

The institutional determinants of peer effects on corporate cash holdings

Michael Machokoto*
Chimwemwe Chipeta†
Ngozi Ibeji‡

June 16, 2021

Highlights

-
- This study examines the institutional determinants of peer effects on cash holdings.
 - Peer effects on corporate cash holdings vary significantly with institutional development.
 - Mimicking is more pronounced in environments with developed national institutions.
 - Mimicking corporate cash holdings has real implications on shareholder value.
-

Abstract

Analysing a large firm-level dataset from 47 countries, we document robust and significant positive peer effects on cash holdings. Specifically, a firm increases cash holdings, on average, by 5%—7% in response to a one standard deviation increase in peer firms' cash holdings. However, this response is heterogeneous — being relatively higher in countries with well-developed legal systems, higher national governance quality and more developed capital markets. These findings are consistent with rivalry-based motives of mimicking, where firms mimic to stay abreast or ahead of rivals in increasingly competitive product markets. We further find that mimicking is not a sub-optimal strategy *per se* as it is beneficial in good economic states but less beneficial or distracting in bad economic states. Our findings are important as peer effects not only have real implications at the firm level but could potentially attenuate or amplify firm-specific shocks within and across industries and countries, more so, with increased globalisation.

Keywords: Peer effects, cash holdings, financial crisis, international, institutions.

JEL classification: C31, D22, G32.

*The Faculty of Business and Law, The University of Northampton, Waterside Campus, Northampton, NN1 5PH, UK, **Email:** michael.machokoto@northampton.ac.uk, **Tel:** +44 160 489 3484

†Corresponding author; School of Economics & Finance, University of the Witwatersrand, 1 Jan Smuts Avenue, Braamfontein, Johannesburg, 2000, Republic of South Africa, **Email:** chimwemwe.chipeta@wits.ac.za, **Tel:** +27 11 717 8145

‡The Faculty of Business and Law, The University of Northampton, Waterside Campus, Northampton, NN1 5PH, UK, **Email:** Ngozi.Ibeji@northampton.ac.uk, **Tel:** +44 160 489 3336

“Industry benchmarking is the first essential step for many companies looking to optimise their working capital.” — J.P Morgan, Working Capital Index: the 2019 Guide to helping companies benchmark for success.

1 Introduction

There is a heightened interest in understanding whether peer effects influence corporate decisions as they could potentially attenuate or amplify firm-specific or idiosyncratic shocks. The attenuation or amplification arises from managers considering the policies of their peers or rivals when making critical or strategic decisions. Examples of where such peer effects have been reported include, among others, executive remuneration, capital structure, cash holdings, trade credit, dividends, earnings management, stock market entry, corporate social responsibility, risk aversion, innovation (research and development), corporate taxes and investments.¹ The implications arising thereof are of interest to academics, practitioners, and policymakers as firm-specific or idiosyncratic shocks potentially have ripple effects within and across industries and countries.²

Notwithstanding the above contributions, some interesting questions remain unanswered: Do peer effects matter across countries? If so, how does institutional development impact peer effects? Do imitative strategies benefit or harm the firm? These questions remain open as the studies mentioned above focus on within-industry and -country peer effects in the US, which is institutionally distinct from other countries, especially emerging economies beleaguered by weak institutions. As such, institutional development significantly influences several aspects of the firm’s operations or activities.³ To the best of our knowledge, [Francis et al. \(2016\)](#), the only cross-country study on peer effects, finds that

¹Several studies report significant peer effects on executive remuneration ([Albuquerque et al., 2015](#); [Bizjak et al., 2008, 2011](#); [Cadman and Carter, 2013](#); [Lewellen, 2013](#)), capital structure ([Bernard et al., 2020](#); [Fairhurst and Nam, 2018](#); [Francis et al., 2016](#); [Leary and Roberts, 2014](#); [Lee et al., 2017](#); [Kalda, 2020](#)), cash holdings ([Chen et al., 2019](#)), trade credit ([El Ghouli and Zheng, 2016](#); [Gyimah et al., 2020](#)), dividend payouts ([Adhikari and Agrawal, 2018](#); [Grennan, 2019](#); [Yan and Zhu, 2020](#)), earnings management ([Du and Shen, 2018](#); [Matsumoto et al., 2020](#)), stock market entry ([Kaustia and Knüpfer, 2012](#); [Kaustia and Rantala, 2015](#)), corporate social responsibility ([Cao et al., 2018](#)), risk aversion ([Ahern et al., 2014](#)), innovation ([Bui et al., 2019](#); [Im and Shon, 2019](#); [Machokoto et al., 2021](#)), taxes ([Bird et al., 2018](#)) and investments ([Foucault and Fresard, 2014](#); [Frydman, 2015](#)).

²[Fuertes and Robles \(2021\)](#) find supporting evidence for the transmission of bank-specific or idiosyncratic shocks to peer banks. Specifically, they document that changes in a bank’s CDS spread significantly impact the shareholder value of peers. Similarly, [Wu et al. \(2020\)](#) find significant spillover effect of information from mergers and acquisition of peer firms on the firm’s investments.

³Several studies document the significant impact of institutional factors on corporate financing decisions (see [Francis et al., 2016](#); [Orlova and Sun, 2018](#); [Oztekin and Flannery, 2012](#)).

peer effects are more pronounced on capital structure in environments where the need to signal the firm’s quality (signalling motive — mostly in developed markets) and learn from peers or rivals (learning motive — mostly in developing markets) is high. However, whether institutional development matters for peer effects on other corporate decisions remains an open empirical question, more so for internal financing sources such as cash holdings.

This study departs from the extant literature focusing on the US and examines whether peer effects matter on cash holdings across countries with varied institutional settings. Our focus is motivated by the lack of comprehensive peer effects studies on cash holdings despite the marked surge in corporate cash holdings over the past decades⁴ and anecdotal evidence highlighting significant benchmarking in working capital management.⁵ Underlying our empirical investigation are two counteracting motives or reasons for mimicking gleaned from the literature; on the one hand, firms mimic peers to gain or learn valuable information — the information-based or learning-based motive of mimicking, and on the other hand, they do so to keep abreast with rivals or competitors — the rivalry-based motive of mimicking (Lieberman and Asaba, 2006). Therefore, it is *a priori* unclear if and why firms mimic their peers’ financial policies, more so, for other institutionally distinct countries and understudied corporate policies such as cash holdings.

To address the above research gap and reconcile the divergent motives for mimicking, we hypothesise that peer effects on cash holdings are likely to matter across countries but vary conditional on institutional development in a way that enables us to discriminate among competing propositions for mimicking. We contend that the learning-based motives for imitating are likely to be pronounced or exert more influence in countries associated with high levels of information asymmetry or opaqueness, which increases information search effort and costs. In such an environment, the hoarding of cash by peers perceived to have superior information might send a credible signal to less informed firms

⁴Several studies report marked increases in cash holdings (see Dittmar and Thakor, 2007; Foley et al., 2007; Bates et al., 2009; Brown and Petersen, 2011; Andrén and Jankensgård, 2015).

⁵See the J.P Morgan, Working Capital Index: the 2019 Guide to Helping companies benchmark for success. <https://www.jpmorgan.com/jpmpdf/1320747434298.pdf>.

about future investment opportunities (Chen et al., 2019). Thus, in this context, mimicking cash holdings might serve as a cost-effective strategy to minimise the effort and cost of searching for information. At the same time, product markets in less-developed countries are more concentrated (see UNCTAD, 2017), thereby making mimicking for reasons linked to the rivalry-based theories less plausible.

In contrast to the above discussion, the rivalry-based motives of mimicking are likely to predominate or exert more influence in countries with more developed institutions as product market competition or jostling for market positions is intense. The high transparency or information disclosure that characterises such developed markets makes mimicking to gain valuable information from rivals — the learning-based motive — less pressing as information search effort and costs are lower. For our case of mimicking cash holdings, which have surged significantly in developed markets, the rivalry-based motive is more plausible as it is increasingly becoming a source of strategic flexibility.⁶ This situation is more likely to be pronounced as economies transition from a manufacturing base towards a service and technology-oriented base (knowledge-based capital). As reported by Bao et al. (2012), Bates et al. (2009), Brown and Petersen (2011) and He and Wintoki (2016), such a transition to knowledge-based capital entails increased reliance on internal financing sources such as retained earnings and cash.

Using a large sample of 25,650 firm-year observations from 47 countries over the period 1990–2019, we find significant positive peer firm effects on cash holdings. Specifically, our results which are robust to endogeneity concerns and the reflection problem of Manski (1993) suggest that, on average, a firm increases cash holdings by 5%–7% in response to a one standard deviation increase in peer firms’ cash holdings. This responsiveness which is significantly higher than reported in the US by Chen et al. (2019), highlights the central role of cash holdings in hedging against future shortfalls and enhancing financial flexibility, especially when access to external finance is limited. In further analyses, we find evidence suggesting that firms mimic both increases and decreases in peer firms’ cash holdings, with the former being more pronounced relative to the latter. These findings are

⁶See, Bates et al. (2009), Bao et al. (2012) and He and Wintoki (2016).

robust to alternative model specifications, endogeneity issues, using alternative peer firm reference groups, and controlling for industry, country and year fixed effects, and several firm-specific and macroeconomic factors. Overall our study provides new corroborative evidence on the importance of peer effects or industrial dynamics in shaping corporate decisions and how firms respond to their peers or rivals across countries.

We further document significant heterogeneity in peer effects conditional on several measures of institutional development. To this end, we partition our sample into two subgroups based on the median of the rule of law, property rights, regulatory quality, control of corruption, government effectiveness, financial development, financial institutions, financial markets and national income level. Specifically, we find that peer effects are significant and more pronounced in countries with developed legal systems, higher national governance quality and developed capital markets. These findings show that the international data does not support the learning-based motive (Lieberman and Asaba, 2006), as mimicking is less pronounced and not significant in less-developed economies, a context where the need to learn (new information or insights) from rivals or peers is more pressing. Instead, the international data support the rivalry-based proposition (Lieberman and Asaba, 2006), as peer effects are only significant for firms in developed economies. The need to enhance financing and strategic flexibility are more pressing for firms in developed markets due to the increasingly competitive product markets, especially with the transition from a manufacturing base (tangibles) towards a service and technology base (intangibles). Therefore, the learning-based motive is less plausible in this context as developed markets are more informational efficient, which reduces the need for imitating rivals or peer firms to learn new or valuable information. As such, firms operating in this more informational efficient context are likely to imitate cash holdings for reasons linked to enhancing or attaining financing flexibility, enabling them to stay abreast with or ahead of competitors.

Our final analyses show significant positive effects of mimicking cash holdings on shareholder value, with this impact being more pronounced for firms in developing countries than those in developed countries. We interpret the positive and more pronounced

peer effects for countries with less-developed institutions as suggestive evidence of the benefits of mimicking cash holdings which takes the form of enhanced financial flexibility. Notably, maintaining or improving financial flexibility is *per se* more valuable in developing markets where access to external financing is limited. However, mimicking is less beneficial or detrimental in bad economic states (crisis period) relative to good economic conditions (pre-crisis period). We attribute these findings to the distractions of mimicking behaviour, which are apparent during the financial crisis when resources should be used to the fundamentals. Our international dataset supports this interpretation as we further find that while non-mimicking firms burnt through cash to fend off the adverse effects of the financial crisis, mimicking firms surprisingly maintained or increased their cash balances. Overall, our results, which are robust to using different approaches for identifying mimicking (non-mimicking) firms, suggest that mimicking has real implications on shareholder value.

To the best of our knowledge, our study is the first to extend the study of peer effects on cash holdings to other understudied countries, which are institutionally distinct from the US. In doing so, we test findings in the extant literature using an independent international sample that increases our ability to discriminate among alternative and often contrasting motives for mimicking. Peer effects emerge from our analyses as critical determinants of cash holdings in addition to other firm-specific and macroeconomic factors. Our further investigations reveal new empirical evidence suggesting that peer effects on cash holdings vary significantly with institutional development. This finding, which is central to our study, suggests that institutional development matters not only for the decision to hoard or disgorge cash but extends to whether or not firms mimic their rivals or peers' cash holding policies. Our findings are essential as peer effects could potentially transmit firm-specific or idiosyncratic shocks within and across industries and countries.

We also explore, for the first time, the financial implications of mimicking cash holdings. For this part of our analysis, we use a *quasi-natural experiment* in the form of the financial crisis, which is primarily exogenous (it originated in the US sub-prime mortgage crisis), hence, orthogonal to local investment opportunities and credit market conditions.

In this respect, our study differs from [Fairhurst and Nam \(2018\)](#), who find that mimicking capital structure increases the financial risk (the probability of default) and reduces future profitability. Instead, we conjecture that the financial implications of mimicking peer firms' capital structure are markedly different from those for cash holdings. This situation arises as mimicking increases in capital structure might inadvertently increase financial distress while mimicking cash holdings hedges against financial distress and enhances financial flexibility. Mimicking cash holdings strengthen rather than weaken the firm's strategic position, which ultimately boosts firm performance and shareholder value. Therefore, there is a much higher incentive, *ceteris paribus*, to mimic cash holdings given its positive effects on firm performance and shareholder value.⁷

The rest of our paper is organised as follows. Section 2 presents the literature review and hypotheses. Section 3 describes the methodology used. Section 4 presents that data. Next, Section 5 presents and discusses the empirical results. Section 6 presents the robustness tests, and Section 7 summarises and concludes.

2 Literature review and hypotheses

The motives for mimicking can be broadly categorised into information and rivalry-based theories ([Lieberman and Asaba, 2006](#)). On the one hand, the information-based theories posit that managers mimic policies of peers they perceive to be leaders to learn about the uncertain market prospects and, in the process, reduce information search effort and costs (see [Fairhurst and Nam, 2018](#); [Francis et al., 2016](#); [Grennan, 2019](#); [Leary and Roberts, 2014](#); [Lieberman and Asaba, 2006](#)). Consistent with this proposition, several studies report empirical evidence suggesting that mimicking is more likely amongst firms with the greatest motivation to learn ([Foucault and Fresard, 2014](#); [Francis et al., 2016](#); [Leary and Roberts, 2014](#)). In particular, smaller, less profitable, non-dividend paying and unrated firms have a stronger incentive to mimic their rivals to learn ([Leary and Roberts, 2014](#)). Such firms are usually credit-constrained and likely to have no comparative advan-

⁷Mimicking capital structure is less likely to be pronounced within developing markets as access to external finance is limited ([Guariglia and Yang, 2018](#)). Where available, external finance tends to be costly ([Machokoto, 2020](#)), predominantly short-term in nature ([Sorge et al., 2017](#)) and has restrictive covenants ([Gwatidzo and Ojah, 2014](#)). The slower adjustment speeds of capital structure relative to cash holdings provide supporting evidence of the differences in adjustment costs between internal and external forms of financing (see [Oztekin and Flannery, 2012](#); [Orlova and Rao, 2018](#)).

tages in gathering new information or insights (Chen et al., 2019). Consequently, these firms mimic to avoid or reduce information search effort or costs strategically (Lieberman and Asaba, 2006). For our case, the accumulation of cash reserves enhances a firm’s ability to fund investments (financial flexibility); hence, it is likely to send a cost-effective and more credible signal to rival firms about future investment opportunities (Chen et al., 2019). Therefore, firms mimic the cash holdings of their rivals or peers to learn or gain new information about future investment opportunities or market prospects.

On the other hand, rivalry-based theories posit that firms mimic their peers or rivals as a preemptive tool to maintain or gain a competitive advantage in the product market (Lieberman and Asaba, 2006). In the case of cash holdings, firms can strategically use cash reserves to enact barriers to entry through either aggressive pricing (Bolton and Scharfstein, 1990) or funding investments in innovation aimed at enhancing their market position (Aghion et al., 2005; Machokoto et al., 2021). Thus, increases in cash holdings by rivals or peer firms might prompt a firm to similarly hoard cash. By mimicking peer firms’ cash holdings, a firm can maintain or bolster its competitive position in the product market.⁸ Against this background, we formulate and test the following hypothesis:

Hypothesis 1: *Peer effects have a positive effect on cash holdings.*

To better understand the forces or motives driving mimicking, we next examine whether peer effects vary with the strength and quality of national institutions. For this study, we define less/more developed institutions based on the rule of law, property rights, regulatory quality, control of corruption, government effectiveness, financial development, financial institutions, financial markets, MSCI Index (Morgan Stanley Capital International Market Framework), national income level. In addition, given the multifaceted nature of institutions and for robustness, we also use political stability, newspaper circulation, foreigner ownership, innovation (Researchers in R&D per million people) and legal origin as alternative proxies for institutional development.

We hypothesise that variations in institutional development influence mimicking be-

⁸This prediction is supported by Chen et al. (2019), who finds that a firm responds to the growth in a competitor’s size by hoarding more cash.

haviour on cash holdings. Specifically, peer effects are more likely to matter for learning-based reasons in emerging markets due to high information asymmetry, low transparency, and constrained credit supply. In such an environment, the actions or activities of peer firms perceived to have superior information might send a credible signal to less informed rivals about potential investment opportunities or market prospects. This conjecture is plausible for cash holdings, which are vital for enhancing financial flexibility (see [Ang and Smedema, 2011](#); [Denis, 2011](#); [Marchica and Mura, 2010](#)), especially in developing capital markets where access to external finance is limited. Consistent with our narrative, [Faulkender and Wang \(2006\)](#), and [Denis and Sibilkov \(2010\)](#) find that cash is more valuable for firms likely to experience difficulties in accessing external finance. The high information asymmetry and low information disclosure synonymous with emerging markets also imply that firms expend considerable effort and resources to get actionable market insights or information. This argument is supported by [Fairhurst and Nam \(2018\)](#), who find that firms mimic their peers' financing policies to avoid information search effort and costs. Against this background, firms are more likely to mimic rivals or peer firms' cash holdings for learning-related motives in countries with high information asymmetry or low transparency — less-developed institutions.

In contrast, peer effects on cash holdings are also likely to matter for rivalry-based motives, especially in developed markets characterised by high product market competition. [Lyandres and Palazzo \(2016\)](#) find supporting evidence for this prediction as they report that the intensity of product market competition significantly influences a firm's cash holdings. They further find that cash reserves strategically increase financing flexibility in highly competitive product markets, enabling firms to invest in innovation that enhances or protects their competitive positions. Likewise, [Chen et al. \(2019\)](#) find supporting evidence suggesting that the accumulation of cash by competitors signals potential investment opportunities, which prompts rival firms to similarly hoard cash. Therefore, the need to enhance strategic financing flexibility *via* the accumulation of cash reserves is more pressing in highly competitive product markets — countries with more developed institutions. This need is increasingly becoming paramount with the transition of

economies from tangible capital towards intangibles and services. Following the above discussion, we formulate and test the following hypotheses.

Hypothesis 2: Peer effects are more pronounced in more (less) developed institutions because rivalry-based motives outweigh (exert less influence than) learning-based motives.

After establishing whether peer effects matter, it is imperative to extend our analysis to the implications, if any, of mimicking on shareholder value. These implications relate to the precautionary and agency motives for holding cash. The precautionary motive suggests that firms hoard cash to address liquidity concerns and take advantage of future investment opportunities ([Amess et al., 2015](#)). Hoarding cash improves the firm's financial flexibility ([Denis, 2011](#)), which might be valuable, especially for credit-constrained firms. According to [de Jong et al. \(2012\)](#), firms hoard cash and preserve debt capacity to finance future investment opportunities and hedge against contractions in credit supply. In a related study, [Ferrando et al. \(2017\)](#) find similar evidence as financially flexible firms (cash-rich firms) operating in less-developed capital markets and weak institutional environments are less susceptible to credit supply shocks and have relatively higher investments. It is, therefore, not economically unreasonable to expect firms to benefit from bolstering their cash holdings by mimicking peer firms and for these benefits to be more pronounced in countries beleaguered by institutional voids.

Notwithstanding the above, agency costs might outweigh the advantages of enhanced financial flexibility, especially during crisis periods. According to [Jensen \(1986\)](#), excess free-cash flows might exacerbate the conflicts of interest between managers and shareholders. Following this argument, agency costs are likely to have adverse effects on the financial viability of mimicking firms, especially during periods characterised by high uncertainty such as the financial crisis. Also, during such periods of high uncertainty, imitation might lead to undesirable outcomes as managers are likely to be less focused on the firm's fundamentals or competitive advantages ([Fairhurst and Nam, 2018](#); [Gyimah et al., 2020](#); [Lieberman and Asaba, 2006](#)). In a related study, [Nason and Patel \(2016\)](#) find a non-linear relationship between firm value and cash holdings, with diminishing re-

turns of holding cash setting in faster during the financial crisis relative to the pre-crisis period. At the same time, they also find that the benefits of holding cash are relatively higher in the pre-crisis period. We, therefore, contend that during a period of heightened uncertainty such as the financial crisis, managers of mimicking firms might pay less attention to fundamentals/factors that are more pertinent to the survival of their firms. This situation arises as managers of mimicking firms are more likely to be focused on the actions or policies of rivals or peer firms, which could adversely affect shareholder value. Following on the above predictions, we formulate and test the following hypothesis:

Hypothesis 3: *Mimicking is beneficial in non-crisis periods, but less-beneficial or distracting during the financial crisis.*

3 Methodology

To investigate peer firms' influence on cash holdings, we use the following baseline model of [Leary and Roberts \(2014\)](#):⁹

$$y_{ijkt} = \alpha + \beta \bar{y}_{-ijkt} + \gamma' \bar{\mathbf{X}}_{-ijkt-1} + \boldsymbol{\lambda}' \mathbf{X}_{ijkt-1} + \psi' \nu_j + \varphi' \nu_k + \phi' \nu_t + \epsilon_{ijkt} \quad (1)$$

where y_{ijkt} is cash holdings for firm i in industry j and country k at time t , α is a constant, β , $\boldsymbol{\gamma}'$ and $\boldsymbol{\lambda}'$ are the vectors of coefficients to be estimated, $\bar{y}_{-ijkt}$ is the peer firm average cash holdings excluding firm i , $\bar{\mathbf{X}}_{-ijkt-1}$ and $\mathbf{X}_{ijkt-1}$ are vectors of peer firm averages and firm-specific characteristics, respectively. ν_j , ν_k and ν_t are industry, country and year-fixed effects, respectively.¹⁰ Finally, ϵ_{ijkt} is the firm-year specific error term. In line with [Leary and Roberts \(2014\)](#), we assume that ϵ_{ijkt} is correlated within firms and heteroskedastic. The peer firms' average attributes or characteristics are calculated as the average of all firms within an industry-country-year excluding the i^{th} observations. For the main analyses, we define the industry based on the 8-digit Industry Classification Benchmark (ICB).¹¹ The vectors $\bar{\mathbf{X}}_{-ijkt-1}$ and $\mathbf{X}_{ijkt-1}$ include profitability (ROA), To-

⁹Several other studies which examine peer effects on corporate decisions use the same model (see [Adhikari and Agrawal, 2018](#); [Bustamante and Fresard, 2017](#); [Chen et al., 2019](#); [Francis et al., 2016](#)).

¹⁰For the industry-fixed effects, we use the ICB two-digit industry code, a lower level of granularity, as cash holdings are less likely to vary significantly at the higher levels of industrial granularity, more so, in smaller economies. This approach is in line with [Adhikari and Agrawal \(2018\)](#).

¹¹For robustness, we present results based on several other industrial classification schemes.

bin’s q , size, net working capital (NWCA — excluding cash and short-term debt), debt, capital expenditure (Capex), research and development (R&D), GDP growth and inflation. These factors are informed by the literature and defined in Appendix A. To control for other channels through which peer firms might influence cash holdings of the focal firm, we also include peer averages of other firm-specific factors and the idiosyncratic equity risk of the focal firm. This approach aligns with the emerging literature on peer effects (see [Adhikari and Agrawal, 2018](#); [Francis et al., 2016](#); [Gyimah et al., 2020](#); [Leary and Roberts, 2014](#)).

We split the sample into two subgroups to examine whether peer effects are heterogeneous conditional on institutional development. Specifically, we subdivide the sample based on whether the country is above-median (high) and below-median (low) for each corresponding non-dichotomous institutional factor.¹² For the dichotomous or binary measures of institutional development (legal origin and national income level classification by The World Bank), we categorise countries based on whether the attribute under consideration is present or absent. The measures of institutional development we use include; the rule of law, property rights, regulatory quality, control of corruption, government effectiveness, financial development, financial institutions, financial markets, MSCI Index, national income level, political stability, newspaper circulation, foreigner ownership, innovation and legal origin. The literature informs our choice of the measures of institutional development, which broadly relate to national governance quality, the legal environment, level of financial development and information environment (see [La Porta et al., 2006](#); [Levine et al., 2018](#); [La Porta et al., 2008](#)).

The main challenge that studies on peer effects have to address relates to the “reflection problem” (see [Manski, 1993](#)), whereby it is not possible to draw meaningful inferences on whether average group behaviour influences an individual who belongs to the group. To address the reflection problem, we estimate Equation (1) using two-stage least squares (2SLS), instrumenting for the endogenous peer firm average cash holdings with peer

¹²Our untabulated results with categorisations of firms based on above (below) -mean values of each of the non-dichotomous measures of institutional development show qualitatively similar differences in responses to peer firms. The results for alternative sub-samples are available upon request.

firms’ idiosyncratic equity risk ($\overline{\text{ERisk}}$). The extant literature informs our choice of the instrument.¹³ To construct our instrument, we first calculate the monthly residual returns from an augmented market model for stock returns that includes the excess return on an equally weighted industry portfolio (excluding the focal firm) (see [Leary and Roberts, 2014](#)). Following [Adhikari and Agrawal \(2018\)](#), we then calculate the annual idiosyncratic equity risk as the standard deviation of idiosyncratic stock returns. Next, we construct the instrument, peer firms’ idiosyncratic equity risk ($\overline{\text{ERisk}}$), in a similar way as peer firm averages in Equation (1). Appendix B presents a detailed discussion of the instrument’s construction and relevant summary statistics.

Our instrumental variables estimation requires the instrument, peer firms’ idiosyncratic equity risk, be relevant (the instrument should be correlated with the endogenous peer firm average cash holdings) and satisfy exclusion restrictions (the instrument does not directly affect the dependent variable — cash holdings of the focal firm). The first condition, the relevancy of our instrument, can be checked *via* the significance of the First-Stage F-statistic (the goodness-of-fit of the “first stage” regressions). Accordingly, for our 2SLS regressions, we present the First-Stage F-statistic, which is large and greater than the minimum critical value of 10 in all cases ([Staiger and Stock \(1997\)](#)’s rule of thumb). The large First-Stage F-statistic supports our instrument’s relevance; hence, our 2SLS estimates are unlikely to suffer from weak instrument problems. However, we cannot test the second condition relating to the instrument’s validity in our exactly identified case. We, therefore, rely on theory and extant literature, which has shown that peer firms’ idiosyncratic equity risk is reliably orthogonal to the focal firm (see [Adhikari and Agrawal, 2018](#); [Leary and Roberts, 2014](#)). At the same time, it correlates significantly with peer firms’ average cash holdings, suggesting that it is a good candidate for instrumenting the endogenous variable.

For robustness and to facilitate comparisons with prior studies, we re-estimate our main models using several other estimation techniques, namely; the generalised method of

¹³Several other studies on peer effects have used a similar instrument based on idiosyncratic stock returns (see [Adhikari and Agrawal, 2018](#); [Fairhurst and Nam, 2018](#); [Francis et al., 2016](#); [Grennan, 2019](#); [Leary and Roberts, 2014](#)).

moments (IV-GMM), limited-information maximum likelihood (IV-LIML), GMM continuously updated estimator (IV-CUE), instrumental variable tobit — maximum likelihood estimator (IV-TOBIT1), instrumental variable tobit — two-step estimator (IV-TOBIT2), instrumental variables regression with potentially weak instruments (COND-IV), and instrumental variables estimation using heteroskedasticity-based instruments (2SLS-H and IV-GMM-H). The latter two instrumental variables estimation techniques, 2SLS-H and IV-GMM-H, address the lack of appropriate instruments *via* a heteroscedasticity-based identification strategy of [Lewbel et al. \(2012\)](#). Using this approach, external instruments are augmented by internally-generated instruments from higher-order moments of our dataset. This heteroscedasticity-based identification strategy enables the identification of structural parameters in a regression model with endogenous or mismeasured regressors in the absence of repeated measurements or external instruments (see [Baum et al., 2013](#); [Lewbel et al., 2012](#)).

4 Data

Our firm-level dataset is drawn from Datastream over the period 1990—2019. Macroeconomic, financial development and national governance quality data is drawn from The World Bank (WB), The International Monetary Fund (IMF) and The Worldwide Governance Indicators (WGI) project, respectively. The sample period is restricted by data availability. Following extant literature, we apply several filters to the data. First, we exclude firms in regulated sectors (financial and utility sectors). Second, we exclude firms with missing data on key variables and asset or sales growth greater than 100%. Third, we also exclude firms with less than five observations, industries with less than five firm-country-year observations, and countries with less than fifty firm-year observations. Finally, we winsorise firm-specific variables at the lower and upper one percentile of the distribution to reduce/limit the impact of possibly spurious outliers. After applying the above filters, our final sample consists of 298,985 firm-year observations (25,650 firms) from 47 countries, forming 434 industry-country combinations based on the 8-digit Industry Classification Benchmark (ICB).¹⁴ All variables used are defined in [Appendix A](#).

¹⁴There are 135 unique industries over the sample period based on the 8-digit Industry Classification Benchmark (ICB). To check the robustness of our results, we also use other industrial categorisations

Table 1 presents the summary statistics for the main variables.¹⁵

PLEASE INSERT TABLE 1 HERE

Table 1 shows that the mean (median) cash holdings is 15.7% (11.6%), which is comparable to firms in the US with 15.4% (8.8%). Of particular interest is the positive and significant trend of cash holdings, which is in line with prior studies (see [Bao et al., 2012](#); [Bates et al., 2009](#); [Graham and Leary, 2018](#)). This trend highlights the rising importance of cash holdings in corporate financing decisions, with economies shifting towards a predominantly intangible capital base. However, the increase is surprising given advances in information technology and capital markets (see [Philippon, 2015](#)), which should result in less hoarding of excess cash balances as firms can now more easily access external funding sources. Therefore, these dynamics are of interest to researchers, practitioners, and policymakers as excessive or idle cash balances impact efficient resource allocation. The summary statistics of other firm-specific factors and macroeconomic factors are as expected and in line with the literature examining cash holdings.

PLEASE INSERT TABLE 2 HERE

Table 2 presents the cross-sectional differences in cash holdings conditional on the rule of law, property rights, regulatory quality, control of corruption, government effectiveness, financial development, financial institutions, financial markets, MSCI Index (EME — emerging economies *vs* DME — developed economies), national income level (Low *vs* High), political stability, newspaper circulation, foreigner ownership, innovation and legal origin. Our results show that firms in primarily developed economies (Regime 2) consistently hold more cash balances. The only exception relates to sub-samples based on legal origin, wherein firms in civil law countries (Regime 1) have significantly more cash balances than those in common law countries. The significantly higher cash holdings for firms in countries with well-developed legal systems, higher national governance quality and more developed capital markets *a priori* suggest that cash holdings are driven, in our case, more by product market competition rather than the lack of access to finance.¹⁶

based on the Standard Industrial Classification (SIC) and Fama-French Industrial Classification (FF).

¹⁵Appendix C presents the distribution of the sample across industries and countries.

¹⁶Our untabulated results (available upon request) show a significant negative trend in the industrial

The differences across the sub-samples provide preliminary evidence of significant heterogeneity that is not explained by the limited access to external finance proposition (see Bates et al., 2009; Opler et al., 1999) as cash holdings are lower rather than higher in markets where access to finance is supposedly limited (in less-developed capital markets).

PLEASE INSERT TABLE 3 HERE

Table 3 presents pairwise spearman correlations for all variables used. As expected and consistent with our predictions, cash is positively and significantly correlated with peer firms' cash holdings ($\overline{\text{Cash}}$). We further find that market-to-book (Tobin's q), R&D and other alternative proxies of cash (Cash2, Cash/NA, Cash2/NA and ΔCash) are positively and significantly correlated with cash holdings. Table 3 also shows that cash holdings are negatively and significantly correlated with profitability (ROA), size, NWCA, debt, capital expenditure (Capex), cash flow (Cashflow), property, plant and equipment (PPE), GDP growth and inflation. Overall the pairwise correlations are as expected.

5 Empirical results

5.1 Do peer effects matter?

Table 4 summarises the results estimation Equation (1). Columns (1)—(2) and (3)—(6) present results based on OLS and 2SLS, respectively. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity).

PLEASE INSERT TABLE 4 HERE

Column (1) and (2), in Table 4, based on conventional OLS regressions, show a significant positive effect of peer firms ($\overline{\text{Cash}}$) on cash holdings. The estimated coefficients of 0.678 and 0.675, in Columns (1) and (2), respectively, suggest that, on average, a one standard deviation increase in peer firms' cash holdings leads to approximately a 5% (0.678×0.074 and 0.675×0.074) increase in a firm's cash holdings.¹⁷ The results for control variables (other peer firm averages, firm-specific and macroeconomic factors), in concentration ratio measured by the Herfindahl-Hirschman Index (HHI), suggesting an increase in product market competition over the sample period. Our further analyses show that the HHI Index is lower (higher) in countries with stronger (weaker) institutions. These differences imply that the higher and rising cash holdings in countries with stronger institutions are more linked to product market competition than limited access to external finance.

¹⁷The one standard deviation change in cash holdings is a product of the standard deviation (0.074) and coefficient of peer firms' cash holdings.

Columns (1)—(2), are of the expected sign and for brevity and given our focus, we do not further discuss them. Our regression models include peer firm averages of other firm-specific factors to account for other channels through which peer firms might influence the focal firm’s cash holdings. Consistent with our expectations, the peer firm averages of other firm-specific factors, in Columns (1) and (2), on average, appear to have a lower impact on cash holdings relative to peer firms’ cash holdings, our main variable of interest. However, due to the reflection problem highlighted by [Manski \(1993\)](#), our estimates of peer effects based on OLS regressions are potentially biased; henceforth, we focus on 2SLS estimates. We, nevertheless, present the estimates based on OLS regressions in [Table 4](#) to provide a useful benchmark for the rest of our empirical analyses.

For our 2SLS estimates, in Columns (3) and (4), we find significant positive coefficients of peer firms’ cash holdings (0.929 and 0.932). These coefficients imply that the focal firm, on average, increases cash holdings by 6.9% (0.929×0.074 and 0.932×0.074) in response to a one standard deviation increase in peer firms’ cash holdings. The results in Columns (3) and (4) are consistent with Hypothesis 1. Comparatively, the responsiveness to peer firms that we document is higher than estimates of [Chen et al. \(2019\)](#) for US firms, suggesting that industrial benchmarking plays a more prominent role in shaping corporate policies of firms in other countries. Our further analyses, in Columns (5) and (6) for decreases ($\Delta\text{Cash} < 0$) and increases ($\Delta\text{Cash} > 0$) in cash holdings, respectively, show similarly significant peer effects. This finding provides further empirical evidence suggesting firms mimic both decreases and increases in peer firms’ cash holdings, with the former being more pronounced relative to the latter. Therefore, the analyses, in [Table 4](#), provide new corroborative empirical evidence of significant peer effects and asymmetries on cash holdings, which are of interest to academics, practitioners, and policymakers.

5.2 *Does the institutional environment/context matter?*

While the above results show significant positive peer effects, they do not directly discriminate between two plausible and often contradictory motives for mimicking. Thus far, it is not clear whether firms mimic to keep abreast or ahead of competitors (the rivalry-based motives of mimicking) or mimic to learn new market insights from rivals perceived

to have superior information (the learning-based motives for imitating). Focusing on asymmetries conditional on institutional development enables us to discriminate between the two propositions as mentioned above. On the one hand, less-developed institutions are likely to result in high information asymmetry (low transparency and information disclosure), leading to mimicking consistent learning-based motives. On the other hand, good institutions promote transparency and high information disclosure, which boosts product market competition, resulting in mimicking more in line with the rivalry-based motives. Accordingly, we next examine asymmetries or variations in peer effects conditional on several measures of institutional development.

To accomplish the above objective, we partition our sample into two subgroups based on the median of the rule of law, property rights, regulatory quality, control of corruption, government effectiveness, financial development, financial institutions, and financial markets. For the dichotomous institutional development, we categorise countries into emerging and developed subgroups based on the MSCI Index (EME — emerging economies *vs* DME — developed economies) and income subgroups (Low *vs* High) based on the World Bank (WB) classification. Table 5 summarises the results estimating Equation (1) for the sub-samples.

PLEASE INSERT TABLE 5 HERE

Panel A of Table 5 shows significant heterogeneity in peer effects conditional on institutional development. Specifically, in Columns (1)—(2), we note that peer effects are significant and more pronounced for firms in countries with a higher score for the rule of law. Similarly, Columns (3)—(4), (5)—(6), (7)—(8) for sub-samples based on property rights, regulatory quality, control of corruption and government effectiveness, respectively, show that peer effects matter most in countries with more developed legal systems and higher national governance quality. Overall the results show significant asymmetries or differences in the coefficients of peer firms' cash holdings, suggesting that institutional factors — legal systems and national governance quality — influence how the focal firm responds to peer firms.

The above results, in Panel A of Table 5, do not support the proposition that firms

mimic to gain or learn new information, which are mimicking motives more pertinent in countries with less-developed legal systems. Such environments, as reported in several studies (see [Asli et al., 2005](#); [Beck et al., 2003](#); [La Porta et al., 2002, 1997](#)), are, on average, characterised by high information asymmetry or degree of opaqueness, thereby making the learning-based motives of mimicking more relevant or applicable. However, as shown in Panel A of Table 5, the learning-based motives of mimicking are not supported by the international data for our case of peer effects on cash holdings.

Instead, the significant and more pronounced peer effects in countries with well-developed legal systems are in sync with the rivalry-based motives of mimicking (Hypothesis 2), positing that firms mimic to stay abreast or ahead of competitors. This need to stay abreast or ahead of competitors is more pressing for firms in advanced economies, where product market competition is intense.¹⁸ Also, the rivalry-based motives of mimicking are more plausible for cash holdings, which hedge against financial distress and enhance financial flexibility. Over the past decades, the build-up of cash holdings has drawn significant research interest as economies transit from predominantly manufacturing sectors toward technology and service-based sectors.¹⁹ This economy-wide shift, as reported by [Bartram et al. \(2009\)](#), [Comin and Philippon \(2006\)](#) and [He and Wintoki \(2016\)](#) for the case of US firms, has significantly increased idiosyncratic risk. Firms respond to this economy-wide shift and change in their investment portfolios by reducing financial risks — increasing cash holdings and reducing corporate debt — in line [Krainer \(2014\)](#)’s model. Therefore, for firms in developed economies, maintaining financial flexibility is increasingly becoming an important strategic objective; hence, the more pronounced peer effects.

Next, in Panel B of Table 5, we examine the impact of financial development and national income level (Low *vs* High) on mimicking. In Columns (1) and (2), we find that peer effects are positive and significant only for firms in countries with high levels of finan-

¹⁸Our untabulated results (available upon request) show a lower level of industrial concentration ratio as measured by the Herfindahl-Hirschman Index — HHI for advanced economies.

¹⁹Several studies report the marked increase in cash holdings and innovation/intangible assets, which is consistent with the shift in the economy towards technology and service-based sectors (see [Bates et al., 2009](#); [Brown and Petersen, 2011](#); [Borisova and Brown, 2013](#); [Buera and Kaboski, 2012](#); [He and Wintoki, 2016](#); [Witt and Gross, 2020](#)).

cial development. Columns (3)—(4) and (5)—(6), for categorisations based on the levels of development of financial institutions and markets, respectively, show similarly significant peer effects for firms in more developed capital markets. To assess the robustness of our results, we also, in Columns (7)—(8) and (9)—(10), present results for sub-samples of emerging *vs* developed markets (MSCI Index) and low *vs* high-income (World Bank Classification), respectively. We find similarly consistent results with firms in developed economies or capital markets for these additional or alternative classification schemes being significantly more responsive to their peers than comparable counterparts in less-developed economies or capital markets. Overall, these results support the rivalry-based motives of mimicking (Hypothesis 2) as firms in more developed capital markets (for which peer effects are significant in our case) are less subject to information asymmetry upon which the learning-based motives of mimicking are premised.

In summary, our results suggest that the legal system, national governance quality and financial development significantly influences mimicking behaviour.

5.3 Does mimicking peer firms matter?

Although our results thus far suggest that institutional development matters for peer effects on cash holdings, they are silent on the implications, if any, of mimicking on shareholder value. To shed light on this important but under-researched issue, we examine how mimicking affects shareholder value conditional on several measures of institutional development. Specifically, we test whether mimicking affects firm value using a *quasi-natural experiment*. Our *quasi-natural experiment* is centred around the 2008-09 credit supply shock (the financial crisis), which is reliably orthogonal to the local investment opportunities of non-financial firms given that it originated in the banking/financial sector (the US sub-prime mortgage crisis) (see Almeida et al., 2012; Kahle and Stulz, 2013; Popov and Zaharia, 2019; Puri et al., 2011). More so, for non-financial firms operating in economies that are less integrated with the US. Therefore, the financial crisis provides a rare and unique *quasi-natural experiment* setting spanning across countries.

To identify mimicking firms, we follow Fairhurst and Nam (2018) and Machokoto et al. (2021), and use the regression diagnostic statistic (DFBETA). Specifically, we estimate

Equation (1) *via* OLS as in Column (4) of Table 3, and then use the DFBETA statistic to gauge the influence of each observation on the coefficient of peer cash holdings. Next, we categorise mimicking (non-mimicking) firms as those with an above-median (below-median) DFBETA statistic in each country-year. Using categorisations based on the median is a more conservative approach relative to upper (lower) deciles/quartiles of the distribution, which increase the likelihood of finding significant differences between subgroups as they are likely to capture outliers. Our untabulated results (available upon request) with categorisations of mimicking (non-mimicking) firms based on above-mean (below-mean) of the DFBETA statistic show significant and qualitatively similar differences between mimicking and non-mimicking firms.

To study the impact of mimicking on shareholder value, we estimate the following linear model that includes a mimicking dummy as described above:

$$y_{ijkt} = \gamma_0 + \gamma_1 Crisis_t + \gamma_2 Mimicking_{ijkt-1} + \gamma_3 Crisis_t \times Mimicking_{ijkt-1} + \boldsymbol{\theta} \mathbf{Z}_{ijkt-1} + \mu_j + \mu_k + \xi_{ijkt} \quad (2)$$

where y_{ijkt} is the value (Tobin's q) of firm i in industry j and country k at time t ; γ_0 is a constant; γ_1 , γ_2 , γ_3 , and $\boldsymbol{\theta}$ are the vectors of coefficients to be estimated; $Crisis_t$ is a dummy variable that takes the value of one for the period 2008—2012 and zero otherwise; $Mimicking$ is a dummy variable that takes the value of one for mimicking firms and zero otherwise; $\mathbf{Z}_{ijkt-1}$ is a vector of lagged control variables discussed below; μ_j and μ_k are industry and country-fixed effects, respectively; and ξ_{ijkt} is the error term. The lagged control variables in vector $\mathbf{Z}_{ijkt-1}$ are: cash flow (*Cashflow*), size (*Size*), property, plant and equipment (*PPE*), capital expenditure (*Capex*), research and development (*R&D*), debt (*Debt*), GDP growth (*GDP growth*), and inflation (*Inflation*). As in the preceding sections, all variables are defined in Appendix A. We estimate Equation (2) using fixed effects and report standard errors that are robust to heteroskedasticity.

PLEASE INSERT TABLE 6 HERE

Table 6 summarises the results estimating Equation (2) for the *quasi-natural experiment* around the financing crisis. Panel A and B of Table 6 show that the mimicking

coefficient (*Mimicking*) is consistently positive and significant. This finding is consistent with Hypothesis 3. It suggests that mimicking is, on average, beneficial in non-crisis periods as it enables firms to avoid information search effort and costs incurred in optimising corporate decisions. However, this positive effect of mimicking is more pronounced in countries with less-developed legal systems, lower national governance quality, and less-developed capital markets. For firms in such environments, the information search effort and costs are substantial as less-developed capital markets are characterised by lower transparency or information disclosure. Therefore, mimicking is more beneficial in this context as it reduces such substantial information search effort and costs.

We attribute the diminished or lower benefits of mimicking in developed markets to the higher levels of product market competition and better access to several financing sources, making the hoarding of excess or idle cash balances less optimal or sub-optimal. Our interpretation of the diminished benefits of mimicking in developed economies is in line with Kling et al. (2014), who documents an inverted U-shaped relationship between firm value and cash holdings in the US. Similarly, Gyimah et al. (2020) and Machokoto et al. (2021) find diminishing benefits of mimicking with the intensity of mimicking and product market competition on trade credit and innovation, respectively. Our results, on overall, suggest that blending or aligning with peer firms is beneficial given that; (1) firms can avoid substantial information search effort and costs incurred in optimising corporate decisions, and (2) at the same, accumulating cash reserves enhances financial flexibility that is essential for firm survival and growth. These findings are more so when access to external finance is limited (especially in emerging markets) and given the transition of economies from an industrial-base predominance towards a knowledge-base.

To better understand whether the impact of mimicking is asymmetric as predicted by Hypothesis 3, we now focus our attention on the crisis dummy (*Crisis*) and the interaction term of the crisis dummy variable with the mimicking dummy variable ($Mimicking \times Crisis$). For our *quasi-natural experiment*, in both Panel A and B of Table 6, we find a consistent negative effect of the financial crisis (*Crisis*) on firm value. In addition, this negative impact is significantly higher for firms in developed economies, the origin of the

financial crisis. Our results further show a negative coefficient of the interaction term, $Mimicking \times Crisis$, suggesting that mimicking is less beneficial or distracting during periods of heightened uncertainty — such as the financial crisis. This result, which is consistent across sub-samples, contrasts with the positive effect of mimicking for the non-crisis period when the need to keep abreast or ahead of the competition is more pressing. Mimicking during periods of heightened uncertainty (such as the financial crisis) is likely to result in “diverted attention” arising from managers focusing most of their attention on rivals or peer firms rather than fundamentals impacting their firm. This “diverted attention” is costly, especially in countries with less-developed institutions (where monitoring mechanisms are weak), as it could potentially lead to sub-optimal decisions.

We are cognisant that the aforementioned negative impact of mimicking — costly mimicking behaviour — might arise from other channels such as binding credit constraints rather than mimicking *per se*, especially in bad economic states such as during the financial crisis. Empirically, if this plausible situation arises, cash balances should decrease rather than increase as firms switch towards internal financing sources (the scramble for cash story) following contractions in credit supply. While we cannot completely rule out this plausible possibility, we account for it *via* including the *Crisis* dummy (capturing the direct effect of the financial crisis on firm value) and controlling for several firm-specific and macroeconomic covariates, some of which directly affect access to external finance (e.g., cash flow, size, tangibility, R&D, debt, GDP growth and inflation). As our regression models account for the direct impact of the financial crisis on firm value *via* the *Crisis* dummy variable and include several controls for firm-specific and country-specific attributes linked to access to credit, we contend that the binding credit constraints channel or narrative, although plausible as we rightfully acknowledge above, is less likely to drive our findings.

To further ally the above concerns, we contrast, in Appendix D, changes in cash holdings between mimicking and non-mimicking firms around the financial crisis. Appendix D shows that, on average, cash holdings increased rather than decreased during

the financial crisis, with this increase being more pronounced for mimicking relative to non-mimicking firms. This increase in cash holdings is not in sync with the binding credit constraints channel predicting a decrease. We also observe that mimicking firms hold more cash reserves, suggesting that they did not strategically use them to wade off the negative impact of credit supply contractions. In untabulated results (available upon request), we also sub-divide our sample into low and high-cash holdings regimes to better understand forces driving the relationship between mimicking and firm value. For the two regimes, we find a more pronounced negative impact of mimicking for firms with higher cash balances, suggesting that our findings are unlikely to be driven simply by the lack of cash situation or narrative whereby firms do not have the luxury of liquidity to mimic (scrambling for cash during the financial crisis). Based on the above additional checks, we, therefore, contend that the plausible binding credit constraints channel (scrambling for cash during contractions in credit supply) is less likely to drive our findings.²⁰

In summary, our findings corroborate [Ganor \(2011\)](#), who find that, during the financial crisis, agency costs (management compensation) led to the sub-optimal hoarding of excess cash balances and curtailment or postponement of investments. Our study builds on and extends this line of inquiry by showing that mimicking (industry or peer benchmarking) cash holdings is not sub-optimal *per se* as it enables a firm to avoid incurring substantial information search effort and costs when optimising its strategic decisions. However, mimicking peer firms' cash holdings might inadvertently be distracting or less beneficial, especially during periods of heightened uncertainty (such as the financial crisis) when managers need to focus on fundamentals affecting their firm instead of those for rivals or peer firms. More so, in our case, accumulating or building up cash reserves entails the curtailment or postponement of value-enhancing projects.

6 Robustness

To check the robustness of our results, we implement several tests. First, we assess the sensitivity of our results to using alternative variable definitions of cash holdings. Second, we examine whether cross-industrial variations drive peer effects. Third, we

²⁰We thank an anonymous referee for highlighting these useful extensions that have significantly enhanced our study's expositions.

recognise that time-specific factors or events might influence our results. To address this concern, we re-estimate our regression models across six 5-year and three 10-year non-overlapping sub-periods. Fourth, we gauge the sensitivity of our results to using alternative measures of peer firms based on eleven other industrial classifications. Fifth, we assess the sensitivity of our results to using alternative sets of instruments. Sixth, we re-estimate our models using alternative estimation techniques to assess our results' sensitivity to the choice of estimation approach. Finally, we evaluate the robustness of our findings to using five alternative proxies for the institutional environment.

PLEASE INSERT TABLE 7 HERE

However, having established that peer effects matter, we recognise that the way we define our variables might bias our inferences. To address this concern, in Table 7, we gauge our results' sensitivity to using alternative proxies of cash holdings. Consistent with our main findings, Columns (1)—(4) of Table 7 show that the coefficients of peer firms' cash holdings are consistently positive and significant for cash-to-total assets (Cash2), cash and cash equivalent-to-net assets (Cash/NA), cash-to-net assets (Cash2/NA), change in cash and cash equivalent-to-total assets (Δ Cash). More specifically, a firm increase cash holdings, on average, by approximately 4.9%—18.1% in response to a one standard deviation increase in peer firms' cash holdings. This range of response to peer firms is in line with Table 3 and suggests that peer effects matter for cash holdings and that our findings are robust to using alternative definitions of cash holdings.

PLEASE INSERT TABLE 8 HERE

To allay concerns that specific industries or systematic variations in cash holdings and mimicking by industry could drive our results, in Table 8, we re-estimate our regression models for four broad industrial sectors. These sectors are defined as follows; CDS — consumer discretionary and staples; IND — industrials; OT — other sectors; and TT — technology and telecommunications. Our cross-industrial analyses tabulated in Table 8 show that peer effects are statistically significant at the 1% level in consumer discretionary and staples (CDS), industrials (IND), and technology and telecommunications (TT) while being statistically significant at the 10% level for firms in other industries (OT). These

variations in peer effects are not unexpected given the differences in levels of product market competition across the industries. Overall, these cross-industrial analyses support Hypothesis 1. More importantly, they suggest our findings are robust to industries or systematic variations in corporate cash holdings and mimicking.

PLEASE INSERT TABLE 9 HERE

Additionally, in Table 9, we examine our results’ sensitivity to using alternative sub-periods and around the financial crisis (2002—2007 *vs* 2008—2012). For our empirical analyses of time variations, we sub-divide our sample into six 5-year (1990—1994, 1995—1999, 2000—2004, 2005—2009, 2010—2014, 2015—2019) and three 10-year periods (1990—1999, 2000—2009, 2010—2019). Columns (1)—(6) and (7)—(9), for the 5-year and 10-year sub-periods, respectively, show that, on average, firms significantly respond to their peers. Specifically, a firm, on average, increases its cash holdings by between 5% and 8% in response to a one standard deviation increase in peer firms’ cash holdings. Notably, there is a general increase in response to peer firms of approximately 30% (0.065/0.05-1) and 93% (0.085/0.044-1) based on the non-overlapping 5-year and 10-year sub-periods, respectively. This increase in responsiveness to peer firms is in line with the rising importance of corporate cash holdings (see Bao et al., 2012; Bates et al., 2009, 2018; Graham and Leary, 2018), and more importantly, provides further corroborative evidence of the significant effect of peer firms on corporate decisions.

For our analysis around the financial crisis (2002—2007 *vs* 2008—2012), in Column (10) and (11) of Table 9, we find that peer effects are relatively lower before the financial crisis, which suggests that mimicking is more pronounced in bad economic states (during the financial crisis) when firms seek to “play it safe” or “blend with crowd”. Such herding behaviour could potentially lead to misallocation of resources; hence, it is of particular concerns for policymakers as the accumulation of idle or excess cash balances entail curtailing or postponing investments.²¹ Overall, our analyses around the financial crisis (pre-crisis *vs* post-crisis) reveal significant peer effects, suggesting significant industrial

²¹These findings of an increase in “herding or mimicking behaviour” on cash holdings during a period of heightened uncertainty corroborate Caglayan and Xu (2014), Caglayan and Xu (2016a) and Caglayan and Xu (2016b) who document significant distortionary effects of uncertainty on physical capital investments, bank loans and bank lending behaviour, respectively.

interdependencies, and more importantly, confirm the robustness of our findings.

PLEASE INSERT TABLE 10 HERE

To test the sensitivity of our findings to changing the definition of peer firms or industrial groups, we present, in Table 10, results for peer firms based on the 6-digit Industry Classification Benchmark (ICB6), 1-digit Standard Industrial Classification Code (SIC1), 2-digit Standard Industrial Classification Code (SIC2), 3-digit Standard Industrial Classification Code (SIC3), 4-digit Standard Industrial Classification Code (SIC4), Fama French 12 Industrial Classification (FF12), Fama French 17 Industrial Classification (FF17), Fama French 30 Industrial Classification (FF30), Fama French 38 Industrial Classification (FF38) and Fama French 48 Industrial Classification (FF48). In Table 10, we find that the coefficient of peer cash holdings is consistently positive and significant in line with our main findings. Overall the results suggest that our findings are robust to changing the level and way we define our industries or identify peer reference groups.

PLEASE INSERT TABLE 11 HERE

As the validity of our findings is dependant on the relevance and validity of the instrument, in Table 11, we probe the sensitivity of the results to using alternative sets of instruments. The additional instruments relax the constraint imposed in our exactly identified case, for which we could not test the validity of the instrument. Using additional instruments enables us to formally test their validity *via* the Hansen J-test (overidentification test of all instruments). Columns (1)—(9) of Table 11 show that peer firms have a consistently positive and significant impact on cash holdings of the focal firm for regression models based on the alternative sets of instruments. More importantly, the Hansen J-Statistic of over-identification restrictions is consistently not significant, suggesting that our expanded sets of instruments are appropriate (see Baum et al., 2003, 2008; Roodman, 2006). These additional results suggest that our main findings are robust to using alternative instruments.

PLEASE INSERT TABLE 12 HERE

As additional robustness checks, we use several alternative methods to assess the

sensitivity of our results to the choice of estimation technique. Specifically, in Table 12, we re-estimate our models using generalised method of moments (IV-GMM), limited-information maximum likelihood (IV-LIML), GMM continuously-updated estimator (IV-CUE), instrumental variable tobit — maximum likelihood estimator (IV-TOBIT1), instrumental variable tobit — two-step estimator (IV-TOBIT2), instrumental variables regression with potentially weak instruments (COND-IV), and instrumental variables estimation using heteroskedasticity-based instruments (2SLS-H and IV-GMM-H). Columns (1)—(12), for the results based on different estimation techniques, show consistently positive and significant coefficients of peer average cash holdings. The response of a firm to a one standard deviation increase in peer firms’ cash holdings, on average, ranges from a low of 5.2% based on instrumental variables estimation using heteroskedasticity-based instruments (2SLS-H) to a high of 10.2% for estimates based on 2SLS (excluding industry and country-fixed effects). These differences are not unexpected, given that the estimation techniques are premised on different assumptions and the importance of industry and country-fixed effects in empirical research focusing on corporate decisions. Overall the above range of responses to peer firms’ cash holdings is in line with our main findings and suggests that our results are robust to using different estimation techniques.

PLEASE INSERT TABLE 13 HERE

Finally, in Table 13, we gauge the sensitivity of our results to using alternative proxies for the institutional environment. Specifically, we sub-divide our sample into two groups based on the median (Low *vs* High) of political stability, newspaper circulation, foreigner ownership, innovation and legal origin (civil *vs* common law). In line with Hypothesis 2 and our main results, in Columns (1) — (8) of Table 13, we find that peer effects are significant and more pronounced in countries with higher political stability, newspaper circulation (transparency), foreigner ownership (openness) and innovation (researchers per million people). However, in Columns (9) and (10), we do not find significant differences based on legal origin, suggesting that peer effects matters in both common and civil law countries.²² These additional checks indicate that our findings are robust to using

²²Appendix E shows similar cross-sectional differences for the impact of mimicking conditional on political stability, newspaper circulation, foreigner ownership, innovation and legal origin (civil *vs* common

alternative measures of institutional quality.

Overall the checks or tests consistently show that peer firms significantly influence corporate cash holdings, with this influence being more pronounced in countries with more developed institutions. Our findings are robust to a host of concerns, including using alternative sub-samples, sub-periods, instruments, industrial definitions, estimation techniques and proxies for the institutional environment, and controlling for industry, country and year-fixed effects as well as several firm-specific and macroeconomic factors.

7 Summary and conclusions

Although there is a heightened interest in exploring the impact of peer effects on corporate decisions, most studies are confined to the US, limiting the findings' generalisability to countries with different institutional settings. This paper builds on and extends the literature by examining whether peer firms influence cash holdings across countries with different institutional settings. Our study is motivated by the literature reporting the significant effect of institutional development on corporate decisions; however, it is unclear whether institutional development matters for peer effects on cash holdings and if mimicking peer firms has any real implications on shareholder value.

Using an international firm-level dataset, we find positive peer effects on cash holdings, which remain significant even after controlling for industry, country and year-fixed effects as well as several firm-specific and macroeconomic factors. We also document substantial heterogeneity in peer firms' influence on cash holdings. The peer effects are more pronounced and significant in countries with well-developed legal systems, higher national governance quality, and more developed capital markets. These findings are not consistent with the learning-based motives of mimicking, a major driving force for industrial benchmarking in environments characterised by high information asymmetry levels or low levels of information disclosure.

In contrast, our results support the rivalry-based motives of mimicking, which are more applicable in highly competitive product markets. For firms in highly competitive industries, mimicking is an effective strategy of staying abreast or ahead of the competi-
law), suggesting that our results are robust to using alternative measures of institutional development.

tion as liquidity is increasingly becoming a critical factor for enhancing strategic flexibility with the transition of economies from predominantly manufacturing sectors towards technology and service sectors. At the same time, mimicking enables a firm to avoid or reduce information search effort and costs required when optimising corporate policies.

We further use a *quasi-natural experiment* around the financial crisis to shed light on the implications of industrial benchmarking or mimicking corporate cash holdings. Although this research area is important and interesting to academics, practitioners and policymakers, it has not been comprehensively explored in the extant literature. Our *quasi-natural experiment* shows that mimicking is more beneficial in good economic states (the non-crisis period or normal times) and less pronounced for firms in countries with more developed institutions — legal systems, national governance quality and capital markets. However, industrial benchmarking or mimicking tends to be less beneficial or distracting in bad economic states (the crisis period) characterised by heightened uncertainty. The negative impact we find is attributable to the “diverted attention” of mimicking firms’ managers who are more likely to be less focused on their firms’ competitive advantages or fundamentals but fixated on rival or peer firms. This “diverted attention” could lead to sub-optimal decisions as managers fail to utilise their firm’s competitive advantages critical for survival and growth in bad economic states.

In summary, our study broadly shows that industrial benchmarking or peer effects are non-trivial determinants of corporate cash holdings and vary significantly with institutional quality across countries. At the same time, our study adds new evidence suggesting that mimicking has real implications on shareholder value and is not *per se* a sub-optimal corporate strategy. Peer effects emerge as an interesting area to focus on, given their real implications on shareholder value and potential to attenuate or amplify firm-specific or idiosyncratic shocks within and across industries and countries.

Acknowledgements

We gratefully acknowledge helpful comments and suggestions from Jonathan Batten (The Editor) and anonymous reviewers. We also thank Boulis Ibrahim, Nadeem Aftab, Daniel Gymiah, Anthony Kyiu, Thaana Ghalia, Ouarda Dsouli, Marvelous Kadzima,

Daniel Gyimah and seminar participants at the University of Northampton for useful comments. The usual disclaimer applies.

Credit Author Contribution Statement

Michael Machokoto: Conceptualisation, Methodology, Software programming, Formal analysis, Data curation, Visualisation, Writing-original draft, Writing-review and editing. Chimwemwe Chipeta: Conceptualisation, Supervision, Project administration, Validation, Writing-original draft, Writing-review and editing. Ngozi Ibeji: Validation, Writing-original draft, Writing-review and editing.

Data Availability

The firm-level dataset supporting the findings of this study is available from *Thomson Reuters Datastream*. Restrictions might apply to the availability of the dataset, which was used under license. Institutional development data is available from the Morgan Stanley Capital International Market Framework (MSCI), The World Bank and International Monetary Fund (IMF).

Disclosure statement

We certify that there are no potential conflicts of interest relating to the subject matter discussed in this empirical study.

References

- Adhikari, B. K. and Agrawal, A. (2018). Peer influence on payout policies. *Journal of Corporate Finance*, 48:615–637.
- Aghion, P., Bloom, N., Blundell, R., Griffith, R., and Howitt, P. (2005). Competition and Innovation: an Inverted-U Relationship*. *The Quarterly Journal of Economics*, 120(2):701–728.
- Ahern, K. R., Duchin, R., and Shumway, T. (2014). Peer Effects in Risk Aversion and Trust. *Review of Financial Studies*, 27(11):3213–3240.
- Albuquerque, R., Ramadorai, T., and Watugala, S. W. (2015). Trade credit and cross-country predictable firm returns. *Journal of Financial Economics*, 115(3):592–613.
- Almeida, H., Murillo, C., Bruno, L., and Scott, W. (2012). Corporate Debt Maturity and the Real Effects of the 2007 Credit Crisis. *Critical Finance Review*, 1(1):3–58.
- Amess, K., Banerji, S., and Lampousis, A. (2015). Corporate cash holdings: Causes and consequences. *International Review of Financial Analysis*, 42:421–433.
- Andrén, N. and Jankensgård, H. (2015). Wall of cash: The investment-cash flow sensitivity when capital becomes abundant. *Journal of Banking & Finance*, 50:204–213.
- Ang, J. and Smedema, A. (2011). Financial flexibility: Do firms prepare for recession? *Journal of Corporate Finance*, 17(3):774–787.
- Asli, T. B., Demirgüç-Kunt, T. B. A., and Levine, R. (2005). Law and Firms’ Access to Finance. *American Law and Economics Review*, 7(1):211–252.
- Bao, D., Chan, K. C., and Zhang, W. (2012). Asymmetric cash flow sensitivity of cash holdings. *Journal of Corporate Finance*, 18(4):690–700.
- Bartram, S. M., Brown, G., and Stulz, R. M. (2009). Why Do Foreign Firms Have Less Idiosyncratic Risk than U.S. Firms? Working Paper 14931, National Bureau of Economic Research, New York, USA.
- Bates, T. W., Chang, C.-H., and Chi, J. D. (2018). Why Has the Value of Cash Increased Over Time? *Journal of Financial and Quantitative Analysis*, 53(2):749–787.
- Bates, T. W., Kahle, K. M., and Stulz, R. M. (2009). Why Do U.S. Firms Hold So Much More Cash than They Used To? *The Journal of Finance*, 64(5):1985–2021.
- Baum, C. F., Lewbel, A., Schaffer, M. E., and Talavera, O. (2013). Instrumental variables estimation using heteroskedasticity-based instruments. Technical Report 05, Stata Users Group.
- Baum, C. F., Schaffer, M. E., and Stillman, S. (2003). Instrumental Variables and GMM: Estimation and Testing. *The Stata Journal*, 3(1):1–31.
- Baum, C. F., Schaffer, M. E., and Stillman, S. (2008). Enhanced Routines for Instrumental Variables/Generalized Method of Moments Estimation and Testing. *The Stata Journal*, 7(4):465–506.

- Beck, T., Demirgüç-Kunt, A., and Levine, R. (2003). Law, endowments, and finance. *Journal of Financial Economics*, 70(2):137–181.
- Bernard, D., Kaya, D., and Wertz, J. (2020). Entry and capital structure mimicking in concentrated markets: The role of incumbents’ financial disclosures. *Journal of Accounting and Economics*, page 101379.
- Bird, A., Edwards, A., and Ruchti, T. G. (2018). Taxes and Peer Effects. *The Accounting Review*, 93(5):97–117.
- Bizjak, J., Lemmon, M., and Nguyen, T. (2011). Are all CEOs above average? An empirical analysis of compensation peer groups and pay design. *Journal of Financial Economics*, 100(3):538–555.
- Bizjak, J. M., Lemmon, M. L., and Naveen, L. (2008). Does the use of peer groups contribute to higher pay and less efficient compensation? *Journal of Financial Economics*, 90(2):152–168.
- Bolton, P. and Scharfstein, D. S. (1990). A Theory of Predation Based on Agency Problems in Financial Contracting. *The American Economic Review*, 80(1):93–106.
- Borisova, G. and Brown, J. R. (2013). R&D Sensitivity to Asset Sale Proceeds: New Evidence on Financing Constraints and Intangible Investment. *Journal of Banking & Finance*, 37(1):159–173.
- Brown, J. R. and Petersen, B. C. (2011). Cash holdings and R&D smoothing. *Journal of Corporate Finance*, 17(3):694–709.
- Buera, F. J. and Kaboski, J. P. (2012). The Rise of the Service Economy. *American Economic Review*, 102(6):2540–69.
- Bui, D. G., Chen, Y., Lin, C.-Y., and Lin, T.-C. (2019). R&D Expenditure as a Response to Peer Influence. SSRN Scholarly Paper ID 3412770, Social Science Research Network, Rochester, NY, USA.
- Bustamante, M. C. and Fresard, L. (2017). Does Firm Investment Respond to Peers’ Investment? SSRN Scholarly Paper ID 2827803, Social Science Research Network, Rochester, New York, USA.
- Cadman, B. and Carter, M. E. (2013). Compensation Peer Groups and Their Relation with CEO Pay. *Journal of Management Accounting Research*, 26(1):57–82.
- Caglayan, M. and Xu, B. (2014). Allocation effects of uncertainty on resources in Japan. *Economics Letters*, 122(1):23–26.
- Caglayan, M. and Xu, B. (2016a). Inflation volatility effects on the allocation of bank loans. *Journal of Financial Stability*, 24:27–39.
- Caglayan, M. and Xu, B. (2016b). Sentiment volatility and bank lending behavior. *International Review of Financial Analysis*, 45:107–120.
- Cao, J., Liang, H., and Zhan, X. (2018). Peer Effects of Corporate Social Responsibility. SSRN Scholarly Paper ID 2634100, Social Science Research Network, Rochester, New York, USA.

- Chen, Y.-W., Chan, K., and Chang, Y. (2019). Peer effects on corporate cash holdings. *International Review of Economics & Finance*, 61:213–227.
- Comin, D. A. and Philippon, T. (2006). The Rise in Firm-Level Volatility: Causes and Consequences. *NBER Macroeconomics Annual 2005, Volume 20*, pages 167–228.
- de Jong, A., Verbeek, M., and Verwijmeren, P. (2012). Does Financial Flexibility Reduce Investment Distortions? *Journal of Financial Research*, 35(2):243–259.
- Denis, D. J. (2011). Financial Flexibility and Corporate Liquidity. *Journal of Corporate Finance*, 17(3):667–674.
- Denis, D. J. and Sibilkov, V. (2010). Financial Constraints, Investment, and the Value of Cash Holdings. *The Review of Financial Studies*, 23(1):247–269.
- Dittmar, A. and Thakor, A. (2007). Why Do Firms Issue Equity? *The Journal of Finance*, 62(1):1–54.
- Djankov, S., La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2008). The law and economics of self-dealing. *Journal of Financial Economics*, 88(3):430–465.
- Du, Q. and Shen, R. (2018). Peer performance and earnings management. *Journal of Banking & Finance*, 89:125–137.
- El Ghouli, S. and Zheng, X. (2016). Trade credit provision and national culture. *Journal of Corporate Finance*, 41:475–501.
- Fairhurst, D. D. and Nam, Y. (2018). Corporate Governance and Financial Peer Effects. *Financial Management*, 49(1):235–263.
- Faulkender, M. and Wang, R. (2006). Corporate Financial Policy and the Value of Cash. *The Journal of Finance*, 61(4):1957–1990.
- Ferrando, A., Marchica, M.-T., and Mura, R. (2017). Financial Flexibility and Investment Ability Across the Euro Area and the UK. *European Financial Management*, 23(1):87–126.
- Foley, C. F., Hartzell, J. C., Titman, S., and Twite, G. (2007). Why Do Firms Hold So Much Cash? A Tax-Based Explanation. *Journal of Financial Economics*, 86(3):579–607.
- Foucault, T. and Fresard, L. (2014). Learning from peers’ stock prices and corporate investment. *Journal of Financial Economics*, 111(3):554–577.
- Francis, B. B., Hasan, I., and Kostova, G. L. (2016). When do peers matter?: A cross-country perspective. *Journal of International Money and Finance*, 69:364–389.
- Frydman, C. (2015). What Drives Peer Effects in Financial Decision-Making? Neural and Behavioral Evidence. SSRN Scholarly Paper ID 2561083, Social Science Research Network, Rochester, NY, USA.
- Fuertes, A.-M. and Robles, M.-D. (2021). Bank credit risk events and peers’ equity value. *International Review of Financial Analysis*, 75:101668.

- Ganor, M. (2011). Agency Costs in the Era of Economic Crisis – The Enhanced Connection between CEO Compensation and Corporate Cash Holdings. SSRN Scholarly Paper ID 1916470, Social Science Research Network, Rochester, NY, USA.
- Graham, J. R. and Leary, M. T. (2018). The Evolution of Corporate Cash. *The Review of Financial Studies*, 31(11):4288–4344.
- Grennan, J. (2019). Dividend payments as a response to peer influence. *Journal of Financial Economics*, 131(3):549–570.
- Guariglia, A. and Yang, J. (2018). Adjustment behavior of corporate cash holdings: the China experience. *The European Journal of Finance*, 24(16):1428–1452.
- Gwatidzo, T. and Ojah, K. (2014). Firms’ Debt Choice in Africa: Are Institutional Infrastructure and Non-Traditional Determinants Important? *International Review of Financial Analysis*, 31:152–166.
- Gyimah, D., Machokoto, M., and Sikochi, A. S. (2020). Peer influence on trade credit. *Journal of Corporate Finance*, 64:101685.
- He, Z. and Wintoki, M. B. (2016). The cost of innovation: R&D and high cash holdings in U.S. firms. *Journal of Corporate Finance*, 41:280–303.
- Im, H. J. and Shon, J. (2019). The effect of technological imitation on corporate innovation: Evidence from US patent data. *Research Policy*, 48(9):103802.
- Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, 76(2):323–329.
- Kahle, K. M. and Stulz, R. M. (2013). Access to Capital, Investment, and the Financial Crisis. *Journal of Financial Economics*, 110(2):280–299.
- Kalda, A. (2020). Peer Financial Distress and Individual Leverage. *The Review of Financial Studies*, 33(7):3348–3390. Publisher: Oxford Academic.
- Kaustia, M. and Knüpfer, S. (2012). Peer performance and stock market entry. *Journal of Financial Economics*, 104(2):321–338.
- Kaustia, M. and Rantala, V. (2015). Social learning and corporate peer effects. *Journal of Financial Economics*, 117(3):653–669.
- Kling, G., Paul, S. Y., and Gonis, E. (2014). Cash Holding, Trade Credit and Access to Short-Term Bank Finance. *International Review of Financial Analysis*, 32:123–131.
- Kraimer, R. E. (2014). Financial Aspects of Business Cycles: An Analysis of Balance Sheet Adjustments of U.S. Nonfinancial Enterprises over the Twentieth Century. *Journal of Money, Credit and Banking*, 46(2-3):371–407.
- La Porta, R., Lopez-De-Silanes, F., and Shleifer, A. (2006). What Works in Securities Laws? *The Journal of Finance*, 61(1):1–32.
- La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2008). The Economic Consequences of Legal Origins. *Journal of Economic Literature*, 46(2):285–332.

- La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. (2002). Investor Protection and Corporate Valuation. *The Journal of Finance*, 57(3):1147–1170.
- La Porta, R., Lopez-De-Silanes, F., Shleifer, A., and Vishny, R. W. (1997). Legal Determinants of External Finance. *The Journal of Finance*, 52(3):1131–1150.
- Leary, M. T. and Roberts, M. R. (2014). Do Peer Firms Affect Corporate Financial Policy? *The Journal of Finance*, 69(1):139–178.
- Lee, C.-C., Lee, C.-C., Zeng, J.-H., and Hsu, Y.-L. (2017). Peer bank behavior, economic policy uncertainty, and leverage decision of financial institutions. *Journal of Financial Stability*, 30:79–91.
- Levine, R., Lin, C., and Xie, W. (2018). Corporate Resilience to Banking Crises: The Roles of Trust and Trade Credit. *Journal of Financial and Quantitative Analysis*, 53(4):1441–1477. Publisher: Cambridge University Press.
- Lewbel, A., Dong, Y., and Yang, T. T. (2012). Comparing features of convenient estimators for binary choice models with endogenous regressors. *Canadian Journal of Economics/Revue canadienne d’économique*, 45(3):809–829.
- Lewellen, S. (2013). Executive Compensation and Peer Effects. Technical report, Yale University, USA.
- Lieberman, M. B. and Asaba, S. (2006). Why Do Firms Imitate Each Other? *Academy of Management Review*, 31(2):366–385.
- Lyandres, E. and Palazzo, B. (2016). Cash Holdings, Competition, and Innovation. *Journal of Financial and Quantitative Analysis*, 51(6):1823–1861.
- Machokoto, M. (2020). Do financial constraints really matter? A case of understudied African firms. *International Journal of Finance & Economics*, pages 1–36.
- Machokoto, M., Gyimah, D., and Ntim, C. G. (2021). Do peer firms influence innovation? *The British Accounting Review*, page 100988.
- Manski, C. F. (1993). Identification of Endogenous Social Effects: The Reflection Problem. *The Review of Economic Studies*, 60(3):531–542.
- Marchica, M.-T. and Mura, R. (2010). Financial Flexibility, Investment Ability, and Firm Value: Evidence from Firms with Spare Debt Capacity. *Financial Management*, 39(4):1339–1365.
- Matsumoto, D. A., Serfling, M., and Shaikh, S. (2020). Geographic Peer Effects in Management Earnings Forecasts. SSRN Scholarly Paper ID 3025002, Social Science Research Network, Rochester, NY, USA.
- Nason, R. S. and Patel, P. C. (2016). Is cash king? Market performance and cash during a recession. *Journal of Business Research*, 69(10):4242–4248.
- Opler, T., Pinkowitz, L., Stulz, R., and Williamson, R. (1999). The Determinants and Implications of Corporate Cash Holdings. *Journal of Financial Economics*, 52(1):3–46.

- Orlova, S. V. and Rao, R. P. (2018). Cash holdings speed of adjustment. *International Review of Economics & Finance*, 54:1–14.
- Orlova, S. V. and Sun, L. (2018). Institutional determinants of cash holdings speed of adjustment. *Global Finance Journal*, 37:123–137.
- Oztekin, O. and Flannery, M. J. (2012). Institutional Determinants of Capital Structure Adjustment Speeds. *Journal of Financial Economics*, 103(1):88–112.
- Philippon, T. (2015). Has the US Finance Industry Become Less Efficient? On the Theory and Measurement of Financial Intermediation. *American Economic Review*, 105(4):1408–38.
- Popov, A. and Zaharia, S. (2019). Credit market competition and the gender gap in labor force participation: Evidence from local markets. *European Economic Review*, 115:25–59.
- Puri, M., Rocholl, J., and Steffen, S. (2011). Global retail lending in the aftermath of the US financial crisis: Distinguishing between supply and demand effects. *Journal of Financial Economics*, 100(3):556–578.
- Roodman, D. (2006). How to Do xtabond2. *The Stata Journal*, 9(1):86–136.
- Sorge, M., Zhang, C., and Koufopoulos, K. (2017). Short-Term Corporate Debt around the World. *Journal of Money, Credit and Banking*, 49(5):997–1029.
- Staiger, D. and Stock, J. H. (1997). Instrumental Variables Regression with Weak Instruments. *Econometrica*, 65(3):557–586.
- Svirydzenka, K. (2016). Introducing a New Broad-based Index of Financial Development. IMF Working Paper 16/5, International Monetary Fund, Washington, USA.
- UNCTAD (2017). Trade and Development Report, 2017: Beyond austerity: Towards a Global new Deal. Chapter VI, United Nations, New York, USA.
- Witt, U. and Gross, C. (2020). The rise of the “service economy” in the second half of the twentieth century and its energetic contingencies. *Journal of Evolutionary Economics*, 30(2):231–246.
- Wu, C., Yu, X., and Zheng, Y. (2020). The spillover effect of financial information in mergers and acquisitions. *The British Accounting Review*, 52(4):100879.
- Yan, Q. and Zhu, H. (2020). Peer influence on dividend policy: Evidence from the Chinese stock market. *Economics Letters*, 192:109229.

Table 1 Basic statistics

The table presents the summary statistics for all variables used. The industry is defined based on the 8-digit Industry Classification Benchmark (ICB). The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990—2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

#	Variables	N	Mean	Median	SD	Trend-Mean	Trend-Median
(1)	Cash	298,985	0.157	0.116	0.143	0.170***	0.150***
(2)	ROA	298,985	0.055	0.053	0.094	-0.075***	-0.055***
(3)	Tobin's q	298,985	1.497	1.165	1.091	0.022	-0.549***
(4)	Size	298,985	15.137	15.206	3.046	7.268***	9.074***
(5)	NWCA	298,985	0.137	0.126	0.173	-0.126***	-0.123***
(6)	Debt	298,985	0.225	0.201	0.191	-0.106***	-0.129***
(7)	Capex	298,985	0.045	0.031	0.049	-0.044***	-0.046***
(8)	R&D	298,985	0.017	0.000	0.041	-0.011***	0.000***
(9)	Cashflow	298,985	0.094	0.089	0.105	-0.098***	-0.084***
(10)	PPE	298,985	0.304	0.271	0.210	-0.185***	-0.207***
(11)	Cash2	298,985	0.088	0.051	0.109	0.266***	0.240***
(12)	Cash/NA	298,985	0.332	0.249	0.438	-0.082***	0.156***
(13)	Cash2/NA	298,985	0.191	0.105	0.315	0.313***	0.482***
(14)	Δ Cash	298,985	0.010	0.003	0.077	0.018***	0.016***
(15)	GDP growth	298,985	0.027	0.025	0.028	0.017***	-0.018***
(16)	Inflation	298,985	0.018	0.017	0.027	-0.002***	-0.011***
	# of firms	25,650					
	# of industries	135					
	# of countries	47					

Table 2 Differences in cash holdings

The table presents the summary statistics for cash holdings conditional on institutional development. The sample split into two subgroups based on whether the country is below-median (Regime 1) and above-median (Regime 2) for each of the corresponding measures of institutional development. For the MSCI Index, emerging countries are categorised in Regime 1 and developed countries are categorised in Regime 2. For the World Bank (WB) classification, low-income countries are categorised in Regime 1 and high-income countries are categorised in Regime 2. For legal origin, civil law countries are categorised in Regime 1 and common law countries are categorised in Regime 2. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

#	Institutional development	Regime 1				Regime 2				Differences — Regime 2 vs Regime 1			
		N	Mean	Median	SD	N	Mean	Median	SD	Mean	Median	SD	SD
(1)	Rule of law	74,018	0.146	0.110	0.130	224,831	0.161	0.119	0.146	0.015***	0.009***	0.016***	0.016***
(2)	Property rights	89,457	0.146	0.110	0.131	209,528	0.161	0.120	0.147	0.015***	0.010***	0.016***	0.016***
(3)	Regulatory quality	73,824	0.145	0.109	0.129	225,025	0.161	0.119	0.147	0.016***	0.010***	0.018***	0.018***
(4)	Control of corruption	89,199	0.146	0.109	0.130	209,650	0.162	0.120	0.148	0.016***	0.011***	0.018***	0.018***
(5)	Government effectiveness	73,822	0.145	0.109	0.129	225,027	0.161	0.119	0.147	0.016***	0.010***	0.018***	0.018***
(6)	Financial development	59,682	0.151	0.115	0.133	239,303	0.158	0.117	0.145	0.007***	0.002***	0.012***	0.012***
(7)	Financial institutions	74,491	0.145	0.109	0.130	224,494	0.161	0.119	0.147	0.016***	0.010***	0.017***	0.017***
(8)	Financial markets	30,002	0.099	0.062	0.110	268,983	0.163	0.123	0.144	0.064***	0.061***	0.034***	0.034***
(9)	MSCI Index	89,548	0.146	0.109	0.130	209,437	0.162	0.120	0.148	0.016***	0.011***	0.018***	0.018***
(10)	National income level	69,879	0.148	0.112	0.130	229,106	0.160	0.118	0.146	0.012***	0.006***	0.016***	0.016***
(11)	Political stability	79,745	0.133	0.099	0.120	219,104	0.166	0.124	0.149	0.033***	0.025***	0.029***	0.029***
(12)	Newspaper circulation	56,189	0.130	0.099	0.115	239,993	0.164	0.122	0.148	0.034***	0.023***	0.033***	0.033***
(13)	Foreigner ownership	92,734	0.148	0.110	0.132	206,251	0.161	0.120	0.147	0.013***	0.010***	0.015***	0.015***
(14)	Innovation	73,539	0.145	0.109	0.129	224,461	0.161	0.119	0.147	0.016***	0.010***	0.018***	0.018***
(15)	Legal origin	160,359	0.167	0.133	0.132	138,490	0.145	0.092	0.153	-0.022***	-0.041***	0.021***	0.021***

Table 3 Correlations

The table presents pairwise correlations for the firm-specific factors, peer firms' average cash holdings and macroeconomic variables. The industry is defined based on the 8-digit Industry Classification Benchmark (ICB). The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

#	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	Cash	1											
(2)	Cash	0.454***	1										
(3)	ROA	-0.004**	0.107***	1									
(4)	Tobin's q	0.200***	0.014***	0.258***	1								
(5)	Size	-0.060***	-0.080***	0.111***	-0.154***	1							
(6)	NWCA	-0.196***	-0.080***	0.041***	-0.143***	0.048***	1						
(7)	Debt	-0.375***	-0.205***	-0.132***	-0.105***	-0.151***	0.068***	1					
(8)	Capex	-0.174***	-0.161***	0.148***	0.092***	-0.047***	-0.151***	0.247***	1				
(9)	R&D	0.286***	0.279***	-0.194***	0.244***	-0.047***	-0.046***	0.247***	-0.046***	1			
(10)	Cashflow	-0.036***	-0.090***	0.877***	0.252***	0.049***	-0.092***	-0.092***	-0.140***	-0.222***	1		
(11)	PPE	-0.364***	-0.308***	0.009***	-0.126***	0.106***	-0.246***	0.268***	0.481***	0.179***	0.100***	1	
(12)	Cash2	0.646***	0.363***	0.011***	0.116***	-0.002	-0.151***	-0.255***	-0.135***	0.115***	-0.011***	-0.274***	1
(13)	Cash/NA	0.485***	0.229***	-0.053***	0.070***	0.068***	-0.163***	-0.004**	-0.127***	0.115***	-0.075***	-0.215***	0.335***
(14)	Cash2/NA	0.342***	0.202***	-0.031***	0.039***	0.078***	-0.137***	-0.011***	-0.106***	0.076***	-0.048***	-0.185***	0.607***
(15)	Δ Cash	0.307***	0.068***	0.082***	0.101***	-0.020***	0.040***	-0.049***	0.015***	0.036***	0.083***	-0.008***	0.205***
(16)	GDP growth	-0.070***	-0.135***	0.033***	0.150***	-0.030***	0.062***	0.031***	0.091***	-0.091***	0.020***	0.057***	-0.125***
(17)	Inflation	-0.115***	-0.222***	0.090***	0.075***	-0.128***	0.034***	0.042***	0.149***	-0.061***	0.093***	0.088***	-0.112***

#	Variables	(13)	(14)	(15)	(16)	(17)
(13)	Cash/NA	1				
(14)	Cash2/NA	0.749***	1			
(15)	Δ Cash	0.174***	0.127***	1		
(16)	GDP growth	-0.059***	-0.099***	0.015***	1	
(17)	Inflation	-0.093***	-0.085***	0.016***	0.381***	1

Table 4 The impact of peer effects on cash holdings

The table presents the OLS and 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on the 8-digit Industry Classification Benchmark (ICB). The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Variables	Full sample				Decreases	Increases
	OLS		2SLS			
	(1)	(2)	(3)	(4)	(5)	(6)
Peer firm averages						
Cash	0.678*** (0.006)	0.675*** (0.006)	0.929*** (0.077)	0.932*** (0.075)	0.987*** (0.123)	0.790*** (0.093)
ROA	-0.093*** (0.008)	-0.095*** (0.008)	-0.098*** (0.008)	-0.099*** (0.008)	-0.091*** (0.011)	-0.095*** (0.011)
Tobin's q	-0.010*** (0.001)	-0.010*** (0.001)	-0.014*** (0.001)	-0.014*** (0.001)	-0.011*** (0.002)	-0.012*** (0.002)
Size	0.007*** (0.000)	0.007*** (0.000)	0.009*** (0.001)	0.009*** (0.001)	0.010*** (0.001)	0.009*** (0.001)
NWCA	0.120*** (0.003)	0.119*** (0.003)	0.160*** (0.013)	0.161*** (0.013)	0.181*** (0.020)	0.141*** (0.016)
Debt	0.123*** (0.003)	0.122*** (0.003)	0.174*** (0.016)	0.175*** (0.016)	0.176*** (0.025)	0.152*** (0.020)
Capex	0.259*** (0.013)	0.256*** (0.013)	0.364*** (0.035)	0.365*** (0.034)	0.412*** (0.056)	0.295*** (0.043)
R&D	-0.369*** (0.019)	-0.370*** (0.019)	-0.542*** (0.057)	-0.545*** (0.055)	-0.576*** (0.090)	-0.424*** (0.068)
Firm-specific control variables						
ROA	0.099*** (0.004)	0.099*** (0.004)	0.099*** (0.004)	0.099*** (0.004)	0.028*** (0.006)	0.122*** (0.006)
Tobin's q	0.015*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.009*** (0.001)	0.018*** (0.000)
Size	-0.010*** (0.000)	-0.010*** (0.000)	-0.010*** (0.000)	-0.010*** (0.000)	-0.007*** (0.000)	-0.013*** (0.000)
NWCA	-0.179*** (0.002)	-0.179*** (0.002)	-0.179*** (0.002)	-0.179*** (0.002)	-0.183*** (0.003)	-0.190*** (0.003)
Debt	-0.194*** (0.002)	-0.194*** (0.002)	-0.193*** (0.002)	-0.193*** (0.002)	-0.162*** (0.002)	-0.215*** (0.002)
Capex	-0.417*** (0.007)	-0.418*** (0.007)	-0.417*** (0.007)	-0.417*** (0.007)	-0.387*** (0.011)	-0.445*** (0.007)
R&D	0.576*** (0.011)	0.576*** (0.011)	0.576*** (0.011)	0.576*** (0.011)	0.539*** (0.015)	0.586*** (0.014)
ERisk	0.011*** (0.004)	0.011*** (0.004)	0.005 (0.004)	0.005 (0.004)	-0.023*** (0.006)	0.021*** (0.005)
Macroeconomic control variables						
GDP growth		-0.012 (0.015)		-0.003 (0.015)	-0.008 (0.020)	-0.020 (0.021)
Inflation		0.072*** (0.011)		0.023 (0.018)	0.009 (0.028)	0.037 (0.024)
First-stage instruments						
ERisk			0.106*** (0.004)	0.110*** (0.004)	0.100*** (0.006)	0.116*** (0.006)
First-stage diagnostic statistics						
Adj.R ²			0.682	0.685	0.691	0.681
F-Statistic			570.70***	600.40***	250.90***	340.50***
Specification test statistics						
K-P LM test of redundancy			712.80***	751.70***	293.30***	448.20***
Industry-FE						
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes
# observations	285,204	285,204	285,189	285,189	129,857	155,332
# of firms	25,650	25,650	25,650	25,650	25,339	25,500
# of industries	135	135	135	135	135	135
# of countries	25,650	25,650	25,650	25,650	25,339	25,500
Adj.R ²	0.388	0.388	0.281	0.281	0.244	0.324

Table 5 The institutional environment and peer effects on cash holdings

The table presents the 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on ICB Industry Code. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Panel A

Institutional development	Rule of law		Property rights		Regulatory quality		Control of corruption		Government effectiveness	
	Low	High	Low	High	Low	High	Low	High	Low	High
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peer firm averages										
Cash	-0.172 (0.389)	0.830*** (0.070)	-0.381 (0.524)	0.799*** (0.070)	0.170 (0.285)	0.840*** (0.069)	-0.113 (0.436)	0.809*** (0.070)	0.161 (0.289)	0.840*** (0.069)
First-stage instruments										
ERisk	-0.039*** (0.007)	0.137*** (0.006)	-0.028*** (0.007)	0.142*** (0.006)	-0.050*** (0.007)	0.139*** (0.006)	-0.032*** (0.007)	0.143*** (0.006)	-0.050*** (0.007)	0.138*** (0.006)
First-stage diagnostic statistics										
Adj.R ²	0.726	0.689	0.713	0.690	0.725	0.689	0.714	0.690	0.727	0.688
F-Statistic	29.12***	556.70***	17.85***	522.60***	49.02***	568.90***	23.38***	527.30***	47.68***	567.10***
Specification test statistics										
K-P LM test of redundancy	28.79***	839.20***	17.72***	814.70***	48.22***	869.10***	23.18***	825.00***	46.88***	862.80***
Equality test		6.43**		4.98**		5.24**		4.35**		5.23**
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	68,882	216,178	83,571	201,618	68,710	216,350	83,343	201,717	68,703	216,357
# of firms	8,991	16,659	8,991	16,659	7,538	8,991	16,659	16,689	7,544	18,088
# of industries	99	130	99	130	95	99	130	130	95	131
# of countries	24	23	24	23	23	24	23	23	23	23
Adj.R ²	0.186	0.304	0.160	0.306	0.229	0.304	0.206	0.305	0.228	0.304

Table 5 The institutional environment and peer effects on cash holdings (continued)

Panel B

Institutional development	Financial development		Financial institutions		Financial markets		MSCI Index		National income level	
	Low	High	Low	High	Low	High	EME	DME	Low	High
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peer firm averages										
Cash	0.298 (0.277)	0.868*** (0.069)	-0.142 (0.488)	0.850*** (0.072)	0.256 (0.285)	0.880*** (0.067)	-0.055 (0.413)	0.810*** (0.070)	0.325 (0.238)	0.839*** (0.069)
First-stage instruments										
ERisk	-0.059*** (0.008)	0.133*** (0.005)	-0.032*** (0.008)	0.133*** (0.006)	-0.060*** (0.009)	0.135*** (0.005)	-0.033*** (0.006)	0.143*** (0.006)	-0.066*** (0.008)	0.135*** (0.006)
First-stage diagnostic statistics										
Adj.R ²	0.757	0.678	0.714	0.692	0.454	0.691	0.715	0.689	0.725	0.689
F-Statistic	50.84***	590.90***	17.54***	548.50***	40.72***	683.70***	25.62***	528.20***	68.62***	578.50***
Specification test statistics										
K-P LM test of redundancy	49.98***	872.90***	17.27***	804.10***	39.57***	993.80***	25.37***	829.00***	67.07***	863.20***
Equality test		3.98**		4.04**		4.56**		4.27**		4.31**
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	55,397	229,792	69,465	215,724	28,082	257,107	83,669	201,520	64,996	220,193
# of firms	6,300	19,350	7,567	18,083	3,278	22,372	8,993	16,657	7,115	18,535
# of industries	94	131	95	132	74	133	99	130	96	131
# of countries	24	23	24	23	24	23	25	22	18	29
Adj.R ²	0.229	0.302	0.189	0.302	0.212	0.293	0.213	0.306	0.241	0.302

Table 6 The implications of mimicking peer firms' cash holdings

The table presents estimation results of Equation (2) that relate firm value to the financial crisis dummy, mimicking dummy, the interaction term for the financial crisis and mimicking, and firm-specific and macroeconomic control variables. *Crisis* is a dummy variable that takes the value of one for the period 2008-2012 and zero otherwise. *Mimicking* is a dummy variable that takes the value of one for mimicking firms and zero otherwise. All estimations include a constant, and industry and country-fixed effects (but not reported for brevity of presentation). The restricted sample around the financial crisis consists of 13,754 listed non-financial and non-utility firms (113,753 firm-year observations) from 37 countries drawn from Datastream over the period 2002–2012. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Panel A

Variables	Institutional development		Rule of law		Property rights		Regulatory quality		Control of corruption		Government effectiveness	
	Low	High	(1)	(2)	Low	High	Low	High	Low	High	Low	High
Mimicking	0.119*** (0.020)	0.028*** (0.008)	0.087*** (0.016)	0.030*** (0.009)	0.120*** (0.020)	0.028*** (0.008)	0.088*** (0.016)	0.029*** (0.009)	0.120*** (0.021)	0.027*** (0.008)		
Crisis	-0.062*** (0.016)	-0.259*** (0.008)	-0.053*** (0.013)	-0.278*** (0.008)	-0.060*** (0.016)	-0.259*** (0.008)	-0.051*** (0.013)	-0.277*** (0.008)	-0.058*** (0.016)	-0.259*** (0.008)		
Mimicking×Crisis	-0.083*** (0.025)	0.021* (0.011)	-0.044** (0.020)	0.019 (0.012)	-0.082*** (0.025)	0.020* (0.011)	-0.045** (0.020)	0.018 (0.012)	-0.083*** (0.025)	0.020* (0.011)		
Equality test - Mimicking		17.02***		9.65***		17.34***		10.36***		17.37***		
Equality test - Crisis		124.90***		209.20***		127.40***		211.60***		128.70***		
Equality test - Mimicking×Crisis		14.36***		7.22***		14.03***		7.33***		14.00***		
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	No	No	No	No	No	No	No	No	No	No	No	No
# observations	25,061	88,692	31,263	82,490	24,947	88,806	31,232	82,521	24,852	88,901		
# of firms	4,178	9,576	4,178	9,576	3,381	4,178	9,576	9,589	3,371	10,383		
# of industries	80	124	80	124	77	80	124	124	77	124		
# of countries	16	21	16	21	16	16	21	21	15	22		
Adj.R ²	0.311	0.277	0.315	0.272	0.313	0.277	0.317	0.272	0.313	0.277		

Table 6 The implications of mimicking peer firms' cash holdings (continued)

Panel B

Variables	Institutional development		Financial development		Financial institutions		Financial markets		MSCI Index		National income level	
	Low	High	Low	High	Low	High	Low	High	EME	DME	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
Mimicking	0.194*** (0.029)	0.027*** (0.008)	0.119*** (0.020)	0.027*** (0.008)	0.163*** (0.037)	0.041*** (0.008)	0.088*** (0.016)	0.029*** (0.009)	0.124*** (0.022)	0.028*** (0.008)		
Crisis	-0.049** (0.021)	-0.244*** (0.007)	-0.068*** (0.016)	-0.257*** (0.008)	-0.196*** (0.033)	-0.213*** (0.007)	-0.051*** (0.013)	-0.277*** (0.008)	-0.047*** (0.017)	-0.260*** (0.007)		
Mimicking×Crisis	-0.149*** (0.035)	0.019* (0.010)	-0.088*** (0.024)	0.022** (0.011)	-0.081* (0.047)	0.004 (0.010)	-0.045** (0.020)	0.018 (0.012)	-0.090*** (0.027)	0.021** (0.011)		
Equality test - Mimicking		29.84***		18.42***		10.25***		10.36***		16.12***		
Equality test - Crisis		74.29***		119.60***		0.25		211.60***		135.00***		
Equality test - Mimicking×Crisis		21.65***		17.04***		3.19*		7.33***		14.44***		
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	No	No	No	No	No	No	No	No	No	No	No	No
# observations	17,715	96,038	25,823	87,930	6,933	106,820	31,232	82,521	23,276	90,477		
# of firms	2,479	11,275	3,493	10,261	966	12,788	4,165	9,589	3,165	10,589		
# of industries	66	125	78	124	46	126	79	124	77	124		
# of countries	15	22	17	20	14	23	16	21	11	26		
Adj.R ²	0.288	0.281	0.316	0.276	0.408	0.273	0.317	0.272	0.312	0.278		

Table 7 Alternative definitions of cash holdings

The table presents the 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on ICB Industry Code. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

	Cash2	Cash/NA	Cash2/NA	Δ Cash2
Variables	(1)	(2)	(3)	(4)
Peer firm averages				
Cash	0.723*** (0.061)	0.778*** (0.159)	0.661*** (0.112)	0.392*** (0.104)
First-stage instruments				
ERisk	0.112*** (0.004)	0.338*** (0.029)	0.267*** (0.020)	0.053*** (0.003)
First-stage diagnostic statistics				
Adj.R ²	0.632	0.108	0.094	0.091
F-Statistic	725.50***	138.00***	176.70***	421.70***
Specification test statistics				
K-P LM test of redundancy	1,097.00***	146.00***	198.80***	592.70***
Peer firm average controls	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes
# observations	285,189	285,180	285,180	285,189
# of firms	25,650	25,650	25,650	25,650
# of industries	135	135	135	135
# of countries	47	47	47	47
Adj.R ²	0.181	0.119	0.144	0.049

Table 8 Sub-samples by major industries

The table presents the 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on ICB Industry Code. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. The main industries are defined as follows; CDS — consumer discretionary and staples; IND — industrials; OT — other industries; and TT — technology and telecommunications. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

	CDS	IND	OT	TT
Variables	(1)	(2)	(3)	(4)
Peer firm averages				
Cash	0.826*** (0.099)	0.878*** (0.106)	1.272* (0.684)	1.088*** (0.151)
First-stage instruments				
ERisk	0.143*** (0.009)	0.133*** (0.008)	0.022*** (0.007)	0.170*** (0.014)
First-stage diagnostic statistics				
Adj.R ²	0.614	0.632	0.634	0.705
F-Statistic	230.80***	309.10***	10.65***	142.80***
Specification test statistics				
K-P LM test of redundancy	384.10***	513.70***	11.12***	153.10***
Peer firm average controls	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes
# observations	88,901	79,772	67,738	48,778
# of firms	6,555	4,754	6,555	4,754
# of industries	36	13	36	13
# of countries	43	38	43	38
Adj.R ²	0.255	0.263	0.285	0.328

Table 9 Sub-period analysis of peer effects on cash holdings

The table presents the 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on Standard Industrial Classification (SIC), Industry Classification Benchmark (ICB) and Fama-French Industry Codes (FF). The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Sub-periods	5-year sub-periods					10-year sub-periods					Financial crisis	
	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2019	1990-1999	2000-2009	2010-2019	2020-2019	2002-2007	2008-2012
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(11)
Peer firm averages												
Cash	0.936*** (0.297)	0.781*** (0.175)	0.828*** (0.229)	0.789*** (0.241)	1.111*** (0.128)	0.810*** (0.228)	0.834*** (0.132)	0.565** (0.259)	1.072*** (0.134)	0.724** (0.345)	1.230*** (0.280)	
First-stage instruments												
ERisk	0.250*** (0.024)	0.306*** (0.017)	0.137*** (0.015)	0.083*** (0.010)	0.134*** (0.010)	0.058*** (0.006)	0.311*** (0.013)	0.062*** (0.008)	0.077*** (0.005)	0.065*** (0.012)	0.063*** (0.009)	
First-stage diagnostic statistics												
Adj.R ²	0.861	0.848	0.801	0.721	0.686	0.674	0.846	0.735	0.675	0.772	0.680	
F-Statistic	104.50***	337.60***	82.54***	67.34***	181.70***	83.23***	530.70***	60.39***	231.20***	31.86***	52.57***	
Specification test statistics												
K-P LM test of redundancy	110.00***	314.20***	71.93***	71.09***	190.70***	79.83***	495.70***	60.69***	244.60***	31.36***	55.31***	
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	16,476	23,965	34,043	56,372	76,313	78,020	40,441	90,415	154,333	54,181	68,768	
# of firms	9,335	14,796	9,335	14,796	18,919	9,335	14,796	16,143	20,486	13,182	17,441	
# of industries	122	128	122	128	133	122	128	128	135	126	131	
# of countries	27	37	27	37	47	27	37	37	47	34	45	
Adj.R ²	0.204	0.244	0.292	0.290	0.264	0.273	0.233	0.294	0.264	0.297	0.257	

Table 10 Alternative definitions of peer firms

The table presents the 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on Standard Industrial Classification (SIC), Industry Classification Benchmark (ICB) and Fama-French Industry Codes (FF). The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Variables	ICB6	SIC1	SIC2	SIC3	SIC4	FF12	FF17	FF30	FF38	FF48
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peer firm averages										
Cash	0.906*** (0.084)	0.803*** (0.079)	0.888*** (0.068)	1.017*** (0.068)	1.019*** (0.077)	0.833*** (0.080)	0.813*** (0.082)	0.881*** (0.070)	0.810*** (0.075)	0.905*** (0.069)
First-stage instruments										
ERisk	0.109*** (0.004)	0.120*** (0.004)	0.115*** (0.005)	0.099*** (0.005)	0.078*** (0.005)	0.109*** (0.004)	0.114*** (0.004)	0.122*** (0.005)	0.112*** (0.005)	0.118*** (0.005)
First-stage diagnostic statistics										
Adj.R ²	0.749	0.748	0.647	0.563	0.513	0.780	0.730	0.711	0.683	0.674
F-Statistic	653.60***	719.50***	466.70***	365.00***	239.40***	776.50***	766.20***	619.30***	518.10***	499.70***
Specification test statistics										
K-P LM test of redundancy	916.60***	1,224.00***	609.60***	421.20***	266.90***	1,104.00***	882.70***	792.10***	691.00***	627.60***
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	285,197	284,797	281,723	270,078	251,567	284,642	284,288	283,814	283,415	282,897
# of firms	25,369	24,471	25,369	24,471	23,080	25,369	24,471	25,548	25,510	25,467
# of industries	71	316	71	316	723	71	316	30	36	48
# of countries	47	47	47	47	47	47	47	47	47	47
Adj.R ²	0.274	0.270	0.284	0.267	0.255	0.270	0.270	0.280	0.279	0.283

Table 11 Alternative instruments for peer cash holdings

The table presents the OLS and 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on ICB Industry Code. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Peer firm averages									
Cash	0.864*** (0.075)	0.804*** (0.066)	0.855*** (0.051)	0.823*** (0.054)	0.844*** (0.054)	0.804*** (0.062)	0.836*** (0.047)	0.820*** (0.044)	0.833*** (0.041)
First-stage instruments									
ERisk _{t-2}	0.106*** (0.005)					0.058*** (0.005)	0.049*** (0.005)	0.041*** (0.006)	0.037*** (0.006)
ERisk _{t-3}		0.131*** (0.006)				0.099*** (0.006)	0.045*** (0.006)	0.032*** (0.006)	0.038*** (0.007)
ERisk _{t-4}			0.199*** (0.005)				0.165*** (0.006)	0.122*** (0.007)	0.107*** (0.007)
ERisk _{t-5}				0.204*** (0.006)				0.129*** (0.007)	0.083*** (0.007)
ERisk _{t-6}					0.215*** (0.006)			0.129*** (0.006)	0.133*** (0.007)
First-stage diagnostic statistics									
Adj.R ²	0.686	0.688	0.691	0.693	0.697	0.688	0.692	0.695	0.701
F-Statistic	508.60***	540.70***	1,433.00***	1,214.00***	1,192.00***	262.00***	520.60***	425.40***	360.50***
Specification test statistics									
K-P LM test of redundancy	728.40***	877.60***	1,487.00***	1,291.00***	1,291.00***	969.30***	1,682.00***	1,815.00***	1,976.00***
Hansen						0.01	1.23	0.53	0.73
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	259,539	233,889	208,239	182,589	158,304	233,889	208,239	182,589	158,304
# of firms	25,650	24,285	25,650	24,285	21,205	25,650	24,285	24,285	21,205
# of industries	135	135	135	135	133	135	135	135	133
# of countries	47	47	47	47	47	47	47	47	47
Adj.R ²	0.283	0.286	0.284	0.285	0.284	0.286	0.285	0.285	0.285

Table 12 Alternative estimation methods

The table presents estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. The regression models are estimated using the generalised method of moments (IV-GMM), limited-information maximum likelihood (IV-LIML), GMM continuously-updated estimator (IV-CUE), instrumental variable tobit — maximum likelihood estimator (IV-TOBIT1), instrumental variable tobit — two-step estimator (IV-TOBIT2), instrumental variables regression with potentially weak instruments (COND-IV), and instrumental variables estimation using heteroskedasticity-based instruments (2SLS-H and IV-GMM-H). All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on ICB Industry Code. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Estimation techniques	IV-GMM	IV-LIML	IV-CUE	IV-TOBIT1	IV-TOBIT2	COND-IV	2SLS-H	IV-GMM-H	2SLS	2SLS	2SLS	2SLS
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Peer firm averages												
Cash	0.932*** (0.075)	0.932*** (0.075)	0.932*** (0.075)	0.950*** (0.075)	0.950*** (0.065)	0.932*** (0.065)	0.706*** (0.008)	0.754*** (0.007)	0.920*** (0.058)	0.960*** (0.036)	0.954*** (0.053)	1.372*** (0.159)
First-stage instruments												
ERisk	0.110*** (0.004)	0.110*** (0.004)	0.110*** (0.004)	0.110*** (0.004)	0.110*** (0.004)	0.110*** (0.004)	0.110*** (0.004)	0.110*** (0.004)	0.113*** (0.004)	0.190*** (0.006)	0.153*** (0.005)	0.041*** (0.003)
First-stage diagnostic statistics												
Adj.R ²	0.685	0.685	0.685	0.685	0.685	0.685	0.685	0.685	0.542	0.494	0.652	0.876
F-Statistic	600.40***	600.40***	600.40***	600.40***	600.40***	600.40***	600.40***	600.40***	905.10***	1,171.00***	894.90***	172.80***
Specification test statistics												
K-P LM test of redundancy	751.70***	751.70***	751.70***						1,106.00***	2,239.00***	1,399.00***	213.30***
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-FE	No	No	No	No	No	No	No	No	No	No	No	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
# observations	285,189	285,189	285,189	285,189	285,189	285,189	285,189	285,189	285,189	285,189	285,189	285,189
# of firms	25,650	25,650	25,650	25,650	25,650	25,650	25,650	25,650	25,650	25,650	25,650	25,650
# of industries	135	135	135	135	135	135	135	135	135	135	135	135
# of countries	47	47	47	47	47	47	47	47	47	47	47	47
Adj.R ²	0.281	0.281	0.281				0.388	0.387	0.326	0.375	0.333	-0.099

Table 13 Alternative proxies of the institutional environment

The table presents the 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on ICB Industry Code. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Institutional development	Political stability		Newspaper circulation		Foreigner ownership		Innovation		Legal origin	
	Low	High	Low	High	Low	High	Low	High	Civil	Common
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peer firm averages										
Cash	-0.136 (0.362)	0.794*** (0.069)	-0.046 (0.300)	0.832*** (0.065)	-0.763 (0.792)	0.798*** (0.075)	-0.044 (0.366)	0.832*** (0.070)	0.934*** (0.057)	0.961*** (0.285)
First-stage instruments										
ERisk	-0.037*** (0.006)	0.144*** (0.006)	-0.051*** (0.008)	0.144*** (0.006)	-0.020*** (0.007)	0.134*** (0.006)	-0.040*** (0.007)	0.137*** (0.006)	0.218*** (0.008)	0.038*** (0.005)
First-stage diagnostic statistics										
Adj.R ²	0.597	0.713	0.586	0.712	0.708	0.689	0.729	0.688	0.634	0.780
F-Statistic	33.53***	535.80***	43.47***	641.30***	9.04***	484.80***	29.99***	550.50***	711.90***	65.86***
Specification test statistics										
K-P LM test of redundancy	32.99***	848.40***	41.89***	994.40***	8.97***	726.20***	29.54***	834.70***	771.00***	65.70***
Equality test		6.37**		7.74***		3.85**		6.57**		0.01
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	74,710	210,350	52,447	230,179	86,736	198,453	68,457	215,828	152,076	132,984
# of firms	8,043	17,589	5,855	19,427	9,283	16,367	7,498	18,034	12,963	12,669
# of industries	100	127	95	129	101	130	96	131	114	108
# of countries	23	23	23	21	24	23	22	22	30	16
Adj.R ²	0.171	0.311	0.142	0.309	0.061	0.304	0.204	0.304	0.277	0.274

Appendix A Variable definitions

The table lists the definitions of all variables used. All firm-level variables are drawn from Datastream and macroeconomic variables are from the IMF and The World Bank.

Panel A: Firm-specific factors

Variable	Source	Definition
Cash	Datastream	Cash and cash equivalent-to-total assets.
ROA	Datastream	Operating income-to-total assets.
Tobin's q	Datastream	Market of equity plus total debt-to-total assets (Firm value).
Size	Datastream	Log of total assets.
NWCA	Datastream	Net-working capital (excluding cash and cash equivalent)-to-total assets.
Debt	Datastream	Total debt-to-total assets.
Capex	Datastream	Capital expenditure-to-total assets.
R&D	Datastream	Research and development expenditure-to-total assets.
Cashflow	Datastream	Operating income <i>plus</i> depreciation-to-total assets.
PPE	Datastream	Property, plant and equipment-to-total assets.
Cash2	Datastream	Cash-to-total assets.
Cash/NA	Datastream	Cash and cash equivalent-to-net assets.
Cash2/NA	Datastream	Cash-to-net assets.
Δ Cash	Datastream	The change in cash and cash equivalent-to-total assets.
Mimic	Datastream	A dummy variable that takes the value of one if a firm is categorised as above-median of the regression diagnostic statistic (DFBETA) and zero otherwise.
Crisis		A crisis dummy that takes the value of one from 2008 to 2012 and zero otherwise.

Panel B: Macroeconomic factors

Variable	Source	Definition
GDPGrowth	WDI	The growth rate of GDP.
Inflation	WDI	The inflation rate based on the Consumer Price Index (CPI).

Appendix A Variable definitions (continued)

Panel C: Institutional development

Variable	Source	Definition
Rule of law	WGI	The rule of law indicates the degree of confidence that agents have in and abide by the rules of society.
Property rights		Indicates the level of economic freedom concerning the legal system and property rights security.
Regulatory quality	WGI	Source: https://www.fraserinstitute.org/economic-freedom/approach . Regulatory quality is an index that captures the perception of governments ability to formulate and implement suitable policies and regulations that promote and allow the development of the private sector.
Control of corruption	WGI	It is an index that captures the degree of public power used for personal benefit, taking into account both small and large forms of corruption.
Government effectiveness	WGI	Government effectiveness is an index that captures the perception of the quality of civil and public services and the extent of their independence from (political) pressures regarding interference in policy formulation and implementation.
Financial development	IMF	Financial Institutions index (FDI) is a comparative ranking of economies based on the combination of their scores on the access, depth, and efficiency of financial institutions and the financial market (see Svirydzenka, 2016).
Financial institutions	IMF	Financial Institutions index (FI) is a combination of Financial Institutions Depth index (FID), Financial Institutions Efficiency Index and Financial Institutions Access index (FIA) (see Svirydzenka, 2016).
Financial markets	IMF	Financial Markets index (FM) is a combination of Financial Markets Depth index (FMD), Financial Markets Efficiency index (FME) and Financial Markets Access index (FMA) (see Svirydzenka, 2016).
MSCI Classification	MSCI	The country classification based on the Morgan Stanley Capital International Market Framework.
Income-level	WDI	The national income level classification based on the World Bank.
Political stability	WGI	Captures perceptions of the probability of political instability and violence that are politically motivated, including terrorism .
Newspaper circulation		The logarithm of newspapers and periodicals circulation per thousand inhabitants in 2000 (see Djankov et al., 2008).
Foreigner ownership		An index based on the freedom of foreign ownership/investment.
Innovation	WDI	Source: https://www.fraserinstitute.org/economic-freedom/approach . Researchers in R&D (per million people).
Legal origin		Legal origin of a country's laws - civil & common law (see Djankov et al., 2008).

Appendix B Stock return regressions

The table presents the summary statistics for the instruments are calculated from the following models:

$$\text{Monthly stock returns} = r_{ijt} = \alpha_{ijt} + \beta_{ijt}^m(rm_t - rf_t) + \beta_{ijt}^{ind}(\bar{r}_{-ijt} - rf_t) + \eta_{ijt} \quad (3)$$

$$\text{Expected monthly returns} \equiv \widehat{r}_{ijt} = \widehat{\alpha}_{ijt} + \widehat{\beta}_{ijt}^m(rm_t - rf_t) + \widehat{\beta}_{ijt}^{ind}(\bar{r}_{-ijt} - rf_t) \quad (4)$$

$$\text{Idiosyncratic monthly returns} \equiv \widehat{\eta}_{ijt} = r_{ijt} - \widehat{r}_{ijt} \quad (5)$$

where r_{ijt} is the stock return for firm i in industry j over month t , $rm_t - rf_t$ is the excess market return, $\bar{r}_{-ijt} - rf_t$ is the excess return on an equally weighted industry portfolio, excluding the focal firm i 's return, and η_{ijt} is the error term. The expected monthly returns ($\widehat{r}_{ijt}$) are the predicted returns from estimating the augmented market model (including the excess return on an equally weighted industry portfolio) specified above. The idiosyncratic monthly returns ($r_{ijt} - \widehat{r}_{ijt}$) are calculated as the difference between the stock returns (r_{ijt}) and expected monthly returns ($\widehat{r}_{ijt}$). The peer firms' average characteristics are calculated as the average of all firms within a particular industry-country-year excluding the i^{th} observations (relating to the focal firms). Industry-country combinations are defined based on the 8-digit Industry Classification Benchmark (ICB). Equation (3) is estimated on a rolling annual basis using monthly returns. To ensure accuracy / consistency, each firm is required to at least have 24 months of historical returns data and use up to 60 months of data for the estimations. Using the estimated coefficients from Equation (3) for the previous year ($t - 1$) and the monthly factor returns for the current year (t). The annual idiosyncratic risk by taking the geometric average of the monthly idiosyncratic returns. Our instrument, the average peer idiosyncratic return shock, is calculated similarly to the average peer firm-specific variables in Equation (1) discussed above. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles.

Variables	Mean	Median	SD
$\widehat{\alpha}_{ijt}$	0.029	0.019	0.041
$\widehat{\beta}_{ijt}^m$	0.439	0.353	1.560
$\widehat{\beta}_{ijt}^{ind}$	0.626	0.458	1.338
# of observations per regression	58	60	5
Adj.R ²	0.269	0.238	0.187
Monthly returns (r_{ijt})	0.016	0.000	0.139
Expected monthly returns ($\widehat{r}_{ijt}$)	0.016	0.013	0.059
Idiosyncratic monthly returns ($r_{ijt} - \widehat{r}_{ijt}$)	0.102	0.097	0.045

Appendix C Sample distribution across countries/regions and industries

The table presents the summary statistics for cash holdings by country and industry. The broad industries are defined based on the 2-digit Industry Classification Benchmark (ICB). The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Panel A: Sample distribution across countries

#	Country	N	Firms	Mean	Median	SD	Trend-Mean	Trend-Median
(1)	Australia	3,351	377	0.151	0.089	0.168	0.321***	0.218***
(2)	Austria	262	35	0.128	0.098	0.091	0.746***	0.592*
(3)	Belgium	697	64	0.095	0.075	0.085	-0.245***	0.139*
(4)	Brazil	1,890	204	0.124	0.101	0.104	-0.160*	-0.149**
(5)	Canada	2,122	267	0.120	0.049	0.167	0.582***	0.408***
(6)	Chile	213	32	0.063	0.043	0.065	0.211	0.374**
(7)	China	17,034	1,854	0.174	0.144	0.116	0.292***	0.228***
(8)	Croatia	137	17	0.051	0.037	0.055	0.507**	0.403*
(9)	Denmark	1,363	122	0.123	0.067	0.154	-0.050	-0.256***
(10)	Egypt	200	34	0.120	0.085	0.105	-0.419	-0.752*
(11)	Finland	913	84	0.145	0.085	0.155	-0.614***	0.084
(12)	France	5,424	485	0.146	0.113	0.119	0.081***	0.159***
(13)	Germany	5,484	521	0.159	0.104	0.157	0.232***	0.288***
(14)	Greece	1,863	191	0.069	0.040	0.076	0.160***	0.121***
(15)	Hong Kong	14,151	1,477	0.211	0.171	0.152	0.203***	0.167***
(16)	Hungary	287	20	0.085	0.074	0.056	-0.267***	-0.027
(17)	India	7,299	730	0.080	0.035	0.104	0.210***	0.062***
(18)	Indonesia	3,372	353	0.116	0.085	0.107	-0.164***	-0.057
(19)	Ireland	190	19	0.238	0.264	0.183	-1.693***	-2.796***
(20)	Israel	409	50	0.244	0.185	0.189	-0.291	-0.534**
(21)	Japan	69,701	4,033	0.182	0.149	0.130	0.209***	0.130***
(22)	Malaysia	7,627	719	0.136	0.099	0.118	0.281***	0.300***
(23)	Mexico	1,223	145	0.100	0.084	0.071	-0.110	-0.031
(24)	Netherlands	2,233	212	0.104	0.077	0.099	0.040	0.148***
(25)	New Zealand	326	41	0.051	0.021	0.081	-0.241***	-0.159***
(26)	Norway	1,365	158	0.100	0.083	0.073	-0.223***	-0.170***
(27)	Pakistan	1,284	146	0.065	0.020	0.093	-0.042	-0.021
(28)	Peru	252	32	0.121	0.080	0.127	0.282	-0.522*
(29)	Philippines	729	77	0.097	0.070	0.097	-0.142*	0.091
(30)	Poland	1,255	151	0.099	0.063	0.107	0.015	0.052
(31)	Portugal	215	26	0.120	0.097	0.075	-0.502***	-0.570***
(32)	Romania	136	18	0.080	0.031	0.108	0.123	0.297
(33)	Russia	666	70	0.112	0.077	0.110	0.027	0.036
(34)	Saudi Arabia	324	36	0.108	0.078	0.100	-0.306*	-0.548**
(35)	Singapore	6,225	642	0.173	0.137	0.134	0.078**	0.031
(36)	South Africa	1,608	220	0.104	0.085	0.081	0.027	0.274***
(37)	South Korea	15,590	1,431	0.150	0.109	0.132	0.338***	0.261***
(38)	Spain	823	74	0.113	0.087	0.084	0.239***	0.402***
(39)	Sri Lanka	685	76	0.081	0.046	0.104	0.072	-0.006
(40)	Sweden	4,584	399	0.130	0.097	0.121	-0.065**	-0.032
(41)	Switzerland	4,094	336	0.177	0.148	0.123	0.123***	-0.020
(42)	Taiwan	14,644	1,353	0.223	0.188	0.151	0.510***	0.575***
(43)	Thailand	7,384	634	0.107	0.067	0.109	0.176***	0.143***
(44)	Turkey	1,503	136	0.102	0.070	0.100	0.039	0.244***
(45)	United Kingdom	21,864	1,870	0.115	0.076	0.122	0.129***	0.121***
(46)	United States	63,641	5,365	0.154	0.088	0.171	0.283***	0.291***
(47)	Vietnam	2,343	314	0.130	0.077	0.144	0.521***	0.207**
	Full Sample	298,985	25,650	0.157	0.116	0.143	0.170***	0.150***

Panel B: Sample distribution across industries

#	Variables	N	Firms	Mean	Median	SD	Trend-Mean	Trend-Median
(1)	Basic Materials	35,907	3,064	0.117	0.087	0.110	0.079***	0.048***
(2)	Consumer Discretionary	66,234	5,485	0.153	0.114	0.140	0.291***	0.281***
(3)	Consumer Staples	27,007	2,219	0.121	0.087	0.115	0.074***	0.060***
(4)	Energy	9,493	1,008	0.107	0.074	0.112	0.153***	0.258***
(5)	Health Care	19,614	1,777	0.196	0.148	0.171	0.050***	0.054***
(6)	Industrials	83,318	6,637	0.142	0.111	0.122	0.116***	0.084***
(7)	Real Estate	5,972	706	0.123	0.092	0.116	0.062**	0.166***
(8)	Technology	39,389	3,615	0.247	0.208	0.175	0.237***	0.243***
(9)	Telecommunications	12,051	1,139	0.182	0.137	0.155	0.093***	0.158***
	Full Sample	298,985	25,650	0.157	0.116	0.143	0.170***	0.150***

Appendix D The changes in firm value and cash holdings around the financial crisis: mimicking *vs* non-mimicking firms

The table presents the changes in firm value and cash holdings around the financial crisis. *Crisis* is a dummy variable that takes the value of one for the period 2008–2012 and zero otherwise. *Mimicking* is a dummy variable that takes the value of one for mimicking firms and zero otherwise for *Non-Mimicking*. The restricted sample around the financial crisis consists of 13,754 listed non-financial and non-utility firms (113,753 firm-year observations) from 37 countries drawn from Datastream over the period 2002–2012. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Panel A: Sample splits based on the median values of the DFBETA statistic

Variable	Sub-Samples	Before (2002–2007)				After (2008–2012)				After <i>vs</i> Before			
		N	Mean	Median	SD	N	Mean	Median	SD	Mean	Median	SD	
Tobin's <i>q</i>	Full sample	55,301	1.514	1.194	1.060	58,452	1.318	1.041	0.911	-0.196***	-0.153***	-0.149***	
	(A) Non-Mimicking	29,921	1.502	1.195	1.040	29,636	1.294	1.033	0.884	-0.208***	-0.162***	-0.156***	
	(B) Mimicking	25,380	1.528	1.193	1.083	28,816	1.342	1.050	0.937	-0.186***	-0.143***	-0.146***	
	(A) <i>vs</i> (B)		0.026	-0.002***	0.043***	25,380	0.048***	0.017***	0.053***				
Cash	Full sample	55,301	0.152	0.109	0.144	58,452	0.163	0.124	0.143	0.011***	0.015**	-0.001***	
	(A) Non-Mimicking	29,921	0.148	0.116	0.128	25,380	0.158	0.101	0.161	0.010***	-0.015***	0.033***	
	(B) Mimicking	29,636	0.154	0.128	0.124	28,816	0.173	0.120	0.159	0.019***	-0.008***	0.035***	
	(A) <i>vs</i> (B)		0.006***	0.012***	-0.004***		0.015***	0.019*	-0.002***				

Panel B: Sample splits based on the mean values of the DFBETA statistic

Variable	Sub-Samples	N	Before (2002—2007)				After (2008—2012)				After <i>vs</i> Before			
			Mean	Median	SD	N	Mean	Median	SD	Mean	Median	SD		
Tobin's <i>q</i>	Full sample	55,301	1.514	1.194	1.060	58,452	1.318	1.041	0.911	-0.196***	-0.153***	-0.149***		
	(A) Non-Mimicking	26,496	1.516	1.217	1.033	28,369	1.292	1.036	0.872	-0.224***	-0.181***	-0.161***		
	(B) Mimicking	28,805	1.512	1.173	1.085	30,083	1.342	1.047	0.945	-0.170***	-0.126***	-0.140***		
	(A) <i>vs</i> (B)		-0.004***	-0.044***	0.052***	28,805	0.050**	0.011***	0.073***					
Cash	Full sample	55,301	0.152	0.109	0.144	58,452	0.163	0.124	0.143	0.011***	0.015**	-0.001***		
	(A) Non-Mimicking	26,496	0.144	0.114	0.124	28,805	0.160	0.104	0.160	0.016***	-0.010***	0.036***		
	(B) Mimicking	28,369	0.155	0.130	0.124	30,083	0.171	0.119	0.158	0.016***	-0.011***	0.034***		
	(A) <i>vs</i> (B)		0.011***	0.016	0.000***		0.011***	0.015*	-0.002***					

Appendix E Additional analysis of the implications of mimicking peer firms' cash holdings

The table presents estimation results of Equation (2) that relate firm value to the financial crisis dummy, mimicking dummy, the interaction term for the financial crisis and mimicking, and firm-specific and macroeconomic control variables. *Crisis* is a dummy variable that takes the value of one for the period 2008-2012 and zero otherwise. *Mimicking* is a dummy variable that takes the value of one for mimicking firms and zero otherwise. Mimicking (non-mimicking) firms are those with above (below) mean of the DFBETA statistic. All estimations include a constant, and industry and country-fixed effects (but not reported for brevity of presentation). The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Variables	Institutional development			Political stability			Newspaper circulation			Foreigner ownership			Innovation			Legal origin		
	Low	High		Low	High		Low	High		Low	High		Low	High		Civil	Common	
Mimicking	0.103*** (0.017)	0.030*** (0.009)		0.198*** (0.026)	0.026*** (0.008)		0.082*** (0.015)	0.031*** (0.009)		0.130*** (0.021)	0.026*** (0.008)		0.048*** (0.013)	0.026*** (0.008)		0.048*** (0.013)	0.055*** (0.013)	
Crisis	-0.061*** (0.015)	-0.264*** (0.008)		-0.097*** (0.022)	-0.238*** (0.007)		-0.064*** (0.013)	-0.281*** (0.008)		-0.056*** (0.016)	-0.259*** (0.008)		-0.174*** (0.008)	-0.259*** (0.008)		-0.174*** (0.008)	-0.280*** (0.012)	
Mimicking×Crisis	-0.062*** (0.022)	0.018 (0.011)		-0.155*** (0.033)	0.022** (0.010)		-0.044** (0.019)	0.021* (0.012)		-0.099*** (0.025)	0.023** (0.011)		-0.019 (0.011)	0.023** (0.011)		-0.019 (0.011)	0.015 (0.017)	
Equality test - Mimicking		14.19***			38.94***			8.73***			21.05***			21.05***			0.18	
Equality test - Crisis		146.30***			39.27***			208.20***			129.10***			129.10***			52.66***	
Equality test - Mimicking×Crisis		10.44***			26.37***			8.53***			19.28***			19.28***			2.55	
Firm-specific control variables	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Macroeconomic control variables	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Industry-FE	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Country-FE	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Year-FE	No	No		No	No		No	No		No	No		No	No		No	No	
# observations	27,822	85,931		18,160	95,518		33,461	80,292		24,883	88,586		62,349	88,586		62,349	51,404	
# of firms	3,649	10,105		2,461	11,278		4,427	9,327		3,368	10,339		7,347	10,339		7,347	6,407	
# of industries	80	121		73	122		84	124		77	124		106	124		106	88	
# of countries	16	21		16	20		17	20		14	21		22	21		22	15	
Adj.R ²	0.310	0.274		0.297	0.277		0.307	0.274		0.315	0.276		0.331	0.276		0.331	0.214	

Online Appendices
Not For Publication

Appendix A.1 The changes in cash holdings around the financial crisis by country/region and industry

The table presents the changes in firm value and cash holdings around the financial crisis. The restricted sample around the financial crisis consists of 13,754 listed non-financial and non-utility firms (113,753 firm-year observations) from 37 countries drawn from Datastream over the period 2002–2012. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Country/Industry	Before (2002–2007)				After (2008–2012)				After vs Before			
	N	Mean	Median	SD	N	Mean	Median	SD	Mean	Median	SD	
Australia	584	0.137	0.079	0.158	573	0.149	0.093	0.161	0.012*	0.014	0.003***	
Belgium	127	0.127	0.080	0.129	150	0.110	0.097	0.096	-0.017	0.017***	-0.033***	
Canada	464	0.158	0.074	0.194	475	0.142	0.073	0.176	-0.016	-0.001**	-0.018***	
China	1,869	0.146	0.122	0.098	3,498	0.169	0.143	0.112	0.023***	0.021***	0.014***	
Denmark	192	0.083	0.072	0.064	219	0.084	0.042	0.082	0.001***	-0.030***	0.018***	
Finland	295	0.187	0.071	0.212	355	0.155	0.109	0.135	-0.032***	0.038***	-0.077***	
France	1,154	0.142	0.105	0.125	1,337	0.140	0.112	0.111	-0.002	0.007***	-0.014***	
Germany	1,498	0.168	0.101	0.178	1,348	0.163	0.114	0.156	-0.005**	0.013***	-0.022***	
Greece	675	0.066	0.038	0.081	426	0.051	0.031	0.060	-0.015	-0.007***	-0.021***	
Hong Kong	1,939	0.194	0.161	0.140	2,703	0.226	0.180	0.163	0.032***	0.019***	0.023***	
Hungary	83	0.092	0.072	0.060	95	0.100	0.076	0.057	0.008	0.004	-0.003***	
India	649	0.070	0.031	0.096	1,168	0.075	0.035	0.097	0.005	0.004	0.001***	
Indonesia	237	0.113	0.082	0.116	732	0.124	0.085	0.120	0.011	0.003	0.004***	
Ireland	30	0.428	0.430	0.154	65	0.217	0.155	0.158	-0.211***	-0.275	0.004***	
Israel	71	0.248	0.192	0.195	138	0.276	0.244	0.203	0.028	0.052	0.008***	
Japan	15,632	0.152	0.122	0.115	13,377	0.178	0.147	0.131	0.026***	0.025***	0.016***	
Malaysia	1,452	0.112	0.075	0.112	2,290	0.131	0.094	0.114	0.019***	0.019	0.002***	
Netherlands	525	0.127	0.098	0.118	459	0.092	0.072	0.072	-0.035***	-0.026***	-0.046***	
New Zealand	18	0.092	0.040	0.101	65	0.032	0.022	0.030	-0.060**	-0.018***	-0.071***	
Norway	152	0.140	0.097	0.107	169	0.118	0.101	0.068	-0.022	0.004***	-0.039***	
Pakistan	28	0.120	0.037	0.161	236	0.056	0.016	0.083	-0.064**	-0.021***	-0.078***	
Philippines	145	0.094	0.062	0.108	200	0.117	0.086	0.116	0.023*	0.024	0.008***	
Poland	75	0.110	0.080	0.096	147	0.095	0.050	0.113	-0.015**	-0.030	0.017***	
Portugal	45	0.167	0.160	0.053	50	0.164	0.115	0.104	-0.003	-0.045***	0.051***	
Russia	104	0.093	0.076	0.062	108	0.137	0.101	0.109	0.044	0.025***	0.047***	
Saudi Arabia												
Singapore	1,211	0.157	0.125	0.115	1,598	0.182	0.158	0.129	0.025***	0.033***	0.014***	
South Korea	2,822	0.127	0.093	0.110	3,558	0.143	0.107	0.126	0.016***	0.014***	0.016***	
Spain	132	0.110	0.063	0.134	186	0.097	0.071	0.076	-0.013***	0.008***	-0.058***	
Sri Lanka												
Sweden	779	0.150	0.106	0.138	1,010	0.132	0.105	0.114	-0.018	-0.001***	-0.024***	
Switzerland	774	0.176	0.161	0.110	927	0.188	0.172	0.115	0.012	0.011	0.005***	
Taiwan	1,934	0.173	0.140	0.126	4,094	0.211	0.172	0.146	0.038***	0.032***	0.020***	
Thailand	1,606	0.088	0.053	0.095	2,081	0.115	0.076	0.113	0.027***	0.023***	0.018***	
Turkey	246	0.103	0.060	0.106	409	0.094	0.058	0.105	-0.009	-0.002	-0.001***	
United Kingdom	3,812	0.128	0.087	0.130	3,313	0.123	0.083	0.124	-0.005	-0.004***	-0.006***	
United States	13,942	0.179	0.107	0.188	10,628	0.180	0.121	0.177	0.001	0.014***	-0.011***	
Basic Materials	5,824	0.100	0.072	0.098	6,468	0.118	0.092	0.108	0.018***	0.020***	0.010***	
Consumer Discretionary	12,741	0.141	0.101	0.132	13,056	0.160	0.123	0.140	0.019***	0.022***	0.008***	
Consumer Staples	5,005	0.113	0.082	0.107	5,178	0.125	0.094	0.112	0.012***	0.012***	0.005***	
Energy	1,520	0.107	0.062	0.126	1,589	0.106	0.071	0.110	-0.001**	0.009***	-0.016***	
Health Care	3,729	0.197	0.153	0.174	4,142	0.192	0.148	0.162	-0.005	-0.005***	-0.012***	
Industrials	15,409	0.132	0.103	0.116	15,625	0.144	0.116	0.119	0.012***	0.013***	0.003***	
Real Estate	857	0.123	0.078	0.131	1,027	0.130	0.093	0.135	0.007**	0.015	0.004***	
Technology	7,959	0.250	0.206	0.181	8,648	0.247	0.208	0.171	-0.003	0.002***	-0.010***	
Telecommunications	2,257	0.209	0.157	0.172	2,719	0.205	0.171	0.160	-0.004*	0.014***	-0.012***	
Full sample	55,301	0.152	0.109	0.144	58,452	0.163	0.124	0.143	0.011***	0.015**	-0.001***	

Appendix A.2 The institutional environment and peer effects on cash holdings: alternative sub-samples

The table presents the 2SLS estimation results of Equation (1) that relate cash holdings to peer-firm averages, firm-specific and macroeconomic control variables. All estimations include a constant, and industry, country and time-fixed effects (but not reported for brevity of presentation). The peer-firm averages are calculated based on ICB Industry Code. The sample is split into two subgroups based on whether the country/region is above-mean (high) and below-mean (low) for each of the corresponding non-dichotomous institutional factor — the rule of law, property rights, regulatory quality, control of corruption, government effectiveness, financial development, financial institutions, financial markets, political stability, newspaper circulation, foreigner ownership and innovation. For the dichotomous or binary measure of institutional development (legal origin and national income level classification by The World Bank), we categorise countries based on whether the attribute under consideration is present or absent. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Panel A

Institutional development	Rule of law		Property rights		Regulatory quality		Control of corruption		Government effectiveness	
	Low	High	Low	High	Low	High	Low	High	Low	High
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peer firm averages										
Cash	-0.376 (0.427)	0.849*** (0.067)	-0.522 (0.521)	0.813*** (0.068)	0.242 (0.255)	0.839*** (0.068)	-0.113 (0.436)	0.809*** (0.070)	0.348 (0.240)	0.886*** (0.068)
First-stage instruments										
ERisk	-0.037*** (0.007)	0.140*** (0.006)	-0.029*** (0.007)	0.145*** (0.006)	-0.057*** (0.007)	0.139*** (0.006)	-0.032*** (0.007)	0.142*** (0.006)	-0.062*** (0.008)	0.137*** (0.006)
First-stage diagnostic statistics										
Adj.R ²	0.601	0.702	0.615	0.704	0.729	0.689	0.714	0.690	0.619	0.696
F-Statistic	25.95***	594.70***	19.23***	551.90***	60.61***	577.80***	23.38***	527.00***	65.09***	594.90***
Specification test statistics										
K-P LM test of redundancy	25.72***	910.10***	19.09***	873.40***	59.55***	881.00***	23.18***	823.40***	64.54***	904.50***
Equality test		8.05***		6.45**		5.13**		4.36**		4.64**
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	54,956	230,233	70,021	215,168	67,047	218,142	83,343	201,846	47,804	237,385
# of firms	7,638	18,012	7,638	18,012	7,341	7,638	18,012	16,707	5,440	20,210
# of industries	99	130	99	130	95	99	130	130	92	131
# of countries	23	24	23	24	20	23	24	24	20	27
Adj.R ²	0.098	0.306	0.093	0.309	0.235	0.303	0.206	0.305	0.207	0.302

Appendix A.2 The institutional environment and peer effects on cash holdings: alternative sub-samples (continued)

Panel B

Institutional development	Financial development		Financial institutions		Financial markets		MSCI Index		National income level	
	Low	High	Low	High	Low	High	EME	DME	Low	High
Peer firm averages										
Cash	0.115 (0.407)	0.887*** (0.071)	0.599** (0.248)	0.900*** (0.073)	0.228 (0.328)	0.893*** (0.068)	-0.055 (0.413)	0.810*** (0.070)	0.325 (0.238)	0.839*** (0.069)
First-stage instruments										
ERisk	-0.043*** (0.009)	0.128*** (0.005)	-0.060*** (0.008)	0.129*** (0.005)	-0.052*** (0.010)	0.131*** (0.005)	-0.033*** (0.006)	0.143*** (0.006)	-0.066*** (0.008)	0.135*** (0.006)
First-stage diagnostic statistics										
Adj.R ²	0.772	0.673	0.752	0.678	0.480	0.687	0.715	0.689	0.725	0.689
F-Statistic	24.02***	587.60***	58.38***	555.50***	28.31***	671.30***	25.62***	528.20***	68.62***	578.50***
Specification test statistics										
K-P LM test of redundancy	23.45***	836.00***	56.21***	804.30***	27.43***	947.40***	25.37***	829.00***	67.07***	863.20***
Equality test		3.49*		1.36		3.95**		4.27**		4.31**
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	52,262	232,927	59,711	225,478	26,347	258,842	83,669	201,520	64,996	220,193
# of firms	5,876	19,774	6,560	19,090	3,074	22,576	8,993	16,657	7,115	18,535
# of industries	90	132	92	132	72	133	99	130	96	131
# of countries	22	25	21	26	23	24	25	22	18	29
Adj.R ²	0.231	0.296	0.259	0.294	0.236	0.288	0.213	0.306	0.241	0.302

Appendix A.2 The institutional environment and peer effects on cash holdings: alternative sub-samples (continued)

Panel C

Institutional development	Political stability		Newspaper circulation		Foreigner ownership		Innovation		Legal origin	
	Low	High	Low	High	Low	High	EME	DME	Civil	Common
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peer firm averages										
Cash	-0.329 (0.380) (0.007)	0.843*** (0.069) (0.006)	0.076 (0.272) (0.007)	0.855*** (0.068) (0.006)	-1.152 (1.015) (0.007)	0.799*** (0.074) (0.006)	-0.044 (0.366) (0.007)	0.841*** (0.070) (0.006)	0.934*** (0.057) (0.008)	0.961*** (0.285) (0.006)
First-stage instruments										
ERisk	-0.043*** (0.008)	0.137*** (0.006)	-0.066*** (0.009)	0.133*** (0.005)	-0.018*** (0.007)	0.135*** (0.006)	-0.040*** (0.007)	0.138*** (0.006)	0.218*** (0.008)	0.038*** (0.005)
First-stage diagnostic statistics										
Adj.R ²	0.620	0.700	0.617	0.698	0.712	0.688	0.729	0.685	0.634	0.780
F-Statistic	32.12***	580.00***	54.45***	613.50***	6.68***	495.80***	29.99***	559.20***	711.90***	65.86***
Specification test statistics										
K-P LM test of redundancy	31.75***	877.70***	53.17***	899.20***	6.64***	748.50***	29.54***	855.50***	771.00***	65.70***
Equality test		9.22***		7.75***		3.67*		5.64**		0.01
Peer firm average controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	51,621	233,568	44,707	240,482	85,448	199,741	68,457	216,732	152,076	132,984
# of firms	5,707	19,943	5,096	20,554	9,125	16,525	7,498	18,152	12,963	12,669
# of industries	93	131	90	131	101	130	96	131	114	108
# of countries	18	29	19	28	23	24	22	25	30	16
Adj.R ²	0.108	0.306	0.166	0.305	-0.062	0.304	0.204	0.303	0.277	0.274

Appendix A.3 The implications of mimicking peer firms' cash holdings: alternative sub-samples

The table presents estimation results of Equation (2) that relate firm value to the financial crisis dummy, mimicking dummy, the interaction term for the financial crisis and mimicking, and firm-specific and macroeconomic control variables. *Crisis* is a dummy variable that takes the value of one for the period 2008-2012 and zero otherwise. *Mimicking* is a dummy variable that takes the value of one for mimicking firms and zero otherwise. All estimations include a constant, and industry and country-fixed effects (but not reported for brevity of presentation). The restricted sample around the financial crisis consists of 13,754 listed non-financial and non-utility firms (113,753 firm-year observations) from 37 countries drawn from Datastream over the period 2002–2012. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Panel A

Variables	Institutional development		Rule of law		Property rights		Regulatory quality		Control of corruption		Government effectiveness	
	Low	High	(1)	(2)	Low	High	Low	High	Low	High	Low	High
Mimicking	0.164*** (0.020)	0.029*** (0.008)	0.119*** (0.016)	0.036*** (0.009)	0.165*** (0.020)	0.028*** (0.008)	0.120*** (0.016)	0.036*** (0.009)	0.165*** (0.020)	0.028*** (0.008)		
Crisis	-0.006 (0.017)	-0.260*** (0.008)	-0.008 (0.015)	-0.273*** (0.008)	-0.003 (0.017)	-0.260*** (0.008)	-0.007 (0.015)	-0.273*** (0.008)	-0.002 (0.017)	-0.260*** (0.008)		
Mimicking×Crisis	-0.173*** (0.025)	0.026** (0.011)	-0.114*** (0.020)	0.015 (0.012)	-0.173*** (0.025)	0.026** (0.011)	-0.114*** (0.020)	0.014 (0.012)	-0.173*** (0.025)	0.026** (0.011)		
Equality test - Mimicking		40.27***		20.67***		40.99***		21.26***		40.49***		
Equality test - Crisis		186.20***		252.40***		189.00***		254.30***		189.90***		
Equality test - Mimicking×Crisis		55.55***		31.25***		54.89***		30.88***		54.29***		
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	No	No	No	No	No	No	No	No	No	No	No	No
# observations	25,061	88,692	31,263	82,490	24,947	88,806	31,232	82,521	24,852	88,901		
# of firms	4,178	9,576	4,178	9,576	3,381	4,178	9,576	9,589	3,371	10,383		
# of industries	80	124	80	124	77	80	124	124	77	124		
# of countries	16	21	16	21	16	16	21	21	15	22		
Adj.R ²	0.312	0.277	0.316	0.272	0.314	0.277	0.318	0.272	0.314	0.277		

Appendix A.3 The implications of mimicking peer firms' cash holdings: alternative sub-samples (continued)

Panel B

Variables	Institutional development			Financial development			Financial institutions			Financial markets			MSCI Index			National income level		
	Low	High		Low	High		Low	High		Low	High		EME	DME		Low	High	
Mimicking	0.249*** (0.028)	0.027*** (0.008)		0.161*** (0.019)	0.027*** (0.009)		0.112*** (0.038)	0.049*** (0.008)		0.120*** (0.016)	0.036*** (0.009)		0.174*** (0.021)	0.029*** (0.008)		0.174*** (0.021)	0.029*** (0.008)	
Crisis	0.025 (0.023)	-0.246*** (0.007)		-0.015 (0.016)	-0.259*** (0.008)		-0.185*** (0.036)	-0.206*** (0.007)		-0.007 (0.015)	-0.273*** (0.008)		0.011 (0.018)	-0.261*** (0.008)		0.011 (0.018)	-0.261*** (0.008)	
Mimicking×Crisis	-0.258*** (0.034)	0.026** (0.010)		-0.173*** (0.024)	0.028** (0.011)		-0.069 (0.047)	-0.004 (0.010)		-0.114*** (0.020)	0.014 (0.012)		-0.183*** (0.026)	0.026** (0.011)		-0.183*** (0.026)	0.026** (0.011)	
Equality test - Mimicking		58.17***			40.95***			2.67			21.26***			39.56***			39.56***	
Equality test - Crisis		124.30***			179.00***			0.33			254.30***			197.10***			197.10***	
Equality test - Mimicking×Crisis		65.13***			58.89***			1.86			30.88***			54.17***			54.17***	
Firm-specific control variables	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Macroeconomic control variables	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Industry-FE	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Country-FE	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Year-FE	No	No		No	No		No	No		No	No		No	No		No	No	
# observations	17,715	96,038		25,823	87,930		6,933	106,820		31,232	82,521		23,276	90,477		23,276	90,477	
# of firms	2,479	11,275		3,493	10,261		966	12,788		4,165	9,589		3,165	10,589		3,165	10,589	
# of industries	66	125		78	124		46	126		79	124		124	124		124	124	
# of countries	15	22		17	20		14	23		16	21		11	26		11	26	

Appendix A.3 The implications of mimicking peer firms' cash holdings: alternative sub-samples (continued)

Panel C

Variables	Institutional development		Political stability		Newspaper circulation		Foreigner ownership		Innovation		Legal origin	
	Low	High	Low	High	Low	High	Low	High	EME	DME	Civil	Common
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
Mimicking	0.131*** (0.017)	0.038*** (0.009)	0.233*** (0.026)	0.029*** (0.008)	0.107*** (0.015)	0.040*** (0.009)	0.168*** (0.020)	0.027*** (0.008)	0.064*** (0.009)	0.053*** (0.013)		
Crisis	-0.017 (0.017)	-0.258*** (0.008)	-0.034 (0.024)	-0.236*** (0.007)	-0.026* (0.014)	-0.273*** (0.008)	-0.002 (0.017)	-0.261*** (0.008)	-0.160*** (0.009)	-0.277*** (0.012)		
Mimicking×Crisis	-0.124*** (0.022)	0.009 (0.011)	-0.227*** (0.032)	0.022** (0.010)	-0.101*** (0.019)	0.010 (0.012)	-0.183*** (0.025)	0.029*** (0.011)	-0.038*** (0.012)	0.011 (0.017)		
Equality test - Mimicking		23.87***		57.07***		14.97***		42.69***		0.47		
Equality test - Crisis		170.50***		63.80***		231.90***		190.10***		60.92***		
Equality test - Mimicking×Crisis		28.75***		54.05***		25.17***		61.85***		5.60**		
Firm-specific control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-FE	No	No	No	No	No	No	No	No	No	No	No	No
# observations	27,822	85,931	18,160	95,518	33,461	80,292	24,883	88,586	62,349	51,404		
# of firms	3,649	10,105	2,461	11,278	4,427	9,327	3,368	10,339	7,347	6,407		
# of industries	80	121	73	122	84	124	77	124	106	88		
# of countries	16	21	16	20	17	20	14	21	22	15		
Adj.R ²	0.310	0.274	0.298	0.277	0.307	0.274	0.316	0.276	0.332	0.214		

Appendix A.3 The implications of mimicking and cash holdings

The table presents estimation results of Equation (2) that relate firm value to the financial crisis dummy, mimicking dummy, the interaction term for the financial crisis and mimicking, and firm-specific and macroeconomic control variables. *Crisis* is a dummy variable that takes the value of one for the period 2008-2012 and zero otherwise. *Mimicking* is a dummy variable that takes the value of one for mimicking firms and zero otherwise. All estimations include a constant, and industry and country-fixed effects (but not reported for brevity of presentation). The restricted sample around the financial crisis consists of 13,754 listed non-financial and non-utility firms (113,753 firm-year observations) from 37 countries drawn from Datastream over the period 2002–2012. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Categorisation factor	Cash		Cash/NA	
	Low	High	Low	High
Variables	(1)	(2)	(3)	(4)
Mimicking	0.003 (0.008)	0.070*** (0.013)	0.004 (0.009)	0.080*** (0.013)
Crisis	-0.167*** (0.008)	-0.260*** (0.011)	-0.189*** (0.009)	-0.241*** (0.011)
Mimicking×Crisis	0.045*** (0.011)	-0.053*** (0.017)	0.071*** (0.012)	-0.076*** (0.016)
Equality test - Mimicking		18.05***		23.52***
Equality test - Crisis		46.96***		14.19***
Equality test - Mimicking×Crisis		23.56***		53.19***
Firm-specific control variables	Yes	Yes	Yes	Yes
Macroeconomic control variables	Yes	Yes	Yes	Yes
Industry-FE	Yes	Yes	Yes	Yes
Country-FE	Yes	Yes	Yes	Yes
Year-FE	No	No	No	No
# observations	57,367	56,386	57,319	56,434
# of firms	10,655	10,851	10,655	10,851
# of industries	127	127	127	127
# of countries	37	37	37	37
Adj.R ²	0.253	0.294	0.271	0.293

Appendix A.4 Differences in product market competition conditional on institutional development

The table presents the differences in the industrial concentration ratio measured by the Herfindahl-Hirschman Index (HHI) conditional on institutional development. The sample consists of 25,650 listed non-financial and non-utility firms (298,985 firm-year observations) from 47 countries drawn from Datastream over the period 1990–2019. All variables used are defined in Appendix A and winsorised at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Panel A: HHI-Sales

#	Institutional development	Regime 1					Regime 2					Differences		
		N	Mean	Median	SD	Mean Trend	Median Trend	N	Mean	Median	SD	Mean Trend	Median Trend	SD
(1)	Rule of law	74,018	0.117	0.088	0.094	-0.087***	-0.105***	224,831	0.093	0.060	0.094	0.081***	0.060***	0.000***
(2)	Property rights	89,457	0.130	0.094	0.106	-0.091***	-0.112***	209,528	0.086	0.057	0.086	0.023***	0.020***	-0.020***
(3)	Regulatory quality	73,824	0.117	0.088	0.094	-0.087***	-0.112***	225,025	0.093	0.060	0.094	0.082***	0.060***	0.000***
(4)	Control of corruption	89,199	0.130	0.094	0.107	-0.101***	-0.112***	209,650	0.085	0.057	0.085	0.023***	0.020***	-0.022***
(5)	Government effectiveness	73,822	0.117	0.088	0.095	-0.088***	-0.106***	225,027	0.093	0.060	0.094	0.081***	0.059***	-0.001***
(6)	Financial development	59,682	0.121	0.088	0.100	-0.142***	-0.076***	239,303	0.093	0.063	0.092	0.081***	0.068***	-0.008***
(7)	Financial institutions	74,491	0.118	0.090	0.095	-0.117***	-0.114***	224,494	0.092	0.060	0.094	0.082***	0.056***	-0.001***
(8)	Financial markets	30,002	0.160	0.146	0.104	-0.309***	-0.328***	268,983	0.092	0.063	0.091	0.068***	0.063***	-0.013***
(9)	MSCI Index	89,548	0.130	0.094	0.107	-0.099***	-0.117***	209,437	0.085	0.057	0.085	0.022***	0.020***	-0.022***
(10)	WB Income group	69,879	0.111	0.086	0.089	-0.079***	-0.087***	229,106	0.095	0.062	0.096	0.099***	0.074***	0.007***
(11)	Political stability	79,745	0.137	0.103	0.110	-0.212***	-0.227***	219,104	0.085	0.057	0.084	0.037***	0.034***	-0.026***
(12)	Newspaper circulation	56,189	0.126	0.100	0.094	-0.323***	-0.237***	239,993	0.091	0.061	0.091	0.083***	0.071***	-0.003***
(13)	Foreigner ownership	92,734	0.132	0.099	0.107	-0.163***	-0.211***	206,251	0.084	0.055	0.085	0.028***	0.015***	-0.022***
(14)	Innovation	73,539	0.115	0.088	0.091	-0.090***	-0.098***	224,461	0.093	0.060	0.094	0.081***	0.060***	0.003***
(15)	Legal origin	160,359	0.097	0.067	0.094	0.131***	0.139***	138,490	0.100	0.070	0.095	0.092***	0.064***	0.001***

Panel B: HHI-Total assets

#	Institutional development	Regime 1					Regime 2					Differences		
		N	Mean	Median	SD	Mean Trend	Median Trend	N	Mean	Median	SD	Mean Trend	Median Trend	SD
(1)	Rule of law	74,018	0.183	0.128	0.179	-0.123***	-0.040***	224,831	0.166	0.115	0.164	-0.067***	0.014***	-0.015***
(2)	Property rights	89,457	0.191	0.139	0.180	-0.173***	-0.068***	209,528	0.162	0.108	0.163	-0.098***	-0.020***	-0.017***
(3)	Regulatory quality	73,824	0.183	0.128	0.179	-0.124***	-0.049***	225,025	0.166	0.115	0.165	-0.066***	0.015***	-0.014***
(4)	Control of corruption	89,199	0.190	0.139	0.178	-0.191***	-0.092***	209,650	0.162	0.108	0.163	-0.097***	-0.020***	-0.015***
(5)	Government effectiveness	73,822	0.183	0.128	0.180	-0.122***	-0.043***	225,027	0.166	0.115	0.164	-0.068***	0.015***	-0.016***
(6)	Financial development	59,682	0.186	0.126	0.191	-0.164***	-0.036	239,303	0.167	0.116	0.163	-0.059***	0.020***	-0.028***
(7)	Financial institutions	74,491	0.184	0.129	0.181	-0.131***	-0.094***	224,494	0.166	0.115	0.164	-0.064***	0.021***	-0.017***
(8)	Financial markets	30,002	0.263	0.199	0.217	-0.572***	-0.474***	268,983	0.160	0.108	0.159	-0.098***	-0.031***	-0.058***
(9)	MSCI Index	89,548	0.192	0.139	0.181	-0.177***	-0.091***	209,437	0.162	0.108	0.163	-0.100***	-0.019***	-0.018***
(10)	WB Income group	69,879	0.175	0.121	0.173	-0.067***	-0.057***	229,106	0.169	0.117	0.168	-0.042***	0.029***	-0.005***
(11)	Political stability	79,745	0.206	0.153	0.187	-0.336***	-0.151***	219,104	0.158	0.105	0.159	-0.110***	-0.023***	-0.028***
(12)	Newspaper circulation	56,189	0.204	0.144	0.197	-0.473***	-0.230***	239,993	0.161	0.110	0.158	-0.091***	-0.013***	-0.039***
(13)	Foreigner ownership	92,734	0.196	0.143	0.182	-0.332***	-0.235***	206,251	0.160	0.106	0.161	-0.090***	-0.017***	-0.021***
(14)	Innovation	73,539	0.182	0.127	0.179	-0.108***	-0.027*	224,461	0.167	0.115	0.165	-0.066***	0.014***	-0.014***
(15)	Legal origin	160,359	0.159	0.107	0.161	0.055***	0.143***	138,490	0.184	0.125	0.176	-0.064***	-0.065***	0.015***