data for all MSCI Developed and Emerging Markets. More precisely, for these countries, we download stock returns from Datastream (using the total return index) over the period 1990 to 2019. Then, we apply two criteria to filter our sample. First, we only include stocks that have at least 30 weeks of stock return data in a given year. Second, we exclude country-year observations in cases where the country has less than 25 stocks that meet the first criterion in that year. To account for the presence of outliers, we winsorize each firm's stock returns at the 1% and the 99% levels, as in Francis et al. (2015). Our initial sample consists of 1,354 country-year observations.

3.1.1. Stock price synchronicity

To calculate the measure of stock price synchronicity, we follow Morck, et al. (2000), Jin and Myers (2006), and Eun et al. (2015). More specifically, R^2 is obtained using the following expanded market model:

$$\begin{aligned} r_{i,j,t} = {} & a_{i,j} + b_{1,i} r_{m,j,t} + b_{2,i}\left[r_{U.S.,t} + ER_{j,t}\right] + b_{3,i} r_{m,j,t-1} + b_{4,i}\left[r_{U.S.,t-1} + ER_{j,t-1}\right] \\ & + b_{5,i} r_{m,j,t-2} + b_{6,i}\left[r_{U.S.,t-2} + ER_{j,t-2}\right] + b_{7,i} r_{m,j,t+1} + b_{8,i}\left[r_{U.S.,t+1} + ER_{j,t+1}\right] + \\ & b_{9,i} r_{m,j,t+2} + + b_{10,i}\left[r_{U.S.,t+2} + ER_{j,t+2}\right] + \varepsilon_{i.j,t} \end{aligned} \quad (1)$$

Returns on eq. (1) are on a weekly basis (Wednesday-to-Wednesday). We do so, in order to account for any calendar anomalies such as the Monday effect (An and Zhang, 2013; Francis et al., 2015). In the equation, *i* denotes a firm index, *j* denotes a country index, and *t* is a time indicator (week). In this regard, $r_{i,j,t}$ is the weekly return of firm *i*

of country *j* in week *t* of a year, and $r_{m,j,t}$ is the domestic market index return in the same time period.[5] Further, the term $r_{U.S.,t} + ER_{j,t}$ stands for the U.S. market return, adjusted for changes in the local currency against the U.S. dollar. Furthermore, we include lags and leads to avoid thin trading issues (Dimson, 1979). Finally, in each year, we calculate country R^2 as the average R^2 of all firms in that country.

Considering that the R^2 obtained by eq. (1) is highly skewed and is within the interval [0, 1], we apply a logistic transformation of R^2 as in Morck et al. (2000):

$$Synchronicity_{j,t} = Ln\left(\frac{R^2_{j,t}}{1-R^2_{j,t}}\right) \quad (2)$$

where $Synchronicity_{j,t}$ is the stock price synchronicity of country *j* in year *t*, and $R^2_{j,t}$ is the R^2 obtained from eq. (1) for country *j* in year *t*.

3.1.2. Indicator of the Culture of Secrecy

Building on Gray (1988) and Hope et al. (2008) we construct the key independent variable of secrecy with the use of the following three dimensions of national culture from Hofstede (1980): uncertainty avoidance, power distance, and individualism.[6]

Starting with the cultural dimension of uncertainty avoidance, Gray (1988) argues in favour of a positive relationship between uncertainty avoidance and secrecy. The underlying idea is that societies which are characterized by strong uncertainty will restrict the dissemination of information in order to avoid conflict, restrict the uncertainties of competition and preserve security (Gray, 1988; Gray and Vint, 1995;

[5] For each country *j*, we measure the domestic market index return using the Datastream Global Equity Indices.

[6] Uncertainty avoidance is defined as "*the extent to which the members of a culture feel threatened by ambiguous or unknown situations*" (Hofstede et al., 2010, p. 191). Power distance is defined *as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally* (Hofstede et al., 2010, p. 61). Individualism (versus collectivism) "*stands for a society in which the times between individuals are loose: everyone is expected to look after him-or herself and his or her immediate family only*" (Hofstede et al., 2010, p. 519).

Hope et al., 2008). The framework of Gray (1988) also points towards a positive association between a culture of power distance and secrecy, since people in high-power distance societies are expected to restrict information to preserve power inequalities.[7] Finally, secrecy is consistent with a preference for collectivism rather than individualism (Gray, 1988). This is due to different concerns for the interest of the group most closely and directly involved with the management and financing of the corporation rather than external parties like potential investors and the general public (Gray, 1988; Gray and Vint, 1995).[8]

Based on the above conceptual framework, Hope et al. (2008) suggest the estimation of an indicator of the national culture secrecy to be used in empirical research. This is defined as the summation of uncertainty avoidance (UA) and power distance (PD) scores less the individualism (IND) score from Hofstede's framework – i.e. SECRECY = UA + PD – IND. For the purposes of the present study we follow this approach, which has been widely employed in recent studies (Chen et al., 2017; Mazboudi and Hasan, 2018; Kanagaretnam et al., 2019; Pasiouras et al., 2020). All the scores for the national culture dimensions are from Hofstede Insights.

3.1.3. Country-related disclosure characteristics

To account for the institutional environment, we use the good government index constructed as in Eun et al. (2015). This is calculated by taking the summation of the

[7] Hofstede et al. (2010) also refer to differences that may relate to the dissemination of information. For example, they mention that in societies with a culture of large power-distance people read relatively few newspapers, as well as that "*scandals involving persons in power are expected, and so is the fact that these scandals will be covered*" (p. 77).

[8] Along the same lines, Mazboudi and Hasan (2018) argue that "*people in high individualistic societies, such as the U.K. and the U.S., are expected to be less secretive and are more willing to share information with external parties, other than related parties, as opposed to people in high collectivistic societies, such as Brazil and Mexico, who are more likely to restrict information to related parties or the social unit they belong to*" (p. 169).

percentile ranks of the following two indices from the World Bank's Worldwide Governance Indicators (WGI) Project: (i) government effectiveness, and (ii) control of corruption. In general, bad government has been associated with a lack of protection of private property, which in turn serves as proxy for more opaqueness, and shifts firm-specific risk from outside investors to inside managers (Jin and Myers, 2006). Along these lines, Morck et al. (2000) suggest that in countries with weak investors' protection from corporate insiders, problems like intercorporate income shifting could make firm-specific information less useful to risk arbitrageurs, and therefore hinder its capitalization into stock prices.

To account for the dissemination of information in the markets through the press, we control for the freedom of the press as in Kim et al. (2014). We use information from the Freedom House, which based on its annual Freedom of the Press Survey classifies countries in three groups. These are as follows: (i) Free - rated as 1, (ii) Partly Free - rated as 2, and (iii) Not Free - rated as 3. Hence, a higher score indicates lack of freedom of the press.

We also control for the role of the diversity of analyst forecasts, accounting transparency and auditing activity - documented in Jin and Myers (2006) - with the use of two indicators. The first indicator is the diversity of analyst forecasts. This is calculated as follows:

$$Analyst\ diversity_{i,j,t} = \frac{\sigma_{i,j,t} \Big/ \left|\mu_{i,j,t}\right|}{\sqrt{N_{i,j,t}}} \tag{4}$$

Where $\sigma_{i,j,t}$ is the standard deviation of analysts' forecasts of the firm's i earnings in year t, $\mu_{i,j,t}$ is the mean forecast of the firm's i earnings in year t, $N_{i,j,t}$ is the number of analysts following the firm i in year t, and j denotes a country index. We collect data

on the analysts' earnings forecasts from the Institutional Broker's Estimate System (I/B/E/S). Each year *t*, for each country *j*, the country analyst diversity is the average analyst diversity of all firms in that country. We use the absolute value of mean earnings forecasts in eq. (4), because any negative values could underestimate the degree of the diversity of analysts' opinions.

The second indicator reflects the country-level perceptions on the strength of accounting and auditing standards. Data are from the Executive Opinion Survey of the World Economic Forum (WEF). The index that we use is based on the response to the following survey question "In your country, how strong are financial auditing and reporting standards?". The respondents choose an answer in the range of 1 (extremely weak) to 7 (extremely strong), with the individual answers being aggregated at the country level by the WEF in the Global Competitiveness Report.

3.1.4. Control variables

We use various control variables suggested in past studies as potential drivers of stock price synchronicity. Morck et al. (2000) argue that higher synchronicity might simply reflect fewer traded stocks. To account for this, they include the logarithm of the number of listed stocks in each market in their estimations. We follow the same approach, which is also consistent with Jin and Myers (2006), Fernandes and Ferreira (2009) and Eun et al. (2015). We also use the natural logarithm of the GDP per capita to control for the overall economic development of a country (Morck et al., 2000; Jin and Myers, 2006; Doan et al., 2020) and its geographical size in square kilometers to account for the fact that smaller countries might have more geographically localized activities with implications for stock price comovement (Morck et al., 2000; Fernandes and Ferreira, 2009). To control for macroeconomic instability, we use the standard

deviation of GDP growth, as in Morck et al. (2000), Jin and Myers (2006), Fernandes and Ferreira (2009), and Eun et al. (2015). Following the same studies, we also use the firm Herfindahl index and the industry Herfindahl index. Countries with relatively few and large firms or industries are expected to have high R^2s. This is because having listed firms concentrated in a few industries means that their fundamentals could be highly correlated and their stock prices highly synchronous (Morck et al., 2000). Similarly, in markets dominated by a few very large firms, it is highly likely that the remaining listed firms will be suppliers or customers of these dominant firms, leading to a high degree of stock price synchronicity (Morck et al., 2000).

Firm fundamentals might also move together. To account for this, Morck et al. (2000) suggest the construction of an earnings co-movement index of the firms' return on assets in each country. This index is constructed in way that is analogous to the R^2 of the stock price synchronicity, but it measures the synchronicity of firm fundamentals instead. Therefore, to calculate the earning co-movement index, we use the R^2 of the following regression model:

$$ROA_{i,j,t} = a_{i,j} + b_{i,t} ROA_{m,j,t} + \varepsilon_{i,j,t} \quad (3)$$

where $ROA_{i,j,t}$ is the return on assets (ROA) of firm i in country j at year t, and $ROA_{m,j,t}$ is the domestic market ROA at the same year. Each year, for every firm, the ROA regression is estimated using a five-year rolling window, as in Chan et al. (2013). Following Goldeng et al. (2008), we exclude observations if a firm's ROA is higher than 100% or lower than –100%. The former case means that the firm's profits were higher than its assets in a giver year, while the latter case means that the firm has lost all of its assets in a given year. For each year, the country R^2 is measured at the average R^2 of all firms in the country. Finally, we calculate the country ROA synchronicity as the logistic transformation of the country R^2.

3.2. Methodology

To address our main research question, we estimate the following panel regression model:

$$Synchronicity_{j,t} = a_j + b_{1,j} Secrecy_j + b_{2,j} X_{j,t} + b_{3,j} Z_{j,t} + \varepsilon_{j,t} \quad (5)$$

where $Synchronicity_{j,t}$ is the stock price synchronicity of country j in year t, $Secrecy_j$ is our measure of the culture of secrecy of country j, $X_{j,t}$ is a vector of country-specific disclosure-related characteristics of country j at year t, and $Z_{j,t}$ is a vector of control variables of country j at year t.

In our empirical setting, it is likely that the residuals are correlated in two ways. First, the residuals can be correlated across years within a country, and second, they can be correlated across countries within a year. One possible solution to address this concern is to use the standard approach of two-way clustering (country clustering and year clustering). However, as outlined by Petersen (2009), this approach may yield biased results, if the number of clusters is relatively small (usually less than fifty). To overcome this issue, we use the wild bootstrap method of Cameron et al. (2008). More precisely, in all our panel regressions, we estimate standard errors with country clustering and year cluster bootstrapping with 1,000 replications.

4. Empirical results

4.1. Baseline regressions

Table 1 presents the list of the 49 countries of the sample, and the corresponding period that we use to measure stock price synchronicity. We also show information about the main independent variable of interest (i.e. Secrecy). Additionally, we present information about the four control variables that relate to the dissemination of information, those being accounting standards, the lack of freedom of the press, analyst

diversity and good government index. It should be noted that due to data availability, information about the accounting standards variable is restricted to the period 2006 - 2019. Similarly, information about the lack of press freedom is restricted to the period 2001 -2016. Table 2 presents summary statistics about all variables, and Table 3 shows the correlation coefficients.

[Insert Tables 1 to 3 Around Here]

Table 4 shows our baseline regressions. In the first columns we present benchmark regressions, like the ones estimated in Morck et al. (2000), Jin and Myers (2006), and Eun et al. (2015). In more detail, in Column 1 we show the regression of stock price synchronicity on economy structural variables. These estimations reveal that the deviation of GDP growth and the synchronicity of the return on assets are both positively associated with stock price synchronicity. In Column 2, we add the good government index. Consistent with the results in Morck et al. (2000), Jin and Myers (2006), and Eun et al. (2015) we find the index to be negatively associated with stock price co-movement. In Column 3 we add the dispersion of analysts' forecasts. Given that this is considered a measure of opaqueness (Jin and Myers, 2006) we would expect it to be positively associated with stock price synchronicity. While it enters the regression with the expected sign, its impact is not statistically significant, a finding that is consistent with the one in Eun et al. (2015).

In column 4 we present the main specification of interest of the present study, which includes the indicator of cultural secrecy. Consistent with our hypothesis, it enters the regression with a positive coefficient, which is statistically significant at the 1% level. In terms of economic significance, a one standard deviation increase in

Secrecy increases *Synchronicity* by 11%. Therefore, we document that stock price synchronicity is higher in countries characterized by a culture of opaqueness.

Table 4 also presents the estimations with the inclusion of the control variables for the accounting and auditing standards (columns 5 and 6) and the lack of freedom of the press (columns 7 and 8).[9] Consistent with our expectations, the results in column 5 show that stock synchronicity is lower in countries with better accounting and auditing standards that enhance the dissemination of information in the market. However, the effect of accounting and auditing standards becomes insignificant when we add the indicator of the culture of secrecy in column 6. Similarly, the lack of press freedom is positively associated with stock price synchronicity and statistically significant at the 1% level in column 7. However, once we add the culture of secrecy in the specification in Column 8, the statistical significance of the freedom of press indicator drops at the 10% level. This possibly reflects that the culture of secrecy that is a deep-rooted and more general indicator of opaqueness, is a more important driver of stock synchronicity than the accounting and auditing standards or the freedom of press.

[Insert Table 4 Around Here]

4.2. Robustness tests

4.2.1. Using alternative methodological approaches

In this section we present the results obtained with three alternative estimation techniques. First, we re-estimate the specifications of Table 4 with the use of a balanced sample. Therefore, we restrict the sample to those countries for which we have

[9] We do not include these in the baseline regression in Column 4 because of the limited time period for which the data are available, decreasing the sample by approximately 50%.

information for all the years of the analysis. We do so, as the clustered standard errors are more reliable in a balanced sample. Second, as in Jin and Myers (2006), we rely on Fama-MacBeth (1973) regressions. We present these results in Tables 5 and 6. In both cases, the main results hold, as, we continue to find a positive association between the indicator of the culture of secrecy and stock price synchronicity.

At this point, we should note that in Table 6, more variables enter the regressions with statistically significant coefficients compared to Tables 4 and 5. This is probably due to the fact that the Fama-MacBeth (1973) approach addresses the within-year correlation of residuals, but the predicted standard errors could be biased if the residuals are also correlated across countries within a year (Petersen, 2009). For this reason, the results of the Fama-MacBeth (1973) regressions should be interpreted with caution.

[Insert Tables 5 and 6 Around Here]

Third, we account for endogeneity. The results presented so far are unlikely to be driven by reverse causality. We have no reasons to believe that stock price synchronicity could have an impact on something as deep-rooted as culture. Second, the inclusion of various control variables used in earlier studies, mitigates further potential concerns about omitted variables. However, at this stage we also address this issue in a more formal way, at least to the extent that it is possible with the data in hand. Therefore, we rely on a 2SLS IV regression with the use of exogenous instruments. While it is not possible to completely rule out endogeneity, these estimations should enhance confidence in the reported findings. We present tests with three instruments that are: (i) unlikely to have a direct influence on stock price synchronicity, therefore

satisfying the exogeneity requirement, and (ii) correlated with the culture of secrecy, therefore satisfying the relevance requirement.

Following Pasiouras et al. (2020) we use religion as the first instrument. We have no reasons to believe that religion has a direct impact on stock synchronicity, unless it is through other country-specific attributes like culture. As outlined in Pasiouras et al. (2020) scholars from the fields of religion, sociology, and anthropology have all investigated secrecy as a key element of religiosity, with elements of secrecy being central in the understanding of many elements of religion beliefs, experiences and practices in religious communities (Duncan, 2006).[10] We consider the total share of religion adherence in each country in 1900 from Barro and McClearly (2003). In more detail we use the summation of the proportion of adherence to one of the following ten religions: Catholic, Protestant, Orthodox, Other Christian, Hindu, Jewish, Muslim, Buddhism, Other Eastern religions, Other religions. Thus, we ignore the proportion of the population with no adherence (nonreligions, atheists).

The second instrument that we use is a dummy variable indicating whether a country was a British colony.[11] Nash and Patel (2019) refer to several scholars who suggest that colonization by the British, compared to colonization by other European powers, had profound social implications impacting various attributes like self-determination and self-assertion (Licht et al., 2005, 2007; Acemoglu et al., 2001). Along the same lines, the results of Ashkanasy et al. (2002) show that the Anglo Cluster

[10] Religion has been used widely as an instrument of individual indicators of national culture. See for example Li et al. (2013), El Ghoul and Zheng (2016), Boubakri et al. (2017), Gaganis et al. (2020). Carl et al. (2004) and Hofstede et al. (2010) also discuss how religion could relate to individual indicators of national culture, like uncertainty avoidance and power distance. See also Scheid (2006) and Teeuwen (2006) for a discussion of the Japanese Middle Ages where secrecy in religion spread beyond religion to become a "culture of secrecy" across various segments of the society.

[11] Information on British colonies is obtained from the ICOW colonial history data set (Hensel, 2014), which attempts to identify colonial or other dependency relationships for each state over the past two centuries.

of former British colonies is characterized by an individualistic performance orientation. Furthermore, Nash and Patel (2019) outline various studies discussing that in "extractive" states, typically established by Latin nations, the colonial authorities designed institutions to consolidate power and facilitate the exploitation of the indigenous population and the natural resources (e.g. Acemoglu et al., 2001; Easterly and Levine, 2003), resulting in a culture of high power distance. In contrast, the British were inclined mostly towards the foundation of "settlement colonies" where the development of a robust middle class resulted in the wider distribution of power and wealth, and a culture of lower power distance (Nash and Patel, 2019). Finally, Ashkanasy et al. (2002) reveal that the Anglo cluster is one of only three clusters that believe that there should be less uncertainty avoidance than there is in practice. All in all, it seems that being a British colony should be associated with a lower score for our indicator of cultural secrecy.

The third instrument that we use is the ethnolinguistic fractionalization index from La Porta et al. (1999), which reflects the degree of heterogeneity in a country in terms of ethnicities and language. Our approach to instrument culture with a fractionalization index is consistent with Kwok and Tadesse (2006), Siegel et al. (2013), Li et al. (2013), Gaganis et al. (2020), among others.

We present these results in Table 7. Columns 1, 3, and 5 present the results of the first stage regression with secrecy being the dependent variable and religion (column 1), British colony (column 3), and ethnolinguistic fractionalization (column 5) being independent variables. These first-stage regressions also include all the control variables of the second stage regressions. Columns 2, 4, and 6 present the corresponding second-stage regressions with the use of the instrumented cultural variable. In all the cases, the instruments pass the tests for weak identification and under-identification.

Since we use the instruments one at a time, the regressions are always exactly identified. The results hold. Secrecy continues to be positively associated to stock price synchronicity when we address endogeneity concerns with the use of exogenous instruments.

[Insert Table 7 Around Here]

4.2.2. Using an alternative indicator of secrecy

As discussed earlier, Gray (1988) also suggests that there could be a negative, albeit less important link between masculinity and secrecy.[12] The underlying idea is that more caring societies (i.e. higher femininity / lower masculinity) are more likely to be more open especially as it concerns socially related information. Based on this, Hope et al. (2008) also perform a robustness test with the use of an alternative indicator, calculated as SECRECY2 = UA + PD – IND – MAS. Consistent with this and other empirical studies (Chen et al., 2017; Mazboudi and Hasan, 2018), we re-estimate the specifications of Table 4 with the use of this alternative indicator of secrecy. The results remain the same.[13]

4.3. Further analysis

In this section we attempt to shed some further light on our findings, by: (i) offering an explanation as for the mechanisms through which the culture of secrecy influences stock price synchronicity, and (ii) disaggregating our measure of stock price synchronicity into an indicator of market-wide variation and firm-specific variation.

[12] Masculinity, the opposite of femininity, "*stands for a society in which emotional gender roles are clearly distinct: men are supposed to be assertive, tough, and focused on material success; women are supposed to be more modest, tender, and concerned with the quality of life*" (Hofstede et al., 2010; p. 519)

[13] To conserve space, we do not tabulate these results which are available upon request.

4.3.1. *Possible mechanisms on the influence of the culture of secrecy*

So far, we have presented robust evidence that a culture of secrecy is associated with higher stock price synchronicity. Motivated by earlier findings on the role of good government (Morck et al., 2000; Jin and Myers, 2006; Eun et al., 2015), accounting disclosures (Jin and Myers, 2006), and the freedom of press (Kim et al., 2014) in explaining stock price synchronicity, we examine whether cross-country differences across these dimensions are due to differences in the culture of secrecy.

As we discussed earlier, existing evidence has already documented an association between accounting disclosures and a culture of secrecy (e.g. Gray and Vint, 1995). Furthermore, there are various reasons for which a culture of secrecy can be negatively with the index of good government used in our study. First, the literature suggests that there exists a correlation between a lack of transparency and high levels of corruption (Kolstad and Wiig, 2009; Bauhr and Grimes, 2017).[14] Second, earlier studies establish a link between various cultural dimensions and corruption (Husted, 1999; Seleim and Bontis, 2009).[15] Third, transparency is also useful in verifying the terms of the rules and the identifies of the decisions makers, hence enhancing scrutiny and monitoring. In turn, this should have implications for government effectiveness because of accountability. Finally, evidence suggests that there exists an association between cultural dimensions, like individualism, and government effectiveness (Porcher, 2021).

[14] Kolstad and Wiig (2009), outline various reason for this. Among other things they mention that a lack of transparency: (i) makes corruption less risky and more attractive, (ii) makes it harder to use incentives to make public officials act cleanly, (iii) makes it hard to select the most honest and efficient people for public sector positions or as contract partners, (iv) makes cooperation more difficult to sustain, and opportunistic rent-seeking more likely.

[15] For example, Husted (1999) argues that power distance, uncertainty avoidance, and masculinity should be positively related to corruption, while the opposite should hold in the case of individualism. See Banuri and Eckel (2021) for a review of the literature.

Table 8 presents the results with the use of the good government index (column 1), accounting and auditing standards (column 2), and the lack of the freedom of press (column 3) as the dependent variable. The independent variables are the indicator of the culture of secrecy and the control variables used in Table 4. As expected, the coefficient of secrecy is negative in the case of the good government index and the accounting and auditing standards, and positive in the case of the lack of press freedom. Thus, cross-country heterogeneity across these attributes can be explained by deep-rooted cultural characteristics formed long time ago. This also explains why the inclusion of the indicator of culture of secrecy in the regressions of stock synchronicity drives out the significance of these standard variables used in earlier research.

[Insert Table 8 Around Here]

4.3.2. Secrecy, market-specific *and firm-specific variations*

A high R^2 can reflect low levels of firm-specific variation or high levels of market-specific variation or both. Therefore, following Morck et al. (2000), we decompose our stock price synchronicity measure into market-specific variation and firm-specific variation. More precisely, the market-specific variation is the average explained sum of squares as measured by eq. (1), while the firm-specific variation is the average residual sum of squares as measured by eq. (1). In our regressions, we use the natural logarithm of these sub-indices as the dependent variable.[16]

Table 9 presents the results of this analysis. In columns 1 to 3, the dependent variable is the natural logarithm of market-specific variation, and in columns 4 to 6, the

[16] We do not apply the logistic transformation of eq. (2) in this case, as both variables are not bounded between unit and zero.

dependent variable is the natural logarithm of firm-specific variation. The coefficient of *Secrec*y is negative in all six models. However, in the case of market-specific variation, *Secrecy* is significant at the 5% level only in models 2 and 3, while in the case of firm-specific variation, *Secrecy* is significant at the 1% level in all three models. Furthermore, the magnitude of its coefficient suggests that *Secrecy* reduces firm-specific variation more than market-specific variation. This result indicates that firms operating in more secretive societies are less informative, a fact which reduces the amount of firm-specific information impounded in the stock prices. Therefore, the culture of secrecy increases stock price synchronicity mainly by decreasing firm-specific variations.

[Insert Table 9 Around Here]

5. Conclusions

The information environment of the market has a central role in the stock price synchronicity literature. Existing studies focus on various mechanisms like the opacity of the financial statements, the cost of information collection, and the dissemination of information. We present robust empirical evidence of an association between a national culture of secrecy and stock price synchronicity across counties, suggesting that the lack of transparency reduces the ability of stock prices to incorporate and reflect firm-specific information. These results are robust to the inclusion of various control variables in the regressions, the use of a slightly different indicator of culture of secrecy, and alternative regression techniques. Additionally, we find that a culture of secrecy increases R^2 mainly by decreasing firm-specific variations.

Another interesting observation is that the inclusion of the culture of secrecy indicator in the regressions drives out the significance of the accounting and auditing, lack of press of freedom, and government effectiveness suggested in earlier studies. Further regressions reveal that that cultural values of secrecy affect all these country-level attributes. Overall, our results support the findings of a growing number of studies that reveal that cultural values with deep roots in societies affect the decision-making and the characteristics of financial markets. For example, Chui et al. (2010) conclude that individualism is positively associated with trading volume, volatility, and the magnitude of momentum profits. More recent evidence by Ashraf (2021) reveals that the national-level uncertainty avoidance moderates the stock markets' reaction to the Covid-19 pandemic. The findings of these studies combined with our results could have implications for practitioners when constructing global portfolios of securities.

Our study is not without its limitations. For example, endogeneity may cloud our findings. It should be noted that national culture changes very slowly over time and perceptions over secretiveness depend on personal attributes that are deeply rooted into societal characteristics. Still, one may argue that major prior events related to the country's financial market could affect perceptions over social norms leading to reverse causality (Mourouzidou-Damtsa et al., 2019). A more important concern in our context relates to omitted variables influencing our results. We first attempted to account for this by controlling for a wide range of country-level determinants of stock price synchronicity used in earlier studies. Then we used a more formal way to address endogeneity with a two-stage least squares regression and exogenous instruments. Nonetheless, it is possible that we cannot completely mitigate endogeneity concerns in our setting. Therefore, future studies could use propensity score and difference-in-difference approaches to further address endogeneity issues.

References

Acemoglu, D., Johnson, S., Robinson, J.A., 2001. The Colonial origins of comparative development: An empirical investigation. American Economic Review 91, 1369-1401.

An, H., Zhang, T., 2013. Stock price synchronicity, crash risk, and institutional investors. Journal of Corporate Finance 21, 1-15.

Ashkanasy, N.M., Trevor-Roberts, E., Earnshaw, L., 2002. The Anglo cluster: Legacy of the British empire. Journal of World Business 37, 28-39.

Ashraf, B.N., 2021. Stock markets' reaction to Covid-19: Moderating role of national culture. Finance Research Letters, Forthcoming.

Banuri, S., Eckel, C., 2012. Experiments in culture and corruption: A review. Policy Research Working Paper No. 6064, World Bank.

Barro, R.J., McCleary, R.M., 2003. Religion and economic growth across countries. American Sociological Review 68, 760-781.

Bauhr, M., Grimes, M., 2017. Transparency to curb corruption? Concepts, measures and empirical merit. Crime, Law and Social Change 68, 431-458.

Boubaker, S., Mansali, H., Rjiba, H., 2014. Large controlling shareholders and stock price synchronicity. Journal of Banking and Finance 40, 80-96.

Boubakri, N., Mirzaei A., Samet A., 2017. National culture and bank performance: Evidence from the recent financial crisis. Journal of Financial Stability 29, 36-56.

Cameron, A.C., Gelbach, J.B., Miller, D.L., 2008. Bootstrap-based improvements for inference with clustered errors. Review of Economics and Statistics 90, 414-427.

Carl, D., Gupta, V., Javidan, M., 2004. Power distance, In: House R.J., Hanges P.J., Javidan M., Dorfman P.W., Gupta V., (Editors), Culture, Leadership and Organizations: The Globe Study of 62 Societies, Sage Publications, pp. 513-563.

Chan, K., Hameed, A., 2006. Stock price synchronicity and analyst coverage in emerging markets. Journal of Financial Economics 80, 115-147.

Chan, K., Hameed, A., Kang, W., 2013. Stock price synchronicity and liquidity. Journal of Financial Markets 16, 414-438.

Chen, T.T.Y., Zhan, F., Zhou, G., .2017. Secrecy culture and audit opinion: Some international evidence. Journal of International Financial Management & Accounting 28, 274-307.

Chui, A.C.W, Titman, S., Wei, K.C.J., 2010. Individualism and momentum around the world. Journal of Finance 65, 361-392.

Dang, T.L., Dang, M., Hoang, L., Nguyen, L., Phan, H.L., 2020. Media coverage and stock price synchronicity. International Review of Financial Analysis 67, Article 101430.

Devos, E., Hao, W., Prevost, A.K., Wongchoti, U., 2015. Stock return synchronicity and the market response to analyst recommendation revisions. Journal of Banking and Finance 58, 376-389.

Dimson, E., 1979. Risk measurement when shares are subject to infrequent trading. Journal of Financial Economics 7, 197-226.

Ding, R., Zhou, H., Li, Y., 2020. Social media, financial reporting opacity, and return comovement: Evidence from Seeking Alpha, Journal of Financial Markets 50, Article 100511.

Doan, A-T., Phan, T., Lin, K-L., 2020. Governance quality, bank price synchronicity and political uncertainty. International Review of Economics and Finance 69, 231-262.

Doupnik, T.S., Riccio, E.L., 2006. The influence of conservatism and secrecy on the interpretation of verbal probability expressions in the Anglo and Latin cultural areas. International Journal of Accounting 41, 237-261.

Duncan, A.W., 2006. Religion and secrecy: A bibliographic essay. Journal of the American Academy of Religion 74, 469-482.

Easterly, W., Levine, R., 2003. Tropics, germs, and crops: How endowments influence economic development. Journal of Monetary Economics 50, 3-39.

Eddie, I.A., 1990. Asia Pacific cultural values and accounting systems. Asia Pacific International Management Forum 16, 22-30.

El Ghoul, S., Zheng, X., 2016. Trade credit provision and national culture. Journal of Corporate Finance 41, 475-501.

Eun, C.S., Wang, L., Xiao, S.C., 2015. Culture and R^2. Journal of Financial Economics 115, 283-303.

Fama, E.F., MacBeth, J.D., 1973. Risk, return, and equilibrium: Empirical tests. Journal of Political Economy 81, 607-636.

Fernandes, N., Ferreira, M.A., 2009. Insider trading laws and stock price informativeness. Review of Financial Studies 22, 1845-1887.

Figlioli, B., Lima, F.G., 2019. Stock pricing in Latin America: The synchronicity effect. Emerging Markets Review 39, 1-17.

Francis, B.B., Hasan, I., Song, L., Yeung, B., 2015. What determines bank-specific variations in bank stock returns? Global evidence. Journal of Financial Intermediation 24, 312-324.

Gaganis, C., Hasan, I., Pasiouras, F., 2020. National culture and housing credit. Journal of Empirical Finance 56, 19-41.

Goldeng, E., Grünfeld, L.A., Benito, G.R.G., 2008. The performance differential between private and state owned enterprises: The roles of ownership, management and market structure. Journal of Management Studies 45, 1244-1273.

Gray, S.J., 1988. Towards a theory of cultural influence on the development of accounting systems internationally. Abacus 24, 1-15.

Gray, S.J., Vint, H.M., 1995. The impact of culture on accounting disclosures: Some international evidence. Asia-Pacific Journal of Accounting 2, 33-43.

Gul, F.A., Kim, J-B., Qiu, A.A., 2010. Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: Evidence from China. Journal of Financial Economics 95, 425-442.

Hasan, I., Song, L., Wachtel, P., 2014. Institutional development and stock price synchronicity: Evidence from China. Journal of Comparative Economics 42, 92-108.

Hensel, P.R., 2014. ICOW Colonial history data set, version 1.0. Available at: http://www.paulhensel.org/icowcol.html

Hofstede, G., 1980. Culture's consequences: International differences in work-related values. Beverly Hills, CA: Sage.

Hofstede, G., Hofstede, G.J., Minkov, M., 2010. Cultures and organizations: Software of the mind, (Rev. 3rd ed.), McGraw-Hill: New York.

Hope, O.K., Kang, T., Thomas, W., Yoo Y.K., 2008. Culture and auditor choice: A test of the secrecy hypothesis. Journal of Accounting and Public Policy 27, 357-373.

Husted, B.W., 1999. Wealth, culture, and corruption. Journal of International Business Studies 30, 339-360.

Hutton, A.P., Marcus, A.J., Tehranian, H., 2009. Opaque financial reports, R^2, and crash risk. Journal of Financial Economics 94, 67-86.

Jin, L., Myers, S.C., 2006. R^2 around the world: New theory and new tests. Journal of Financial Economics 79, 257-292.

Kanagaretnam, K., Lobo, G.J., Wang, C., Whalen, D.J., 2019. Cross-country evidence on the relationship between societal trust and risk-taking by banks. Journal of Financial and Quantitative Analysis 54, 275-301.

Kim, J-B., Shi, H., 2012. IFRS reporting, firm-specific information flows, and institutional environments: International evidence. Review of Accounting Studies 17, 474-517.

Kim, J-B., Zhang, H., Li, L., Tian, G., 2014. Press freedom, externally-generated transparency, and stock price informativeness: International evidence. Journal of Banking and Finance 46, 299-310.

Kolstad, I., Wiig, A., 2009. Is transparency the key to reducing corruption in resource-rich countries? World Development 37, 521-532.

Kwok, C.C.Y., Tadesse, S., 2006. National culture and financial systems. Journal of International Business Studies 37, 227-247.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 1999. The quality of government. Journal of Law, Economics, and Organization 15, 222-279.

Li, K., Griffin, D., Yue, H., Zhao, L., 2013. How does culture influence corporate risk-taking? Journal of Corporate Finance 23, 1-22.

Licht, A.N., Goldschmidt, C., Schwartz, S.H., 2005. Culture, law, and corporate governance. International Review of Law and Economics 25, 229-255.

Licht, A.N., Goldschmidt, C., Schwartz, S.H., 2007. Culture rules: The foundation of the rule of law and other norms of governance. Journal of Comparative Economics 35, 659-688.

Liu, H., Hou, C., 2019. Does trade credit alleviate stock price synchronicity? Evidence from China. International Review of Economics and Finance 61, 141-155.

MacArthur, J.B., 1999. The impact of cultural factors on the lobbying of the International Accounting Standards Committee on E32, comparability of financial statements: An extension of MacArthur to accounting member bodies. Journal of International Accounting, Auditing and Taxation 8, 315-335.

Mazboudi, M., Hasan, I., 2018. Secrecy, information shocks, and corporate investment: Evidence from European Union countries. Journal of International Financial Markets, Institutions and Money 54, 166-176.

Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: Why do emerging markets have synchronous stock price movements? Journal of Financial Economics 58, 215-260.

Mourouzidou-Damtsa, S., Milidonis, A., Stathopoulos, K., 2019. National culture and bank risk-taking. Journal of Financial Stability 40, 132-143.

Nash, R., Patel, A., 2019. Instrumental variables analysis and the role of national culture in corporate finance. Financial Management 48, 385-416.

Pasiouras, F., Bouri, E., Roubaud, D., Galariotis, E., 2020. Culture and multiple firm-bank relationships: A matter of secrecy and trust? Journal of Business Ethics, Forthcoming.

Petersen, M.A., 2009. Estimating standard errors in finance panel data sets: Comparing approaches. Review of Financial Studies 22, 435-480.

Porcher, S., 2021. Culture and the quality of government. Public Administration Review, Forthcoming.

Rao, L., Zhou, L., 2019. The role of stock price synchronicity on the return-sentiment relation. North American Journal of Economics and Finance 47, 119-131.

Roll, R., (1988), R^2. Journal of Finance 43, 541-566.

Salter, S.B., Niswander, F., 1995. Cultural influence on the development of accounting systems internationally: A test of Gray's [1988] Theory. Journal of International Business Studies 26, 379-397.

Scheid, B., 2006. Preface, In: Scheid B., Teeuwen M., (Editors), The Culture of Secrecy in Japanese Religion, Routledge: Taylor & Francis Group.

Seleim, A., Bontis, N., 2009. The relationship between culture and corruption: A cross-national study. Journal of Intellectual Capital 10, 165-184.

Siegel, J.I., Licht, A.N., Schwartz, S.H., 2013. Egalitarianism, cultural distance, and foreign direct investment: A new approach. Organization Science 24, 1174-1194.

Teeuwen, M., 2006. Japan’s culture of secrecy from a comparative perspective, In: Scheid B., Teeuwen M., (Editors), The Culture of Secrecy in Japanese Religion, Routledge: Taylor & Francis Group, pp. 1-34.

Zarzeski, M.T., 1996. Spontaneous harmonization effects of culture and market forces on accounting disclosure practices. Accounting Horizons 10, 18-37.

Appendix

Variable definitions

Variable	Description
R^2	Country R^2 measured as the average R^2 of each firm in the country on an annual basis.
Synchronicity	The logistic transformation of R^2.
Secrecy	Measure of the culture of secrecy based on Hope et al. (2008). This is defined as the summation of uncertainty avoidance (UA) and power distance (PD) scores less the individualism (IND) score from Hofstede's framework.
Accounting standards	An indicator of each country's strength of accounting and auditing standards. Data are from the World Economic Forum's Executive Opinion Survey.
Lack of free press	An inverse indicator of each country's freedom of press, based on the Freedom House annual Freedom of the Press Survey.
Analyst diversity	Country average diversity as the average analyst diversity of each firm in the country on an annual basis. Firm's analyst diversity is measured as the standard deviation of the analysts' forecasts of the firm's earnings, normalized by the absolute value of mean forecast, and the divided by the square root of the number of analysts following the firm. Data on analysts' forecasts are collected from I/B/E/S.
Good government	The sum of the percentile ranks of two indices from the World Bank's Worldwide Governance Indicators (WGI) Project: (i) government effectiveness, and (ii) control of corruption.
St.dev (GDP growth)	The standard deviation of the country's GDP growth for the period 1990-2019.
Ln(GDP per capita)	The natural logarithm of the GDP per capita on an annual basis.
Ln(size)	The natural logarithm of each country's geographical size in square kilometers
Ln(number of stocks)	The natural logarithm of the number of listed stocks in each country on an annual basis.
Firm HHI	Firm concentration ratio, as measured by the firm Herfindahl index on an annual basis.
Industry HHI	Industry concentration ratio, as measured by the industry Herfindahl index on an annual basis.
ROA R^2	Each country's earnings co-movement index is measured by the average R^2 of each firm in the country on annual basis.
ROA synchronicity	The logistic transformation of ROA R^2.

Table 1

R^2 and disclosure-related country characteristics

This table shows the list of the 49 countries of our sample, and the corresponding period we use to measure stock price synchronicity. R^2 is the country's average R^2 obtained from eq. (1), *Secrecy is* the cultural measures of Hofstede, *Accounting standards* is the average measure of *Accounting standards* for each country, *Lack of free* p*ress* is the rating of each country's freedom of press, *Analyst diversity* is the average diversity of analysts' forecasts of the countries' firm earnings, and *Good government* is the average measure of each country's institutional environment.

Countries	Period	R^2	Secrecy	Accounting standards	Lack of free press	Analyst diversity	Good government
Argentina	1994-2019	0.367	89	3.925	2.000	0.356	1.016
Australia	1990-2019	0.237	–1	6.034	1.000	0.163	1.882
Austria	1990-2019	0.296	26	5.923	1.000	0.134	1.861
Belgium	1990-2019	0.277	84	5.705	1.000	0.181	1.812
Brazil	1995-2019	0.282	107	4.853	2.000	0.248	1.059
Canada	1990-2019	0.269	7	6.173	1.000	0.200	1.904
Chile	1990-2019	0.269	126	5.420	1.250	0.123	1.742
China	1995-2019	0.445	90	4.448	3.000	0.118	0.983
Columbia	1992-2019	0.297	134	4.547	2.250	0.132	0.909
Czech Republic	1994-2007	0.246	73	5.126	1.000	0.170	1.465
Denmark	1990-2019	0.269	–33	5.714	1.000	0.153	1.971
Egypt	1997-2019	0.346	125	4.397	2.750	0.178	0.711
Finland	1990-2019	0.323	29	6.358	1.000	0.166	1.967
France	1990-2019	0.267	83	5.666	1.000	0.163	1.770
Germany	1990-2019	0.273	33	5.756	1.000	0.192	1.862
Greece	1990-2019	0.349	125	4.426	1.313	0.228	1.363
Hong Kong	1990-2019	0.306	72	6.149	1.692	0.138	1.824
Hungary	1995-2019	0.295	48	4.933	1.375	0.096	1.469
India	1990-2019	0.251	69	4.963	2.000	0.096	0.971
Indonesia	1990-2019	0.274	112	4.508	2.000	0.154	0.651
Ireland	1990-2019	0.296	–7	5.162	1.000	0.129	1.814
Israel	1990-2019	0.276	40	5.691	1.250	0.130	1.658
Italy	1990-2019	0.365	49	4.208	1.750	0.189	1.389
Japan	1990-2019	0.360	100	5.548	1.000	0.157	1.746
Malaysia	1990-2019	0.348	110	5.502	3.000	0.119	1.417
Mexico	1990-2019	0.305	133	4.817	2.438	0.242	0.996
Netherlands	1990-2019	0.325	11	6.035	1.000	0.122	1.937
New Zealand	1990-2019	0.253	–8	6.260	1.000	0.084	1.933
Norway	1990-2019	0.292	12	6.181	1.000	0.258	1.951
Pakistan	1993-2019	0.269	111	4.224	2.813	0.146	0.475
Peru	1994-2019	0.245	135	4.937	1.938	0.208	0.927
Philippines	1990-2019	0.282	106	4.990	1.875	0.121	0.893
Poland	1995-2019	0.298	101	4.877	1.063	0.147	1.454
Portugal	1990-2019	0.300	135	4.712	1.000	0.166	1.681
Qatar	2006-2019	0.417	148	5.720	3.000	0.055	1.444
Russia	2001-2019	0.306	149	3.928	2.938	0.352	0.571
Saudi Arabia	2006-2019	0.473	150	5.220	3.000	0.102	1.076
Singapore	1990-2019	0.323	62	6.203	3.000	0.125	1.970
South Africa	1990-2019	0.260	33	6.229	1.500	0.111	1.405
South Korea	1990-2019	0.299	127	4.686	1.438	0.208	1.462
Spain	1990-2019	0.346	92	4.827	1.000	0.130	1.684
Sweden	1990-2019	0.301	–11	6.068	1.000	0.201	1.958
Switzerland	1990-2019	0.304	24	5.920	1.000	0.133	1.934
Taiwan	1990-2019	0.396	110	5.492	1.000	0.167	1.552
Thailand	1990-2019	0.320	108	5.006	2.313	0.194	1.090
Turkey	1990-2019	0.409	114	4.506	2.250	0.215	1.105
United Arab Emirates	2004-2019	0.327	145	5.450	3.000	0.097	1.536
United Kingdom	1990-2019	0.259	–19	5.954	1.000	0.106	1.879
United States	1990-2019	0.228	–5	5.580	1.000	0.064	1.811

Table 2

Summary statistics

This table presents the summary statistics for the variables of our sample. Our sample consists of country-year observations of 49 countries during the period 1990 to 2019. R^2 is obtained from eq. (1), and *Synchronicity* is the logistic transformation of R^2. All remaining variables are defined in the Appendix.

Variable	N	Mean	St.dev.	25th	Median	75th
R^2	1,354	0.306	0.075	0.253	0.288	0.337
Synchronicity	1,354	–0.841	0.341	–1.083	–0.904	–0.677
Secrecy	1,354	70.726	52.527	26.000	84.000	112.000
Accounting standards	674	5.287	0.737	4.725	5.351	5.933
Lack of free press	759	1.642	0.781	1.000	1.000	2.000
Analyst diversity	1,311	0.162	0.139	0.081	0.123	0.193
Good government	1,354	1.496	0.434	1.113	1.641	1.872
St.dev (GDP growth)	1,354	2.688	1.140	1.805	2.422	3.407
Ln(GDP per capita)	1,354	9.742	1.149	9.028	10.095	10.645
Ln(size)	1,354	12.662	2.125	11.321	12.762	14.009
Ln(number of stocks)	1,354	5.639	1.190	4.779	5.416	6.551
Firm HHI	1,353	0.060	0.062	0.026	0.045	0.076
Industry HHI	1,353	0.124	0.073	0.077	0.110	0.151
ROA R^2	1,337	0.377	0.102	0.306	0.370	0.437
ROA synchronicity	1,337	–0.518	0.461	–0.820	–0.530	–0.254

Table 3

Correlation matrix

This table presents pairwise correlation between the variables of our sample. Our sample consists of country-year observations of 49 countries during the period 1990 to 2019. R^2 is obtained from eq. (1), and *Synchronicity* is the logistic transformation of R^2. All remaining variables are defined in the Appendix. The symbols *b* and *a* denote statistical significance at the 5% and 1% levels, respectively, using a 2-tail test.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
R^2 (1)	1.000														
Synchronicity (2)	0.997[a]	1.000													
Secrecy (3)	0.268[a]	0.271[a]	1.000												
Accounting standards (4)	–0.145[a]	–0.141[a]	–0.584[a]	1.000											
Lack of free press (5)	0.226[a]	0.218[a]	0.581[a]	–0.425[a]	1.000										
Analyst diversity (6)	0.083[a]	0.087[a]	0.099[a]	–0.170[a]	–0.027	1.000									
Good government (7)	–0.135[a]	–0.133[a]	–0.662[a]	0.769[a]	–0.646[a]	–0.122[a]	1.000								
St.dev (GDP growth) (8)	0.239[a]	0.244[a]	0.398[a]	–0.358[a]	0.465[a]	0.153[a]	–0.328[a]	1.000							
Ln(GDP per capita) (9)	–0.045	–0.040	–0.546[a]	0.592[a]	–0.524[a]	–0.037	0.863[a]	–0.166[a]	1.000						
Ln(size) (10)	–0.070[a]	–0.083[a]	0.104[a]	–0.373[a]	0.150[a]	0.098[a]	–0.458[a]	–0.016	–0.382[a]	1.000					
Ln(number of stocks) (11)	–0.124[a]	–0.142[a]	–0.146[a]	0.140[a]	–0.045	–0.086[a]	0.104[a]	–0.305[a]	–0.004	0.192[a]	1.000				
Firm HHI (12)	0.139[a]	0.143[a]	–0.016	–0.052	–0.047	–0.008	–0.061[b]	0.091[a]	–0.060[b]	–0.105[a]	–0.504[a]	1.000			
Industry HHI (13)	0.197[a]	0.200[a]	0.162[a]	–0.167[a]	0.049	0.031	–0.177[a]	0.206[a]	–0.145[a]	–0.081[a]	–0.517[a]	0.825[a]	1.000		
ROA R^2 (14)	0.191[a]	0.188[a]	0.106[a]	–0.080[b]	0.039	0.165[a]	–0.123[a]	0.061[b]	–0.176[a]	0.033	–0.029	0.032	0.085[a]	1.000	
ROA synchronicity (15)	0.194[a]	0.190[a]	0.099[a]	–0.080[b]	0.033	0.159[a]	–0.116[a]	0.058[b]	–0.170[a]	0.030	–0.020	0.031	0.081[a]	0.996[a]	1.000

Table 4

Baseline regressions

This table presents panel regression results for a sample of 49 countries over the period 1990 to 2019. The sample consists of country-year observations. The dependent variable in all models is the stock price synchronicity, which is the logistic transformation of R^2 as measured by eq. (1). All independent variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% level. *T*-statistics (in parentheses) are based on standard errors with country clustering and year cluster bootstrapping with 1,000 replications. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Secrecy				0.002***		0.001**		0.002***
				(2.85)		(2.07)		(2.97)
Analyst diversity			0.043	0.037	0.065	0.058	0.098	0.040
			(0.41)	(0.35)	(0.30)	(0.26)	(0.62)	(0.26)
Good government		–0.279**	–0.289**	–0.158				
		(–2.24)	(–2.27)	(–1.15)				
Accounting standards					–0.078**	–0.044		
					(–2.13)	(–1.01)		
Lack of free press							0.122***	0.090*
							(2.41)	(1.80)
St.dev (GDP growth)	0.061***	0.044*	0.043*	0.034	0.005	–0.008	0.013	0.001
	(2.50)	(1.78)	(1.75)	(1.44)	(0.21)	(–0.35)	(0.51)	(0.06)
Ln(GDP per capita)	0.008	0.089*	0.094*	0.092*	0.058*	0.083***	0.075***	0.107***
	(0.41)	(1.88)	(1.98)	(1.98)	(2.11)	(2.83)	(2.63)	(3.75)
Ln(size)	–0.009	–0.020	–0.022	–0.013	0.005	0.011	0.007	0.011
	(–0.78)	(–1.60)	(–1.80)	(–1.12)	(0.36)	(0.82)	(0.42)	(0.74)
Ln(number of stocks)	0.005	0.013	0.008	0.009	–0.029	–0.024	–0.009	0.001
	(0.14)	(0.40)	(0.24)	(0.30)	(–0.87)	(–0.74)	(–0.27)	(0.02)
Firm HHI	–0.274	–0.096	–0.231	0.209	–1.054	–0.514	–0.798	–0.271
	(–0.35)	(–0.12)	(–0.32)	(0.29)	(–1.36)	(–0.644)	(–0.82)	(–0.31)
Industry HHI	0.850	0.675	0.575	0.292	1.136	0.760	1.108	0.811
	(1.60)	(1.28)	(0.97)	(0.50)	(1.64)	(1.10)	(1.11)	(0.94)
ROA synchronicity	0.122***	0.131***	0.119***	0.120***	0.169***	0.169***	0.065	0.071
	(4.00)	(4.42)	(3.82)	(3.94)	(3.36)	(3.45)	(1.48)	(1.61)
Constant	–1.019***	–1.247***	–1.217***	–1.582***	–0.862*	–1.452***	–1.893***	–2.329***
	(–2.57)	(–2.92)	(–2.87)	(–3.81)	(–1.72)	(–2.41)	(–3.82)	(–4.75)
N	1,337	1,337	1,303	1,303	662	662	739	739
R^2	0.107	0.132	0.127	0.155	0.122	0.150	0.119	0.160

Table 5

Baseline regressions on a balanced panel

This table repeats the baseline regressions of Table 4 for a balanced sample of 336 country-year observations. The dependent variable in all models is the stock price synchronicity, which is the logistic transformation of R^2 as measured by eq. (1). All independent variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% level. *T*-statistics (in parentheses) are based on standard errors with country clustering and year cluster bootstrapping with 1,000 replications. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Secrecy				0.002**		0.002**		0.001*
				(2.29)		(2.57)		(1.82)
Analyst diversity			–0.139	–0.111	–0.030	–0.023	0.104	0.064
			(–0.55)	(–0.45)	(–0.12)	(–0.09)	(0.38)	(0.23)
Good government		–0.434***	–0.457***	–0.327*				
		(–2.62)	(–2.90)	(–2.06)				
Accounting standards					–0.057	–0.026		
					(–1.27)	(–0.55)		
Lack of free press							0.136**	0.098
							(2.16)	(1.42)
St.dev (GDP growth)	0.013	–0.009	–0.009	–0.021	0.008	–0.012	–0.031	–0.036
	(043)	(–029)	(–0.20)	(–0.67)	(0.23)	(–0.39)	(–0.85)	(–0.96)
Ln(GDP per capita)	0.044	0.186***	0.195***	0.192***	0.063	0.101**	0.099**	0.121***
	(1.11)	(3.13)	(3.20)	(3.31)	(1.60)	(2.53)	(2.35)	(2.90)
Ln(size)	0.016	–0.001	–0.000	0.009	0.012	0.020**	0.022	0.025
	(1.04)	(–0.04)	(–0.02)	(0.55)	(0.73)	(1.18)	(1.27)	(1.49)
Ln(number of stocks)	–0.039	–0.024	–0.023	–0.021	–0.038	–0.030	–0.049	–0.040
	(–0.97)	(–0.81)	(–0.60)	(–0.54)	(–0.94)	(–0.76)	(–1.23)	(–0.50)
Firm HHI	–1.625	–1.099	–1.098	–0.446	–1.485	–0.563	–1.722	–0.921
	(–1.72)	(–1.21)	(–1.23)	(–0.46)	(–1.55)	(–0.56)	(–1.48)	(–0.74)
Industry HHI	1.706	1.015	1.026	0.506	1.469	0.709	1.739	1.042
	(1.91)	(1.10)	(1.11)	(052)	(1.54)	(0.73)	(1.40)	(0.82)
ROA synchronicity	0.106	0.080	0.082	0.091	0.102	0.107	0.100	0.104
	(1.12)	(0.93)	(0.97)	(1.10)	(1.24)	(1.31)	(1.21)	(1.27)
Constant	–1.285**	–1.837***	–1.885***	–2.227***	–1.103	–1.836***	–1.986***	–2.285***
	(–1.95)	(–2.83)	(–2.71)	(–3.20)	(–1.51)	(–2.35)	(–2.84)	(–3.23)
N	336	336	336	336	336	336	336	336
R^2	0.081	0.128	0.130	0.159	0.090	0.139	0.134	0.161

Table 6

Fama-MacBeth regressions

This table present Fama-MacBeth (1973) regressions for a sample of 49 countries over the period 1990 to 2019. The sample consists of country-year observations. The dependent variable in all models is the stock price synchronicity, which is the logistic transformation of R^2 as measured by eq. (1). All independent variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% level. *T*-statistics (in parentheses) are based on Newey-West standard errors with lags up to 6 years. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.

Variables	(1)	(2)	(3)	(4)	(5)	6)	(7)	(8)
Secrecy				0.002***		0.001***		0.002***
				(6.41)		(4.64)		(13.45)
Analyst diversity			–0.077	–0.126*	–0.098	–0.110	–0.005	–0.097
			(–1.08)	(–2.01)	(–1.08)	(–1.03)	(–0.10)	(–1.74)
Good government		–0.342***	–0.407***	–0.251***				
		(–6.61)	(–5.73)	(–5.25)				
Accounting standards					–0.112***	–0.084***		
					(–3.82)	(–3.18)		
Lack of free press							0.123***	0.098***
							(5.69)	(6.02)
St.dev (GDP growth)	0.061***	0.045*	0.048**	0.045*	0.001	–0.012***	0.012	0.003
	(3.17)	(2.03)	(2.06)	(1.73)	(0.17)	(–4.14)	(0.41)	(0.10)
Ln(GDP per capita)	0.008	0.110***	0.128***	0.135***	0.076***	0.102***	0.075***	0.109***
	(0.55)	(4.05)	(5.48)	(6.92)	(8.11)	(19.16)	(4.03)	(7.65)
Ln(size)	–0.011	–0.022**	–0.022**	–0.012	0.004	0.010*	0.006	0.010
	(–0.97)	(–2.29)	(–2.30)	(–1.45)	(0.85)	(1.97)	(0.63)	(1.11)
Ln(number of stocks)	–0.004	0.008	–0.001	0.002	–0.027	–0.022	–0.013	–0.001
	(–0.24)	(0.60)	(–0.10)	(0.16)	(–1.60)	(–1.22)	(–0.61)	(–0.03)
Firm HHI	–0.850***	–0.497*	–0.510**	0.092	–1.131***	–0.549***	–1.192***	–0.528*
	(–2.96)	(–1.85)	(–2.08)	(0.30)	(–5.92)	(–3.11)	(–3.83)	(–2.11)
Industry HHI	0.930***	0.580***	0.367	0.003	0.987***	0.546***	1.179***	0.846***
	(4.88)	(4.21)	(1.66)	(0.01)	(6.05)	(3.10)	(4.71)	(7.48)
ROA synchronicity	0.126***	0.107***	0.105***	0.114***	0.114***	0.116***	0.066***	0.067***
	(5.44)	(4.05)	(4.08)	(4.20)	(3.52)	(3.48)	(3.71)	(3.28)
Constant	–0.928***	–1.274***	–1.272***	–1.813***	–0.840***	–1.384***	–1.839***	–2.323***
	(–4.38)	(–5.14)	(–4.62)	(–10.45)	(–4.87)	(–7.60)	(–12.45)	(–24.64)
N	1,337	1,337	1,303	1,303	662	662	739	739
R^2	0.270	0.313	0.347	0.395	0.277	0.317	0.290	0.344

Table 7

Endogeneity controls

This table presents 2SLS IV regressions for a sample of 49 countries over the period 1990 to 2019. The sample consists of country-year observations. In the first stage regressions (models 1, 3, and 5), the dependent variable is *Secrecy*. The instruments are: *Religion* (model 1), *British colony* (model 3), and *Ethnic fractionalization* (model 5). In the second stage regressions (models 2, 4, and 6), the dependent variable is the stock price synchronicity, which is the logistic transformation of R^2 as measured by eq. (1). All independent variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% level. *T*-statistics (in parentheses) are based on standard errors with country clustering and year cluster bootstrapping with 1,000 replications. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.

	Religion		British colony		Ethnic fractionalization	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Instrument	3.591***		–0.028***		–0.068***	
	(3.88)		(–2.15)		(–2.37)	
Secrecy (Instrumented)		0.004**		0.004**		0.004**
		(1.99)		(2.21)		(2.27)
Analyst diversity	0.003	0.028	–0.10	0.030	0.017	0.030
	(0.27)	(0.26)	(–0.79)	(0.27)	(1.24)	(0.30)
Good government	–0.080***	0.023	–0.068***	0.080	–0.066***	0.047
	(–2.69)	(0.12)	(–2.35)	(0.42)	(–2.46)	(0.28)
St.dev (GDP growth)	0.003	0.022	0.009***	0.020	0.003	0.044
	(0.55)	(0.86)	(1.82)	(0.78)	(0.40)	(1.65)
Ln(GDP per capita)	0.005	0.090*	–0.005**	0.089*	–0.016	0.103**
	(0.53)	(1.98)	(–0.48)	(1.89)	(–1.51)	(2.23)
Ln(size)	–0.004**	–0.002	–0.005***	–0.001	–0.006***	0.004
	(–1.65)	(–0.01)	(–2.10)	(–0.07)	(–3.52)	(0.23)
Ln(number of stocks)	0.002	0.010	0.001	0.016	–0.000	0.010
	(0.40)	(0.35)	(0.22)	(0.51)	(–0.03)	(0.32)
Firm HHI	–0.160	0.814	–0.286***	1.059	–0.305***	0.572
	(–1.72)	(0.87)	(–2.96)	(1.10)	(–3.10)	(0.59)
Industry HHI	0.127	–0.095	0.175*	–0.240	0.126	0.203
	(1.36)	(–0.14)	(1.74)	(–0.37)	(1.21)	(0.30)
ROA synchronicity	0.001	0.120***	–0.001	0.123***	–0.004	0.129***
	(0.19)	3.96)	(–0.21)	(3.91)	(–1.19)	(4.32)
Constant	–3.421***	–2.082***	0.251***	–2.236***	0.413***	–2.406***
	(–3.62)	(–3.13)	(4.01)	(–3.22)	(4.15)	(–3.26)
Underidentification test						
Kleibergen-Paap rk LM stat	134.617		84.013		99.800	
Weak identification test						
Kleibergen-Paap Wald F stat	384.631		91.607		136.844	
N	1,303	1,303	1,273	1,273	1,238	1,238
R^2	0.594	0.146	0.577	0.151	0.579	0.149

Table 8

Disclosure-related country characteristics and culture of secrecy

This table presents panel regression results for a sample of 49 countries over the period 1990 to 2019. The sample consists of country-year observations. The dependent variable in models 1 is the good government index, in model 2 the measure of accounting standards, and in model 3 the countries' rating on lack of free press. All independent variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% level. *T*-statistics (in parentheses) are based on standard errors with country clustering and year cluster bootstrapping with 1,000 replications. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.

	Good government	Accounting standards	Lack of free press
Variables	(1)	(2)	(3)
Secrecy	–0.002***	–0.004***	0.004***
	(–3.86)	(–2.75)	(2.26)
Analyst diversity	–0.149**	–0.951***	–0.392
	(–2.61)	(–3.24)	(–1.24)
St.dev (GDP growth)	–0.037*	–0.077	0.239***
	(–1.94)	(–1.28)	(3.28)
Ln(GDP per capita)	0.248***	0.247***	–0.244***
	(10.48)	(4.00)	(–3.18)
Ln(size)	–0.041***	–0.069***	–0.016
	(–5.59)	(–2.93)	(–0.34)
Ln(number of stocks)	0.019***	0.006	0.083
	(1.14)	(0.11)	(1.16)
Firm HHI	–0.040	–0.753	2.408
	(–0.11)	(–0.42)	(1.02)
Industry HHI	–0.241	–1.312	–2.036
	(–0.53)	(–0.63)	(–0.81)
ROA synchronicity	0.037**	–0.026	–0.038
	(2.44)	(–0.41)	(–0.38)
Constant	–0.202	4.529***	2.934***
	(–0.63)	(4.57)	(2.54)
N	1,303	662	739
R^2	0.850	0.558	0.495

Table 9

Regressions on the components of synchronicity

This table presents panel regression results for a sample of 49 countries over the period 1990 to 2019. The sample consists of country-year observations. The dependent variable in models 1-3 is the market-specific variation, which is the natural logarithm of the average explained sum of squares as measured by eq. (1). The dependent variable in models 4-6 is the firm-specific variation, which is the natural logarithm the average residual sum of squares as measured by eq. (1). All independent variables are defined in the Appendix. All continuous variables are winsorized at 1% and 99% level. *T*-statistics (in parentheses) are based on standard errors with country clustering and year cluster bootstrapping with 1,000 replications. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.

	Market-specific variation			Firm-specific variation		
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Secrecy	–0.003	–0.004**	–0.003**	–0.005***	–0.005***	–0.005***
	(–1.59)	(–2.67)	(–1.94)	(–2.23)	(–3.13)	(–2.63)
Analyst diversity	1.205***	1.380***	1.114***	1.000***	1.171***	0.882***
	(7.12)	(5.59)	(5.58)	(5.90)	(3.87)	(4.11)
Good government	0.038			0.156		
	(0.11)			(0.40)		
Accounting standards		–0.080			–0.036	
		(–1.00)			(–0.32)	
Lack of free press			–0.055			–0.159*
			(–0.68)			(–1.57)
St.dev (GDP growth)	0.110***	0.081*	0.116***	0.081*	0.092*	0.125***
	(3.63)	(1.94)	(3.35)	(1.85)	(1.55)	(2.23)
Ln(GDP per capita)	–0.143	–0.083	–0.123**	–0.199**	–0.145*	–0.216***
	(–1.57)	(–1.35)	(–2.30)	(–1.94)	(–1.78)	(–3.37)
Ln(size)	–0.017	–0.033	–0.027	–0.006	–0.046*	–0.041
	(–0.64)	(–1.52)	(–1.38)	(–0.20)	(–1.65)	(–1.51)
Ln(number of stocks)	0.251***	0.225***	0.250***	0.262***	0.272***	0.273***
	(4.55)	(3.83)	(4.48)	(4.00)	(3.92)	(4.12)
Firm HHI	2.242**	2.168**	2.394***	2.821*	3.956	4.036**
	(2.51)	(1.39)	(1.81)	(2.04)	(1.73)	(1.95)
Industry HHI	0.637	0.087	–0.051	–0.065	–1.442	–1.748
	(0.63)	(0.05)	(–0.03)	(–0.06)	(–0.60)	(–0.85)
ROA synchronicity	0.162***	0.210*	0.161*	0.006	0.017	0.047
	(2.68)	(1.91)	(1.91)	(0.09)	(0.18)	(0.55)
Constant	–3.121***	–2.629***	–2.896***	–1.800**	–1.340	–0.635
	(–4.19)	(–2.97)	(–3.30)	(–2.03)	(–1.21)	(–0.60)
N	1,303	662	739	1,303	662	739
R^2	0.245	0.239	0.227	0.282	0.327	0.320