Do All Diversified Firms Hold Less Cash?

The Role of Corporate Governance and Product Market Competition¹

by

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Abstract:

In this paper, we examine the relationship between corporate diversification and cash holdings for a large sample of more than 21,000 international firms from 17 countries for the period from 1998 to 2013. Previous studies have shown that diversified US firms hold less cash than standalone firms. Using Duchin's (2010) measure of diversification that takes into account the cross-divisional correlations in investment opportunities as well as the correlations between investment opportunities and cash flows, we show that this finding is robust for firms in countries with well-developed capital markets and strong corporate governance. In contrast, diversified firms in countries with low level of governance provisions and less developed capital markets hold more cash than standalone firms. We also document a strong county and firmlevel effect of product market competition on the relationship between corporate diversification and cash holdings. Diversified firms in countries with high import penetration as well as firms with business segments operating in highly competitive industries hold significantly larger cash balances than standalone firms. Taken together, these results suggest that corporate governance and product market competition can weaken or even reverse the effect documented by previous studies where diversification reduces firm's need to hold large cash balances.

JEL Classification: G30; G31; G32

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Introduction

Extant research has documented the large and growing cash holdings of US publicly traded firms. Duchin (2010) points out that as of fiscal year 2006, nonfinancial and nonutility firms in the Compustat universe had aggregate cash holdings of over 1.7 trillion dollars or 9.2% of the total market value of their equity. The growth of cash holdings is equally remarkable. Bates, Kahle, and Stulz (2009) show that the average ratio of cash to assets of listed U.S. industrial firms has increased from 10.5% in 1980 to 23.2% in 2006. In addition, since the 2007 financial crisis, when liquidity dried up and firms scrambled to avoid a cash squeeze, corporate cash balances have grown even faster. According to a recent Fitch Ratings' report on corporate cash holdings², the median industrial U.S. corporate cash balances have increased by 60% to 80% since the end of 2007.

This spectacular increase in US cash holdings have attracted the attention of both academics and Finance practitioners who have tried to understand what has been the driving force behind this change. In this paper, we use a large sample of more than 21,000 international firms from 17 countries for the period from 1998 to 2013 to study the effect of corporate governance and the cross-divisional transfers in the internal capital markets of diversified firms as well as the effect of product market competition on the way diversification affects corporate cash holdings. Using Duchin's (2010) measure of diversification that accounts for the cross-divisional correlations in investment opportunities and the correlations between divisional investment opportunities and cash flows, we document a significant but much smaller diversification increase in the inter-segment correlation in investment opportunities (i.e. reduction in diversification) corresponds to an increase of 0.14% in average cash holdings. In contrast, Duchin (2010) reports a much larger effect for the US publicly traded firms. In his sample, an increase of one standard deviation in the cross-divisional correlation in investment opportunities leads to an increase of 4.4% (9.1%) in the cash holdings of the average (median) firm.

We search for an explanation of this weak result and consider both cross-country and cross-firm variation in the relationship between cash holdings and diversification. For our first set of results, we hypothesize that for firms in countries with low corporate governance provisions

² See the press release on May 8, 2013 via Reuters <u>http://www.reuters.com/article/2013/05/08/ny-fitch-ratings-idUSnBw085883a+100+BSW20130508</u>.

and less developed capital markets, the diversification effect on cash holdings is weak. On the other hand, similar to the evidence for US firms, diversified firms in countries with developed capital markets and strong corporate governance will hold less cash than their standalone counterparts.

Our second set of results considers the effect of product market competition on the relationship between corporate diversification and cash holdings. We hypothesize that firms in countries with high import penetration as well as firms with business segments operating in highly competitive industries will hold significantly larger cash balances than standalone firms.

We test how this diversification effect is influenced by country and firm level factors that proxy for the efficiency of internal capital allocation of diversified firms, the easy of raising external finance, corporate governance and product market competition. We find evidence to support the hypothesis that inefficient allocation and management entrenchment weakens the effect of diversification on cash holdings. The strongest result, however, is for the interaction of diversification with country- and firm-level measures of product market competition. We use import penetration to measure country-level competition and price-cost margin and Herfindahl -Hirschman index to measure competition at the firm level. Import penetration has a significant impact on the diversification effect on cash. With an average import penetration of 27.77%, a one standard-deviation increase in the correlation in investment opportunity corresponds to an increase of 0.05% in average cash holdings as a percentage of total assets, representing an 83.31% reduction in the diversification effect on cash due to strong import competition. In countries where firms face a lot of foreign competitions, firms' cash policies are less sensitive to the benefits of diversification that arise from the low correlations in investment opportunities and cash flows. At the firm and industry-level, we find the diversification effect is stronger for firms with more segments that operate in high profit-margin markets. These diversified firms hold significantly more cash than standalone firms, i.e. for these firms competition reverses the effect of diversification on cash holdings.

Our results also lend support to the hypothesis that in countries with well-developed capital markets firms build cash by security issuances, and that the accessibility of external financing allows firms to fine-tune cash management. Our results show that diversified firms hold less cash only when their countries' capital market development index is above the cross-country

average. Taking together, these results suggest that external financing constraints also weaken the documented diversification effect on cash holdings.

Our paper broadens the cash holdings and corporate diversification literature along several dimensions. Previous studies have argued that diversified firms naturally have less cash as they have used up their cash reserves in previous acquisitions. Other studies have suggested that diversified firms are larger, and economies of scale allow them to hold less liquid assets. Duchin (2010), on the other hand, shows that diversified firms have lower cash balances relative to their standalone counterparts, because they enjoy the benefit of coinsurance. Firms hold precautionary cash so that they will not miss out on profitable future investment opportunities. The imperfect correlations in investment opportunity and cash flow between divisions reduce diversified firms' exposures to risk, smooths and reduces the uncertainty in firms' overall investment opportunities and cash flow, and therefore reduces the amount of precautionary cash firms need to hold in reserves.

Our results show that among diversified firms, there is still a wide variation in the ratio of cash balances to total assets. Not all diversified firms hold less cash than standalone firms. For our sample of international firms, the average cash to assets ratio is 18.89% for focused firms, and 14.82% for diversified firms (with a standard deviation of 14.92% for diversified firms). Figure 1 plots the annual cash holdings for three sample firms that have a very different pattern for their ratio of cash balances to total assets during the sample period 1998 to 2013. All three firms report three operating segments but the graph shows that the cash balances of these firms are very different. For example, DuPont's cash balances (the dashed line) are similar to those of an average diversified firm in our sample. Cisco system's cash balances (the solid line) display an increasing trend during the sample period; however, the absolute level of cash is high and above many focused firms. Finally, World Wrestling Entertainment's cash balances (the dotted line) are also very high, but decreasing over the years.

[Figure 1]

Despite the fact that these results are simple univariate statistics, the examples suggest that not all diversified firms are well positioned to capitalize on the potential benefit of diversification in terms of smoothing divisional cash flows and investments. The literature has identified several channels that might weaken or reduce these benefits. Inefficient internal capital allocation (Shin and Stulz (1998), Rajan et al. (2000)) where divisional managers with strong bargaining power expropriate resources from high profitability divisions and overinvest in low productivity divisions, could weaken the benefits of diversification. Additionally, the need for precautionary cash may arise for reasons other than funding potential projects, e.g. empire building and other managerial private benefits of control.

Finally, Fresard (2010) identifies a strategic role of cash holdings and shows that large cash reserves can allow firms to gain market share at the expense of their rivals. This means that cash rich firms can finance competitive choices in the product markets, and firms' competitive outcomes depend not only on their own cash reserves but also on their rivals'. In turn, Hoberg et al. (2014) show that product market competition influence firms' financial policies. Threats from rivals (measured by product market "fluidity") decrease firms' payouts and increase their cash holdings. Firms may build up cash reserves to fend off predatory behaviors and potential threats from product market rivalries. When competition, or perceived competition, is so severe, it may dominate firms' choices regarding financial policies, and reverse the diversification effects on cash balances. Previous studies have not considered the effect that production market competition may have on the interaction between diversification and cash holdings. Our results provide a strong support for such a channel of interaction.

The remainder of this paper is organized as follows. Section II provides an outline of the relevant literature. Section III describes the sample data and presents some summary statistics. Section IV discusses the methodology we use in this paper. Section V discusses the empirical results. Section VI concludes and considers some implications and extensions.

II. Literature Review

The theoretical models for corporate cash holdings state that firms' optimal cash balances are determined by the trade-off between the marginal costs and benefits of holding liquid assets. The costs of holding cash include opportunity costs of idle capital and agency costs associated with managerial discretion, whereas the benefits of holding cash include avoiding unnecessary transactions and alleviating information asymmetry and agency costs associated with costly external capital.

Kim et al. (1998) model the trade-off between the benefit of minimizing the need for costly external financing and the low return on liquid assets. They find that corporate liquidity is increasing in external financing costs, the variance of future cash flows and the return on investment opportunities, and is decreasing in the return differential between the firm's liquid and non-liquid assets. Opler et al. (1999) examine the relationship between firms' holdings of liquid assets and a wide array of variables. In particular, they find that firms with better investment opportunities and riskier cash flows hold more cash, whereas firms with greater access to external capital markets and ability to raise funds through asset sales or dividends cuts hold less cash. Their results support the trade-off model of cash holdings, as opposed to the financing hierarchy theory, which states that cash holdings rise and fall with firms' internal resources and productivity. Archarya et al. (2007) consider cash and debt from a hedging perspective. A firm has high hedging needs when the correlation between cash flows and investment opportunities is low (i.e. when the "financing gap" is likely to be large), and will therefore prefer to hold more cash. In contrast, if the firm's investment opportunities tend to arrive when cash flow is high, the firm has low hedging needs and will benefit less from holding cash.

Jensen (1986) argues that the agency problems associated with the decision of how to use internally available funds are especially severe for companies that generate substantial free cash flows. Managers have incentives to hoard cash or invest sub-optimally in order to maximize their private benefits instead of returning excessive cash to shareholders. Although some studies find no support to the agency-cost motive for cash holdings (Opler et al. (1999), Mikkelson and Partch (2003)), Dittmar et al. (2003) argue that when good corporate governance and shareholder protection are in place, shareholders can force managers to disgorge excess cash balances. They compare publicly traded companies from countries with different level of shareholder's protection and find that firms in countries with poor governance hold much more cash than firms in countries with strong shareholder protection and good corporate governance.

However at firm-level, the evidence is mixed. Harford et al. (2008) find that U.S. firms with weaker shareholder rights and lower insider ownership have lower cash reserves, while Kato et al. (2013) find that in Japan improved governance is related to decrease in excess cash and increase in payout. In that respect, Harford et al. suggest that the differences imply that country-level enforcing of shareholder rights is more important than firm-level determinants. Another

possible interpretation is that corporate governance does not directly affect the level of cash holdings, but rather the interaction depends on how managers allocate resources within the firm. For example, managers may choose to build up cash reserves and wait for productive investment opportunities (which increases cash holdings), or invest in sub-optimal projects (which decreases cash holdings). More research is required to support or refute this interpretation.

Previous studies (see Subramaniam et al, 2011) have also argued that corporate diversification could significantly affect the optimal cash holdings given that there are different agency costs and financing needs associated with diversified and standalone firms. The growth opportunities of diversified firms are likely to be imperfectly correlated (Lamont, 1997, Shin and Stulz, 1998; Khanna and Tice, 2001). A diversified firm should need less cash to meet its investment demand than a focused firm at any given point in time. Similarly, a diversified firm could cross finance one segment's investment projects with another segment's cash holdings. In short, diversified firms benefit from the availability of internal capital markets which reduces the marginal benefits of holding liquid assets.

This argument is connected to another strand in the cash holdings literature. Harford et al. (2003), Haushalter et al. (2007), Acharya et al. (2007) and Denis and Sibilkov (2010) all argue that cash acts as a hedge for firms against financing and predation risk, especially in economic downturns. Similarly, Hoberg et al. (2014) and Morellec et al. (2013) show that product market competitions and threats decrease firm's payout to shareholders and increase corporate cash holdings. Hoberg et al. (2014) develop a measure, product fluidity, to capture the threats a firm faces from changes in its rivals' products.³ The relations between cash holdings and firm structure or competitions tend to be stronger for firms with greater financial constraints. This further supports the conventional wisdom that accessibility to capital markets is a key determinant of corporate liquidity. Fresard (2010) shows that large cash reserves lead to subsequent growths in product market shares. There are several channels how these effects manifest: aggressive pricing by the firm that challenges rivals' performances, competitive operational choices by the firm

³ Other measures of predation risk include product similarity and interdependence of investment opportunities. Chi and Su (2013) use these proxies and find that predation risk raises the marginal value of cash holdings. Alimov (2014) also identifies cash as the channel through which competition influences firm value.

along the value chain, and signalling of possible aggressive behavior that may distort the choices of existing and potential competitors.

Diversified firms are also more likely to sell their assets to raise funds than focused firms. Shleifer and Vishny (1992) argue that firms should have lower borrowing costs if they have more assets that can be cheaply and easily converted into cash. Subramaniam et al, (2011) points out that because diversified firms are on average three times the size of focused firms, and they have assets from non-core segments, these firms are more likely to raise funds by selling assets from non-core segments, than focused firms. This again reduces the marginal benefit of holding cash, which is a source of internal capital that does not incur the information asymmetry related costs associated with external financing.

While corporate diversification provides benefits, it can also give rise to severe agency costs. Rajan et al. (2000) show that diversified firms may face more severe agency problems that arise from segment-managers' propensity to lobby for firm-wide resources. Segments with more influence in the firm will garner more resources, which could potentially lead to an over-investment problem and other dead-weight costs. As a result, the marginal costs of holding cash and liquid assets associated with these agency costs are higher for diversified firms than for focused firms. The next section discusses our sample data, some summary statistics and how we measure corporate diversification.

III. Sample Data and Summary Statistics

Sample Data

Our initial sample is formed by searching the universe of publicly traded firms in the Worldscope database of Thomson ONE for the list of the 39 countries that constitute the Equity Market Development Index by McLean and Zhao (2014)⁴. For each country, we collect annual firm-level accounting data for our sample firms from DataStream and annual financial data by business segment from the Worldscope for each 4-digit SIC code business segment. We apply the commonly used criteria to filter the sample. We exclude financial (primary SIC between 6000 and 6999) and utility (primary SIC between 4900 and 4999) companies. Following Duchin (2010), we

⁴ We use the index to measure each country's capital market devilment.

do not exclude a multi-segment company with a financial division, if the financial division is not the primary business segment. We eliminate observations for which cash holdings (cash and short-term investment) is missing or cash holdings exceeds total assets. Observations with missing segment SIC codes are also excluded from the sample. For the purposes of our analysis, we identify business segments at the 2-digit SIC code level⁵. Diversified firms are those with two or more distinct 2-digit SIC code business segments. ⁶ Focused firms are those with only one such segment. Finally, we remove all firms in countries for which there are less than 200 firms, or the number of focused firms is below 10% of all active firms in that country. Our final sample consists of 21,108 companies from 17 countries for the period from 1998 to 2013.

[Table 1]

Table 1 presents the distribution of firms by country and reports some country-level characteristics for our sample. The percentage of diversified firms for all countries is 30.72% but there is a substantial cross-country variation. Majority of the companies in Canada and the U.S. are focused, with only 5.71% and 17.73% of firms in the diversified category respectively, whereas in Asian countries the numbers of diversified and focused firms are more or less similar. For example, 58.52% of Singaporean companies and 53.44% of Japanese companies in the sample are diversified. A significant portion of the sample consists of multinational firms. We define a firm as multinational if it has reported foreign sales in any of the years during our sample period ⁷. European countries have relatively low percentage of diversified firm, but they host more multinationals than average. For example, 73.47% of French firms and 66.67% of British firms reported foreign sales. In comparison, Japan has a large number of diversified firms, but relatively less multinationals.

The table also reports a country's legal origin and shareholder rights measured by La Porta et al. (1998), the equity and the debt market development by McLean and Zhao (2014) and import penetration rates. We use import penetration (the value of import over the sum of import and domestic production) to measure the impact of import completion on a country's domestic firms ⁸.

⁵ A more refined identification of business segment will reduce significantly the number of observations in both the focused and diversified groups.

⁶ We define a segment as non-operating if the segment SIC code is 9999. (See Glaser and Muller, 2010)

⁷ This definition is used by Pinkowitz, Stulz, and Williamson, 2012.

⁸ Imports and domestic production data are from Datastream and the World Bank.

Our sample includes both countries with high and low import penetration rates. Singapore and Hong Kong are examples of countries with a high percentage of multinationals as well as high import penetration rates. Other countries, for example, France and Germany have a high percentage of multinationals but a low import penetration rate. Finally, countries like India have both a small percentage of multinationals and a low import penetration rate.

[Table 2]

Table 2 presents some accounting variables for our sample firms. The variable definitions are included in Appendix A1. To avoid potential problems with outliers, we trim all variables at the 1st and 99th percentiles of their distributions. Table 2 suggests that there is considerable variations in firm characteristics. The mean (median) ratio of cash holdings to total assets is 17.35% (10.48%). Diversified firms, however, on average have a lower cash to assets ratio (14.82%) than focused firms (18.89%). In addition, there is considerable cross-country variation in cash holdings as shown in Appendix A2⁹. This suggests that there are dimensions beyond diversification that potentially influence corporate liquidity.

Table 2 also shows the large variation and significant differences between diversified and focused firms with respect to other firm characteristics. The mean Tobin's Q is 1.6 for the whole sample but diversified firms have a smaller Q measure than focused firms. In terms of external financing, diversified firms on average acquire less new financing; they have less net debt and equity issuance, distribute larger payouts in the forms of dividend and share repurchase, and have less capital expenditures. The mean EBITDA is 5.57% of total assets for diversified firms, and -2.39% for focused firms, Similarly, the mean operating cash flow is 3.71% of total assets for diversified firms for diversified firms. Table A2 suggests that the negative EBITDA and cash flows for focused firms are driven by a few observations in countries including Australia, Canada, U.K. and the U.S. Looking at the data more carefully, there are extreme negative earnings and cash

⁹ Indonesian firms have the lowest cash as a percentage of total assets (7.35%), while cash held by American firms (24.56%) is triple that amount. Comparing diversified and focused firms, for some countries (for example, Australia, Canada, the U.S.) diversified firms hold much less cash than focused firms; for other countries (Indonesia, Korea, Sweden) cash holdings are similar for both diversified and focused firms; and for the rest of our sample countries (India, Korea, Turkey) diversified firms hold more cash than focused firms.

flows concentrated in mining (SIC 10 - 14), manufacturing (SIC 20 - 39), and services (SIC 70 - 89) industries.

Measuring Corporate Diversification

To study the relation between diversification, and cash holdings, we follow Duchin (2010) and construct direct measures of volatility and cross-divisional correlation in investment opportunity and cash flow¹⁰. The building blocks of the analysis are annual averages of investment opportunity (Tobin's Q) and cash flow across all standalone firms in each 2-digit SIC code industry, applied as indirect measures of divisional investment opportunity and cash flow¹¹. The average number of segments for diversified firms in our sample is less than 3. The majority of the diversified firms operate in two industries classified by the 2-digit SIC code, although the maximum number of segments is 8 during the sample period.

Multi-segment firms may enjoy a cross-segment diversifying effect because the investment opportunities and cash flows of the segments are not perfectly correlated among segments. Consequently, diversified firms are positioned to have smoother investment opportunities and cash flows than focused firms. The diversifying effect is measured by Tobin's Q correlation and Cash flow correlation, which are reductions¹² in a firm's Tobin's Q volatility and cash flow volatility due to lower than one pair-wise correlations between segments. From Table A3 in the Appendix, the Q volatility (cash flow volatility) of an average diversified firm is 0.0095 (0.0031 or 0.31% of total assets) less than a portfolio of the average stand-alone firms from the matching industries.

¹⁰ There are some minor differences. Duchin (2010) estimates volatilities over a 10-year window, with a minimum 5 non-missing data within the window. In this paper, we use a 5-year window, with a minimum requirement of 3 non-missing observations within the 5-year window.

Duchin (2010) and Rajan et al. (2000) use 3-digit SIC to define segments. We use 2-digit SIC in this paper. The 2-digit SIC provides sufficient differentiation among industries for cross-divisional analysis. Meanwhile, the classification is not overly fine such that there may be too few firms in a particular industry for a particular country.

¹¹ While the use of average industry-standalone companies to proxy for the investment opportunities of conglomerate divisions has been criticized by previous studies (e.g., Campa and Kedia (2002) and Villalonga (2004a)), we do not have direct measures of investment opportunities at the division level.

¹² The values of Q correlation and cash flow correlation are negative for diversified firms and zero for focused firms by definition. A smaller (more negative) value represents larger diversifying effect.

Acharya et al. (2007) study the hedging motives of cash that can be used to transfer resources across time to low cash flow states and fund future investment opportunities. They suggest that with high "hedging needs" – low correlation between investment opportunities and cash flows – financially constrained firms prefer saving cash; with low "hedging needs" firms benefit more from debt reduction.¹³ In Table 2, the mean of the correlation between Tobin's Q and cash flow is 0.2782; the standard deviation is 0.4884. A median firm has a Q-cash flow correlation of 0.3128. Interestingly, diversified firms in our sample have larger "financing gaps" than focused firms on average. Diversified firms also have much less volatile cash flows than focused firms. The volatility of firm-level operating cash flow is 6.48% of total assets for diversified firms on average; the number is 12.47% for focused firms.

To study the effect of cross-divisional transfers and the efficiency of internal capital markets, we construct measures of relative and absolute value added from divisional transfers following Rajan et al (2000). This is related to the theory of internal capital markets (see Maksimovic and Phillips (2007) for a review) as a motive for diversification – a segment's cash flows can be used to fund investment in other segments of the firm. If cash cannot be transferred from one segment in abundance to another segment in need, then the diversified firm would simply be a collection of stand-alone firms, rather than one functional entity, and would not hold less cash. So in order for multi-segment firms to hold less cash than stand-alone firms, the firms need to be able to allocate resources efficiently among segments. We use the measures of the efficiency of allocation developed by Rajan et al. (2000) to account for this matter. In Table 2, the absolute value added by allocation compares diversified and focused firms, while the relative value added by allocation additionally includes the comparison of one segment and other segments of the firm. The mean of the relative value added by cross-segment allocation is -0.03% of total assets for diversified firms in our sample, while the absolute value added is -0.35%.

Appendix A3 reports the cross-segment diversification and allocation by country. Looking at the panel for diversified firm only, Israeli firms have below average Q and cash flow diversification and Q-cash flow correlation, and above average allocation efficiency; their cash holdings rank the second highest among all countries in the sample.

¹³ Duchin (2010) refers to the "hedging needs" or the correlation between Q and cash flow as the "financing gaps".

IV. Methodology

We first test if the diversification effect studied by Duchin (2010) is robust for our sample of international firms. Our Hypothesis 1 states that diversified firms hold less cash than focused firms. This is because the imperfectly correlated investment opportunities and cash flows from multiple segments smooth the across-time variations in the firm's funding needs and internal supply of funds. The diversification reduces the firm's anticipated probability of underinvestment due to financing shortfall, thus reduces the firm's need for holding precautionary cash. Multi-segments firms may enjoy a diversification effect on cash savings and hold less liquid assets.

$$\begin{aligned} cash \ holding_{i,t} &= \alpha_i + \beta_1 Q correlation_{i,t} + \beta_2 CF correlation_{i,t} + \gamma_1 controls_{i,t} + \\ \gamma_2 year \ dummy + \gamma_3 country \ dummy + \varepsilon_{i,t} \end{aligned} \tag{1}$$

Qcorrelation measures investment opportunity diversifications of multi-segment firms. Consider a firm as a portfolio of various components; each operating segment of the firm is a component of the portfolio. The Q-volatility of the portfolio is less than the weighted-sum of component volatilities due to imperfect cross-segment correlations. Qcorrelation is the difference between firm volatility considering actual inter-segment correlation and firm volatility assuming perfect inter-segment correlation of 1.¹⁴ It measures the correlation effect and the degree of diversification in investment opportunity. The measure is zero for focused firms and negative for multi-segment firms; as it becomes more negative, the level of diversification is stronger. Similar interpretation applies to CFcorrelation on the diversification in cash flow.

Control variables include other factors identified by the literature that influence cash holdings, such as the firm's hedging needs measured by the correlation between cash flow and investment opportunity, number of operating segments, firm size measured by total assets, level of operating cash flow and cash flow volatility, Tobin's Q, net working capital, and industry Q and cash flow volatilities. Firm, year- and country- fixed effects are also included.

Hypothesis 1, however, implicitly assumes that a central management body controls the firm's assets and makes efficient operational and financial decisions for the firm including allocating capital to segments with the most productive investment opportunities. However, this may not always be the case. Shin and Stulz (1998) show that cash flows do not always go to the

¹⁴ The calculations follow equation (7) and (8) in Duchin (2010).

segment with the best investment opportunity. The inefficient capital allocation may be a result of "power-seeking" and negotiating ability of divisional managers. Rajan et al. (2000) use multisegment firm data to study economic decisions inside a divisional hierarchy. They show that there is misallocation of internal capital by diversified firms and the misallocation is greater when the diversity (differences in resources and investment opportunities) across segments is greater.

Our Hypothesis 2 states that diversified firms with efficient inter-segment allocation have a stronger diversification effect, i.e. lower cash holdings; with inefficient allocations, diversified firms may not always hold less cash than focused firms.

 $\begin{aligned} cash\ holding_{i,t} &= \alpha_i + \beta_1 Q correlation_{i,t} + \beta_2 CF correlation_{i,t} + \beta_3 EoA_{i,t} + \\ \beta_4 Q correlation \times EoA_{i,t} + \beta_5 CF correlation \times EoA_{i,t} + \gamma_1 controls_{i,t} + \\ \gamma_2 year\ dummy + \gamma_3 country\ dummy + \varepsilon_{i,t} \end{aligned}$ (2)

where the efficiency of allocation (EoA) measures are the proxies developed by Rajan et al. (2000)¹⁵. The proxy measures the overall market value consequences of the firm's internal capital re-allocation policy. As EoA becomes larger, the firm's inter-segment allocation is considered more efficient. The measure is zero for focused firms. The rest of the control variables in equation (2) are the same as in equation (1).

Agency problem is a constant and ubiquitous theme in corporate finance literature. Previous studies also point to the influence of corporate governance on cash holding. Some argue that managers tend to hoard excess cash instead of distributing it to shareholders. For example, Dittmar et al. (2003) find that firms in countries with poor shareholder protection hold much more cash than firms in countries with good shareholder protection do. Kalcheva and Lins (2007) also suggest that entrenched managers hold more cash, especially where country-level shareholder protection is weak. Others (see, for example, Harford et al. (2008)) argue that weakly controlled managers spend cash on acquisitions and capital expenditures; firms with weaker governance hold less cash. The agency problem suggests that managers may not choose the action that is optimal for shareholders. In some cases the action may be hoarding cash, while in other cases the

¹⁵ They are the "value added by allocation" defined by Rajan et al. (2000). The relative value added by allocation is calculated from equation (18) in their paper, whereas the absolute value added is defined in Table V of their paper.

action may involve spending cash on sub-optimal projects. Corporate governance is not necessarily associated with either higher or lower cash reserve. In this study, we are particularly interested in the impact that governance has on the diversification effect on cash rather than its impact on cash directly. We examine this issue with our third hypothesis.

Our hypothesis 3 states that less entrenched managers are more likely to make optimal decisions; they engage in efficient cash management policy and allocate resources to segments with better investment opportunities. Stronger governance structure helps ensure effective decision-making at the firm-level and more efficient inter-segment allocation. Diversified firms with stronger corporate governance have a stronger diversification effect.

 $\begin{aligned} cash\ holding_{i,t} &= \alpha_i + \beta_1 Q correlation_{i,t} + \beta_2 CF correlation_{i,t} + \beta_3 g overnance_{i,t} + \\ \beta_4 Q correlation \times g overnance_{i,t} + \beta_5 CF correlation \times g overnance_{i,t} + \\ \gamma_1 controls_{i,t} + \gamma_2 y ear\ dummy + \gamma_3 country\ dummy + \varepsilon_{i,t} \end{aligned}$ (3)

In equation (3), governance is a dummy variable indicating whether a firm's CEO is also a board member of the firm. The board of directors of a firm has the objective of monitoring the firm's management to ensure that they serve the best interests of the shareholders. CEO duality reduces board monitoring effectiveness and promotes management entrenchment (Finkelstein and D'Aveni (1994)); (alternative measures: insider ownership, ownership by block-holders and institutional investors). Other variables are the same as in equation (1).

V. Results and Discussions

Average cash holding by sorted groups

Our first set of empirical results comes from the comparing the average cash holdings of diversified firms by sorted groups. In Panel A of Table 3, diversified firms are divided into three groups by the level of diversification in investment opportunity or cash flow. The average cash holding in firms with low level of diversification, or high inter-segment correlations, in investment opportunity is 15.14% of total assets, while the average cash holdings is 14.38% in firms with high

level of diversification. Similarly, the average cash holding in firms with low level of diversification in cash flow is higher than in firms with high level of diversification.

[Table 3]

In Panel B of the table, diversified firms are divided into nine groups by the level of diversification as well as the level of allocation efficiency. As expected, highly diversified firms hold less cash. In addition, the differences in average cash holdings between the high and the low diversification firms are smaller (more negative) for firms with high efficiency of allocation. For example, the average cash holdings in firms highly diversified in investment opportunity minus the average cash holdings in firms less diversified is 0.03% where the inter-segment allocation is less efficient; the difference is -1.08% where the allocation is more efficient. It suggests that the allocation efficiency strengthens the diversification effect on cash. Further, diversified firms only hold less cash when they have efficient internal capital allocation.

In Panel C, diversified firms are divided into six groups by the level of diversification as well as whether or not the CEO is also a board member of the firm, a proxy for management entrenchment. For our sample, firms with entrenched managers hold more cash. For example, among firms that are highly diversified in investment opportunity, the average cash holding is 11.35% of total assets for firms where the CEO is not a board member, while the average is 12.24% for firms where the CEO is a board member; among firms that are less diversified in investment opportunity, the average cash holding is 12.88% where the CEO is not a board member, and 14.04% where the CEO is a board member. It appears that management entrenchment strengthens the diversification effect on cash, in contrast with hypothesis 3. The difference in cash holdings between the firms with high- and low- level of diversification in investment opportunity is -1.53% where CEO is not a board member.

Panel D sorts diversified firms into nine groups on the level of diversification and firm size. On average, larger firms hold less cash. The differences in cash holdings between high- and lowdiversification firms are bigger (less negative) for larger firms. As larger firms tend to have less financial constraints, our result is consistent with evidence provided by Duchin (2010) who suggests that the diversification effect on cash concentrates in financially constrained firms.

Regression analysis

In this section we estimate the effect of diversification in investment opportunity and cash flow on cash holdings, controlling for other determinants known to affect corporate liquidity. Table 4 reports estimates from our baseline regressions in hypothesis 1. Columns 1 and 2 are pooled OLS regressions, and columns 3 and 4 are panel regressions with firm fixed effects. All specifications are estimated with year dummy variables and robust standard errors clustered by firm. A one-standard deviation increase in the correlation in investment opportunity corresponds to an increase of 0.14% in average cash holdings (column 2); a one-standard deviation increase in the correlation effect due to the fact that a large portion of the sample is focused firms, the magnitudes of the effect are much lower than those estimated by Duchin (2010). [international firms vs north American firms; 1998-2013 vs 1990-2006]

[Table 4]

The table also indicates that diversification affects cash holdings mainly through investment opportunity. The effect through investment opportunity is statistically significant at the 5% level; however, the effect through cash flow is insignificant. It suggests that with the precautionary motives of reserving cash, firms largely concern about their future demand of cash and pay less attention to the funds they may be able to supply from internal sources. Additionally, cash flow still affects cash holdings through the correlation between investment opportunity and cash flow (the financing gap), as well as cash flow volatility. For example, a one-standard deviation decrease in the correlation between investment opportunity and cash flow corresponds to an increase of 0.22% in average cash holdings.

We also note that the effect of the number of operating segments remains significant and is not absorbed by the correlation measures. For our sample, the relation between company structure and cash is beyond the cross-segment coinsurance, besides which, it is also possible that multi-segment firms are holding less cash because they have spent it in expansions and acquisitions. The effects of other control variables are as expected.

Next, we study the relation between the efficiency of inter-segment resource allocation and the diversification effect on cash holdings. Previous studies suggest that there is financial interdependence between a firm's segments and that firms utilize their internal capital markets to make investments, albeit the capital allocation is not always efficient.¹⁶ Observed from the measured allocation efficiency for our sample, inter-segment allocation provides a positive overall value effect for over 60%¹⁷ of the firm-years, and a negative value effect for less than 40% of the firm-years. Our hypothesis 2 suggests that being able to efficiently allocate capital across segments is a necessary condition for diversification to reduce cash holdings of multi-segment firms. Companies with efficient inter-segment allocation enjoy the diversification effect on cash holdings; with inefficient capital allocation, even firms well diversified in investment opportunity and cash flow may not hold less cash than stand-alone firms. Table 5 presents evidence on this from panel regressions.

[Table 5]

In columns 1 and 2, we measure allocation efficiency by absolute value added, whereas in columns 3 and 4, we measure efficiency by relative value added. The coefficient for efficiency of allocation is -0.0038 in both columns 2 and 4, indicating that firms with efficient internal capital market activities hold less cash. However, the effects of the interaction terms between allocation efficiency and correlations in investment opportunity and cash flow are weaker than expected. One possible explanation is that as a firm's segments become more efficient in sharing internal resources, the marginal benefit of the coinsurance across segments is smaller, and the firm's choice for reserving cash is less sensitive to the diversification in its investment opportunity and cash flow. For some firms the allocation efficiency is a binding condition in order for them to enjoy the benefit of diversification and coinsurance, while for others allocation efficiency trivializes the role of diversification.

Hypothesis 3 tests the relation between corporate governance and the diversification effect on cash. In Table 6, governance is a dummy variable indicating whether the firm's CEO is also a member of the firm's board. The coefficients of interest are the interaction terms between governance and correlations of investment opportunity and cash flow. They all have negative sign, which is as expected by our hypothesis. When the variable takes a value of one, indicating management entrenchment, the overall effects of diversifications in investment opportunity and

¹⁶ See, for example, Lamont (1997), Shin and Stulz (1998), Scharfstein and Stein (2000), Ozbas and Scharfstein (2010), Glaser et al. (2013).

¹⁷ 63.84% by relative value added, and 61.54% by absolute value added.

cash flow are reduced. Poor governance weakens the diversification effect on average cash holdings. Most of these coefficients are not statistically significant. The results suggest that the average effect of governance on cash holdings is relatively weak.

[Table 6]

Country-level variations

The evidence presented so far suggests that diversification in investment opportunity and cash flow allows firms to hold less cash. In models where dummy variables representing a firm's home country are included, their coefficients from the estimations indicate that some country-level variables play significant roles in determining corporate liquidity. What are some potential factors that drive the cross country variations in average cash holdings?

We use import penetration as a proxy of the competition environment faced by companies in a country. We calculate import penetration as the value of imports divided by the sum of imports and domestic production. Previous studies (Morrellec et al. (2013), Hoberg et al. (2014)) have shown that product market competitions decrease the firm's payout to shareholders and increases corporate cash holdings. This consideration applies to diversified and focused firms alike, since both operate under the same economic and market conditions. Competition further affects diversified firms via the diversification effect on cash. With intensive competition, even though the imperfect correlations between segments smooth the variations in investment opportunity and cash flow, the firm is less incentivized to reduce cash reserves, because its precautionary motives are driven more by competition. We test this in hypothesis 4.1.

Our hypothesis 4.1 states that product market competition weakens the diversification effect on average cash holdings. The accessibility of external sources of financing may also affect how strong a firm's precautionary motives are to reserve cash. We use an equity market development index and a debt market development index in McLean and Zhao (2014) to measure a firm's ability to raise capital in the equity and the debt market via "an arm's length transaction". We also include the shareholder protection and legal origin in La Porta et al. (1998). The shareholder protection variable is a country-level corporate governance measure.

Hypothesis 4.2 states that a firm's ability to raise external financing through transactions in the equity and the debt market strengthens the diversification effect on cash holdings.

[Table 7]

Column 1 of Table 7 includes the interaction terms between import penetration and correlations in investment opportunity and cash flow. The results suggest that competition has a significant impact on the diversification effect on cash holdings. With an average import penetration of 27.77%, a one standard-deviation increase in the correlation in investment opportunity corresponds to an increase of 0.05% in average cash holdings as a percentage of total assets, representing an 83.31% reduction in the diversification effect on cash due to import penetration. Similarly, the effect of a one standard-deviation increase in the correlation in cash flow on average cash holdings is reduced by 48.37% due to import penetration. These effects are significant statistically at the 1% level.

Columns 2 and 3 of Table 7 have stock market development and debt market development interact with the correlations in investment opportunity and cash flow. The coefficients of the capital market development are positive, and are stable and highly significant in all three specifications. This is consistent with the story that in countries with developed capital markets firms build cash by issuing equity or debt securities. The coefficients of the interaction terms between capital market development and correlations in investment opportunity and cash flow are positive, suggesting that the accessibility of external financing strengthens the diversification effect on cash. Interestingly, diversified firms hold less cash only when the capital market development reaches certain level. The average value of the stock (debt) market development index is 0.603 (0.583). The overall effects of correlations on cash holdings are positive only when the capital market development index for the country is above the average. For example, with a stock market development index of 0.744 (Australia), a one standard-deviation increase in the correlation in investment opportunity corresponds to an increase of 0.02% in average cash holdings; with a stock market development index of 0.124 (Indonesia), a one standard-deviation increase in the correlation in investment opportunity corresponds to a decrease of 0.10% in average cash holdings. Although the evidence is weak with low statistical significance, it suggests that the diversification effect on cash holdings is limited by firm's external financing constraints.

Product market competitions

The evidence presented in Table 7 regarding product market competition adds to the growing literature that brings together firm's strategic operation and cash policy. However, import penetration of a country does not reflect competition in a particular industry from that country and is a coarse measure for the product market competitions faced by individual firms. To further study the impact of competitions on cash holdings and the diversification effect on cash, we explore other measures that capture firm- and industry-level variations. We calculate the average price-cost margin¹⁸ (PCM) of the industry (at 2-digit SIC code level) where a firm operates. Each segment of a diversified firm has an industry PCM; the segment sales-weighted average value is then used for the firm. As a second measure of competition, we calculate the Herfindahl – Hirschman Index (HHI) for industries. Again, the HHI is sales-weighted for multi-segment firms. Appendix A4 presents PCM and HHI for industry groups in each country. Indeed, for a particular country, there are large cross-industry variations in competitions; for a particular industry group, there are wide cross-country variations.

Product market competition potentially affects focused and diversified firms in different ways, because diversified firms operate in two or more different product markets, which may have different competition intesity. To see how competition affects focused and diversified firms, we consider a few scenarios in a simple setup. Suppose that there are two product markets M1 and M2 with market competition *MC*1 and *MC*2. Without loss of generality, assume that M1 is more competitive than M2, that is, *MC*1 > *MC*2. There are two firms, A and B. Firm A is a focused firm, operating in M1; the firm faces product market competition *FCa*, where *FCa* = *MC*1. Firm B is a diversified firm: one segment, S1, operates in M1, and the other segment, S2, operates in M2; the segments are equally weighted. Firm-level competition for B is the weighted average of the competitions faced by its two segments, thus $FCb \notin (MC1 + MC2)/2$. The difference in competition between the two firms is $FCa - FCb \notin (MC1 - MC2)/2$. Suppose that the competition greater than the threshold is a competitive market; a market with competition less than the threshold is an uncompetitive market. Now we can consider three scenarios.

¹⁸ The price-cost margin is calculated as the operating income before depreciation and amortization over sales.

Scenario 1: $\overline{MC} > MC1 > MC2$; both markets are uncompetitive. Under this scenario, we make two conjectures. (1) As firm A faces greater product market competition than firm B, A holds more cash than B, after controlling for other variables affecting cash. (2) Since predatory competition is not of concern, firm B's cash policy is sensitive to its own expected investment opportunity and cash flow. The diversification effect on cash would be strong.

Scenario 2: $MC1 > \overline{MC} > MC2$; M1 is competitive, and M2 is uncompetitive. (1) Firm A holds more cash than B. This is the same as in scenario 1. (2) Firm B's precautionary motive for reserving cash is jointly driven by financial and strategic reasons. The cash policy is less sensitive to expected investment opportunity and cash flow. In addition, the segment S1 facing product market competition may have the tendency to hoard cash within the division instead of transferring to S2 even though S2 may have better investment opportunity. Overall, firm B may enjoy a diversification effect on cash, which is weaker than that in Scenario 1.

Scenario 3: $MC1 > MC2 > \overline{MC}$; both markets are competitive. (1) Firm A holds more cash than B. This is the same as in the first two scenarios. (2) Both segments of firm B face product market competition, which becomes the main driver for reserving cash. And the segments compete between each other for internal resources, which impede the operation of an efficient internal capital market. As a result, the diversification effect on cash would be weak.

Based on the above analysis, the direct relation between product market competition and cash holdings is associated with firm-level competition that is sourced from all segments. We think it is a weighted average, rather than the sum, of segment market competitions, because a multi-segment firm is not solely vested in any single product market. Even if one segment is demolished by competition, the firm may still go on with the surviving segment. Further, the indirect relation between product market competition and cash holdings is through the impact that competition may have on the diversification effect on cash. And that impact depends on the fraction of the segments in competitive markets. For example, in scenario 1 the fraction is 0, and the diversification effect is strong; in scenario 2 the fraction is 0.5, and the diversification effect is weaker; in scenario 3 the fraction is 1, the diversification effect is the weakest. We develop the two testable hypotheses below:

Hypothesis 5.1 states that firms in competitive product markets hold more cash. Hypothesis 5.2 states that when the fraction of segments that operate in competitive industries is smaller, the

diversified firm enjoys stronger a diversification effect on cash; a firm enjoys weaker diversification effect when all or most of its segments operate in competitive industries. This is assuming that divisions, faced with fierce product market competitions, have the tendency to hoard resources within their own divisions instead of transferring to other divisions with better investment opportunities. Also, as the fraction of segments in competitive market increases, the strategic dimension becomes the stronger driver of the firm's precautionary motive for reserving cash.

The results are presented in Table 8. In columns 1 and 2 we measure product market competition by price-cost margin (PCM). An industry is defined as competitive if the average PCM in the industry is below the sample median; an industry is uncompetitive if the industry PCM is above the median. In columns 3 and 4 we measure competition by market concentration, the Herfindahl – Hirschman Index (HHI). An industry is defined as competitive if the HHI is below the sample median, and as uncompetitive if the HHI is above the median.

[Table 8]

We notice some inconsistencies in the results. In columns 1 and 2, an increase in price-cost margin or a decrease in product market competition corresponds to an increase in average cash holdings; an increase in fraction of segments in competitive market corresponds to an increase in average cash holdings. Results in columns 3 and 4 are as expected in hypothesis 5, but are the opposite of those in columns 1 and 2. In all specifications, these effects are all statistically significant. A possible explanation comes down to the question whether the measurements of product market competition are consistent between themselves. Du and Chen (2010) compare various market competition measures and find that the PCM and concentration measure have negative correlations and can give opposite suggestions to competition levels.

The results in Table 8 are still interesting in their own rights. Columns 1 and 2 suggest that firms with high profit margin are able to accumulate more cash. A larger fraction of segments in high PCM market strengthens the diversification effect on cash, because these firms may not be so resource constrained, thus have leeway in choosing cash policies. Also, high profit margin can be an indication of efficiency. It is possible that these firms are able to perform cash management more efficiently and reduce the holding of costly liquid assets, in light of the diversification in investment opportunity and cash flow. Columns 3 and 4 lend support to our hypothesis 5.1 that

firms in competitive product markets (as represented by low market share concentration) hold more cash. The coefficients of the interaction terms are positive, suggesting firms with more segments in competitive markets enjoy a stronger diversification effect on cash. The effects are not statistically significant. To explain this, we think that another force may be at work, besides what we conjectured in hypothesis 5.2. It is suggested by the popular economic notion that competition leads to efficiency. Firms in competitive product markets are forced to utilize their internal resources efficiently and avoid holding excess liquid assets unnecessarily. Here we have not disentangled these two forces, and the overall impact that competition has on the diversification effect on cash holdings weakly leans towards the competition-driving-efficiency story.

VI. Conclusions

The interaction between corporate liquidity, diversification and product market competition is interesting. Previous studies have documented separately a diversification effect on cash and a competition effect on cash. We show that these results continue to hold for international firms. Further, we provide evidence that the diversification on cash is weakly affected by inter-segment allocation and firm-level governance.

To explain the cross country variations in cash balances, we find that openness of an economy and foreign competitions weaken the diversification on cash. In countries where firms face a lot of foreign competitions, firms' cash policies are less sensitive to the correlations in investment opportunity and cash flow. Consistent to the convention, our results suggest that firms' cash policies are subject to the constraints of external financing conditions. Also, better country-level investor protection is associated with lower absolute cash ratios.

Another interesting result is that firms with high profit margin are able to accumulate more cash. The diversification effect is stronger for firms with segments operating in high profit-margin markets. On the other hand, firms in highly concentrated markets hold less cash, as they potentially face fewer threats from rivalries. A weakly stronger diversification effect on cash is found for firms with more segments in competitive (measured by low concentration) markets.

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Figure 1 Cash holdings of diversified firms

The figure plots the annual cash holdings (cash and short term investment over total assets) of three firms between 1998 and 2013. The solid line represents Cisco Systems Inc; the dashed line represents E.I. DuPont; the dotted line represents World Wrestling Entertainment Inc. All three firms have three operating segments. We define segment using 2-digit SIC code.



Table 1 Country characteristics

firms are those with reported foreign sales in any year during the sample period. Legal origins and shareholder (SH) rights are from La Porta et al. (1998). Stock market development index and debt market development index are from McLean and Zhao (2014). Import penetration is the value of imports divided by imports plus domestic production; the measure This table presents the distribution of sample firms by country and country-level characteristics. Diversified firms are those with two or more operating segments. Multinational is calculated annually and averaged over the sample period.

	# firms	# diversified	% diversified	# multinational	% multinational	Legal origin	SH right	Stock market	Debt market	Import
Country		firms	firms	firms	firms			development	development	penetration
Australia	1010	237	23.47%	431	42.67%	English	4	0.744	0.321	13.27%
Canada	2489	142	5.71%	482	19.37%	English	ß	0.778	0.808	22.73%
France	490	197	40.20%	360	73.47%	French	ŝ	0.581	0.564	19.89%
Germany	596	222	37.25%	420	70.47%	German	1	0.474	0.731	23.50%
Hong Kong	955	568	59.48%	741	77.59%	English	ŋ	0.788	0.897	65.69%
Indonesia	374	201	53.74%	150	40.11%	French	2	0.124	0.128	20.52%
India	2136	496	23.22%	552	25.84%	English	Ŀ	0.500	0.141	17.00%
Israel	341	55	16.13%	98	28.74%	English	ŝ	0.632	0.526	25.44%
Japan	3022	1615	53.44%	1158	38.32%	German	4	0.509	0.974	10.96%
Korea	1435	435	30.31%	637	44.39%	German	2	0.650	0.346	28.25%
Malaysia	842	519	61.64%	513	60.93%	English	4	0.594	0.885	44.48%
Singapore	528	309	58.52%	424	80.30%	English	4	0.741	0.538	61.16%
Sweden	284	94	33.10%	194	68.31%	Scandinavian	ŝ	0.692	0.679	25.79%
Thailand	446	178	39.91%	151	33.86%	English	2	0.385	0.654	38.08%
Turkey	254	53	20.87%	53	20.87%	French	2	0.350	0.038	20.28%
United Kingdom	1344	354	26.34%	896	66.67%	English	S	0.829	0.756	22.87%
United States	4562	809	17.73%	1834	40.20%	English	5	0.876	0.923	12.24%

Table 2 Firm characteristics

utility firms from 17 countries for the period from 1998 to 2013. Diversified firms are those with two or more operating segments by the 2-digit SIC. The table presents the accounting variables for all sample firms, diversified firms and focus firms. The sample consists of non-finanical and non-

		All firms		Diversified firms	Focused firms	Diffe	rence
	Mean	Median	Std Dev	Mean	Mean		t-test
Size, in millions USD	38,722	167	222,076	52,233	30,911	21,322	0.000***
Cash holdings	17.35%	10.48%	19.34%	14.82%	18.89%	-4.07%	0.000***
EBITDA	0.69%	6.26%	30.85%	5.57%	-2.39%	7.96%	0.000***
Operating cash flow	-2.42%	5.60%	35.58%	3.71%	-6.17%	9.88%	0.000***
Tobin's Q	1.601	1.362	0.940	1.470	1.693	-0.223	0.000***
Long-term debt	11.43%	4.81%	15.18%	12.49%	10.81%	1.68%	0.000***
Total debt	21.93%	16.79%	23.08%	23.92%	20.75%	3.17%	0.000***
Net debt issuance	0.18%	0.00%	9.93%	-0.07%	0.33%	-0.40%	0.000***
Net equity issuance	2.48%	-0.01%	35.62%	0.77%	3.53%	-2.76%	0.000***
Payout	1.72%	0.38%	3.29%	1.77%	1.68%	0.09%	0.000***
CAPEX	5.43%	3.01%	7.02%	4.56%	5.94%	-1.38%	0.000***
Net working capital	-0.42%	1.42%	29.50%	1.70%	-1.70%	3.40%	0.000***
Price-cost margin	0.840	0.058	34.730	2.172	-0.035	2.207	0.000***
IHI	0.217	0.130	0.213	0.225	0.211	0.013	0.000***
Number of segments	1.4187	1.0000	0.7476	2.1460	1.0000	1.1460	0.000***
Tobin's Q correlation	-0.0026	0.0000	0.0126	-0.0095	0.0000	-0.0095	0.000***
Cash flow correlation	-0.0008	0.0000	0.0036	-0.0031	0.0000	-0.0031	0.000***
Q-CF correlation	0.2782	0.3128	0.4884	0.1680	0.3299	-0.1620	0.000***
Industry Tobin's Q volatility	0.2180	0.1737	0.1750	0.1806	0.2344	-0.0538	0.000***
Industry Cash flow volatility	0.0433	0.0300	0.0607	0.0382	0.0455	-0.0074	0.000***
Firm cash flow volatility	0.1001	0.0383	0.1880	0.0648	0.1247	-0.0599	0.000***
Relative value added	-0.0001	0.0000	0.0312	-0.0003	0.0000	-0.0003	0.059*
Absolute value added	-0.0010	0.0000	0.1800	-0.0035	0.0000	-0.0035	0.000***

Table 3 Cash holdings by sorted groups

The table compares the average cash holdings for diversified firms by sorted groups. For each sorted group, the average cash holdings and correlations are pooled acrossed firm-year obeservations. The sample consists of non-financial and non-utility firms from 17 countries for the period from 1998 to 2013. Variable definitions are in Appendix A1.

Panel A: One-way sorting on diversif	ication						
	Diversificati	ion, by Q corr	elation		Diversificati	on, by CF corre	elation
	high		low		high		low
cash holding	0.1438	0.1426	0.1514	cash holding	0.1469	0.1418	0.1479
Q correlation	-0.0350	-0.0043	-0.0005	CF correlation	-0.0109	-0.0019	-0.0003

Panel B: Two-wa	y sorting on diversi	fication and efficie	ency of alloca	tion	
		Efficien	ncy of allocatio	on	
		low	- 1200 - 40	high	
Diversification, b	y Q correlation				
high	cash holding	0.1397	0.1479	0.1355	
	Q correlation	-0.0356	-0.0341	-0.0356	
	cash holding	0.1325	0.1397	0.1354	
	Q correlation	-0.0044	-0.0042	-0.0043	
low	cash holding	0.1394	0.1566	0.1463	
	Q correlation	-0.0005	-0.0005	-0.0005	
diff (high - low)	cash holding	0.0003	-0.0087	-0.0108	

Panel C: Two-way sorting on diversification and governance

		Is CEO board m	ember?
		No	Yes
Diversification, b	y Q correlation		
high	cash holding	0.1135	0.1224
	Q correlation	-0.0360	-0.0354
	cash holding	0.1306	0.1267
	Q correlation	-0.0041	-0.0043
low	cash holding	0.1288	0.1404
	Q correlation	-0.0005	-0.0005
diff (high - low)	cash holding	-0.0153	-0.0180

		Efficier	ncy of allocatio	n
		low		high
Diversification, b	y CF correlation			
high	cash holding	0.1399	0.1503	0.1355
	CF correlation	-0.0114	-0.0105	-0.0108
	cash holding CF correlation	0.1351 -0.0019	0.1441 -0.0018	0.1333 -0.0019
low	cash holding CF correlation	0.1347 -0.0003	0.1494 -0.0003	0.1477 -0.0003
diff (high - low)	cash holding	0.0052	0.0009	-0.0122

		Is CEO board mer	mber?
		No	Yes
Diversification, by	CF correlation		
high	cash holding	0.1148	0.1299
	CF correlation	-0.0102	-0.0106
	cash holding	0.1296	0.1207
	CF correlation	-0.0019	-0.0019
low	cash holding	0.1220	0.1393
	CF correlation	-0.0003	-0.0003
diff (high - low)	cash holding	-0.0072	-0.0094

Panel D: Two-way sorting on diversification and firm size

		Firm size	e, by total as	sets			Firm siz	e, by total ass	ets
		small		large			small		large
Diversification, b	y Q correlation				Diversification, b	y CF correlation			
high	cash holding	0.1770	0.1386	0.1239	high	cash holding	0.1751	0.1488	0.1261
	Q correlation	-0.0360	-0.0330	-0.0358		CF correlation	-0.0117	-0.0109	-0.0103
	cash holding	0.1705	0.1428	0.1248		cash holding	0.1778	0.1416	0.1213
	Q correlation	-0.0043	-0.0042	-0.0044		CF correlation	-0.0019	-0.0018	-0.0019
low	cash holding	0.1883	0.1538	0.1264	low	cash holding	0.1813	0.1465	0.1282
	Q correlation	-0.0004	-0.0005	-0.0005		CF correlation	-0.0003	-0.0003	-0.0003
diff (high - low)	cash holding	-0.0113	-0.0152	-0.0025	diff (high - low)	cash holding	-0.0062	0.0022	-0.0021

The table presents estimates from regressions explaining firm-level cash holdings. The sample consists of non-finanical and non-utility firms from 17 countries for the period from 1998 to 2013. Variable definitions are in Appendix A1. All regressions include year fixed effects. Standard errors are robust and clustered by firm; p-values are included in brackets. Significance at the 1%, 5%, and 10% levels is represented by ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
Q correlation	0.2819***	0.1133**	0.0932**	0.0548*
	(0.000)	(0.044)	(0.011)	(0.088)
CF correlation	2.0281***	0.3149	0.3694***	0.0445
	(0.000)	(0.134)	(0.008)	(0.726)
Q-CF correlation		-0.0046**		0.0002
		(0.032)		(0.843)
Num. of segments		-0.0083***		-0.0059***
		(0.000)		(0.000)
In (assets)		-0.0176***		-0.0223***
		(0.000)		(0.000)
Industry Q volatility		0.0455***		0.0102***
		(0.000)		(0.006)
Industry CF volatility		0.0085		0.0626***
		(0.700)		(0.000)
Firm CF		-0.0459***		0.0366***
		(0.000)		(0.000)
Firm CF volatility		0.0784***		0.0384***
		(0.000)		(0.000)
Tobin's Q		0.0672***		0.027***
		(0.000)		(0.000)
Net working capital		-0.0317***		-0.0734***
		(0.000)		(0.000)
Firm fixed effect	No	No	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	No	No
R^2	0.0804	0.2417	0.0026	0.0498
Num. of Observations	146132	66358	146132	66358

The table presents estimates from regressions explaining the relation between the effeciency of intersegment resource allocation and the diversification effect on cash holdings. The sample consists of nonfinanical and non-utility firms from 17 countries for the period from 1998 to 2013. Variable definitions are in Appendix A1. In columns 1 and 2, the efficiency of allocation (EoA) is measured by absolute value added; in columns 3 and 4, EoA is measured by relative value added. Both measures follow the calculations in Rajan et al. (2000). All regressions include year fixed effects. Standard errors are robust and clustered by firm; p-values are included in brackets. Significance at the 1%, 5%, and 10% levels is represented by ***, **, and *, respectively.

	measure efficienc	cy of allocation by	measure efficienc	cy of allocation by
	absolute v	alue added	relative va	lue added
	(1)	(2)	(3)	(4)
Q correlation	0.3666	0.1233**	0.3748***	0.1274**
	(0.155)	(0.040)	(0.000)	(0.035)
CF correlation	2.4151	0.5530**	2.4438***	0.5659***
	(0.178)	(0.011)	(0.000)	(0.010)
Efficiency of allocation	0.0006	-0.0038**	-0.0011	-0.0038
	(0.220)	(0.036)	(0.807)	(0.488)
EoA * Q correlation	1.0853***	0.8387	0.1390	-1.0322
	(0.000)	(0.282)	(0.906)	(0.535)
EoA * CF correlation	-2.3423***	-2.3192	5.6858	3.9899
	(0.000)	(0.221)	(0.169)	(0.398)
Q-CF correlation		-0.0049**		-0.0049**
		(0.025)		(0.024)
Num. of segments		-0.0087***		-0.0087***
		(0.000)		(0.000)
ln (assets)		-0.0178***		-0.0177***
		(0.000)		(0.000)
Industry Q volatility		0.0440***		0.0450***
		(0.000)		(0.000)
Industry CF volatility		0.0138		0.0112
		(0.543)		(0.619)
Firm CF		-0.0490***		-0.0493***
		(0.000)		(0.000)
Firm CF volatility		0.0786***		0.0803***
		(0.000)		(0.000)
Tobin's Q		0.0665***		0.0665***
		(0.000)		(0.000)
Net working capital		-0.0301***		-0.0298***
		(0.000)		(0.000)
Firm fixed effect	No	No	No	No
Year fixed effect	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes
R ²	0.0823	0.2433	0.0825	0.2437
Num. of Observations	138145	61960	137489	61484

The table presents estimates from regressions explaining the relation between governance and the diversification effect on cash holdings. The sample consists of non-finanical and nonutility firms from 17 countries for the period from 1998 to 2013. *Governance* is a dummy variable indicating whether a firm's CEO is also a member of the firm's board. Variable definitions are in Appendix A1. All regressions include year fixed effects. Standard errors are robust and clustered by firm; p-values are included in brackets. Significance at the 1%, 5%, and 10% levels is represented by ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
Q correlation	0.4072	0.4639*	0.1420	0.3539*
	(0.114)	(0.096)	(0.274)	(0.076)
CF correlation	0.9267	1.4856	0.4531	0.3969
	(0.410)	(0.388)	(0.430)	(0.667)
Governance	-0.0237	-0.0171	-0.0046	-0.0079
	(0.200)	(0.436)	(0.438)	(0.308)
Gov * Q correlation	-0.3276	-0.2579	-0.1547	-0.3569*
	(0.234)	(0.360)	(0.255)	(0.080)
Gov * CF correlation	-1.1278	-1.6552	-0.4700	-0.5027
	(0.339)	(0.341)	(0.425)	(0.589)
Q-CF correlation		0.0388***		0.0130***
		(0.002)		(0.003)
Num. of segments		-0.0026		-0.0019
		(0.451)		(0.545)
In (assets)		-0.0114***		-0.0257***
		(0.000)		(0.000)
Industry Q volatility		0.0325		-0.0132
		(0.195)		(0.290)
Industry CF volatility		0.0690		-0.0695*
		(0.291)		(0.072)
Firm CF		-0.2429***		-0.0461***
		(0.000)		(0.007)
Firm CF volatility		0.3343***		0.0749***
		(0.000)		(0.001)
Tobin's Q		0.0931***		0.0217***
		(0.000)		(0.000)
Net working capital		-0.0977***		-0.2482***
		(0.000)		(0.000)
Firm fixed effect	No	No	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	No	No
R ²	0.0382	0.3353	0.0227	0.119
Num. of Observations	5750	4343	5750	4343

The table presents estimates from regressions explaining the relation between specific countrylevel variables and firm-level cash holdings. The sample consists of non-finanical and non-utility firms from 17 countries for the period from 1998 to 2013. Variable definitions are in Appendix A1. All specifications are OLS regressions with year fixed effects and robust standard errors clustered by firm.The p-values are included in brackets. Significance at the 1%, 5%, and 10% levels is represented by ***, **, and *, respectively.

	X: import	X: stock market	X: debt market
	penetration	development	development
	(1)	(2)	(3)
Q correlation	0.2565**	-0.1009	-0.1272
	(0.012)	(0.658)	(0.338)
CF correlation	1.3832***	-1.4644	-0.2353
	(0.002)	(0.134)	(0.689)
Q-CF correlation	-0.0027	-0.0025	-0.0025
	(0.230)	(0.265)	(0.263)
Num. of segments	-0.0087***	-0.0097***	-0.0094***
	(0.000)	(0.000)	(0.000)
In (assets)	-0.0124***	-0.0124***	-0.0124***
	(0.000)	(0.000)	(0.000)
Industry Q volatility	0.0541***	0.0543***	0.0547***
	(0.000)	(0.000)	(0.000)
Industry CF volatility	0.0011	-0.0008	-0.0007
	(0.961)	(0.971)	(0.975)
Firm CF	-0.0599***	-0.0603***	-0.0605***
	(0.000)	(0.000)	(0.000)
Firm CF volatility	0.1008***	0.1014***	0.1017***
	(0.000)	(0.000)	(0.000)
Tobin's Q	0.0659***	0.0659***	0.0660***
	(0.000)	(0.000)	(0.000)
Net working capital	-0.0248***	-0.0247***	-0.0247***
	(0.000)	(0.000)	(0.000)
Import penetration	-0.0141	0.0010	0.0011
	(0.220)	(0.925)	(0.919)
Stock market development	0.0428***	0.0448***	0.0413***
	(0.000)	(0.000)	(0.000)
Debt market development	0.1352***	0.1356***	0.1375***
	(0.000)	(0.000)	(0.000)
Shareholder rights	-0.0249***	-0.0237***	-0.0240***
	(0.000)	(0.000)	(0.000)
X * Q correlation	-0.7695***	0.1595	0.2136
	(0.005)	(0.633)	(0.296)
X * CF correlation	-2.4093**	2.3924*	0.7183
	(0.014)	(0.084)	(0.374)
Legal origin fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
R ²	0.2147	0.2141	0.2141
Num. of Observations	65958	65958	65958

The table presents estimates from regressions explaining the relation between product market competition and firm-level cash holdings. The sample consists of non-finanical and non-utility firms from 17 countries for the period from 1998 to 2013. Variable definitions are in Appendix A1. In columns 1 and 2, competition is measured by price-cost margin; in columns 3 and 4, competition is measured by Herfindahl-Hirschman Index. All specifications are OLS regressions with year fixed effects and robust standard errors clustered by firm. The p-values are included in brackets. Significance at the 1%, 5%, and 10% levels is represented by ***, **, and *, respectively.

	measure competi	ition by price-cost	measure cor	npetition by
	mai	rain	Herfindahl-Hir	schman Index
	(1)	(2)	(3)	(4)
Q correlation	-0.0017	-0.1402	-0.0047	-0.1142
	(0.975)	(0.113)	(0.931)	(0.575)
CF correlation	0.3305	0.1820	0.3041	-0.0434
	(0.116)	(0.551)	(0.147)	(0.947)
Product market competition	0.0001**	0.0002***	-0.0185**	-0.0486***
	(0.023)	(0.004)	(0.026)	(0.000)
Fraction of segments in		0.0102***		-0.0248***
competitive market		(0.000)		(0.000)
Fraction * Q correlation		0.2503*		0.1293
		(0.051)		(0.575)
Fraction * CF correlation		0.2259		0.3966
		(0.647)		(0.615)
Q-CF correlation	-0.0024	-0.0025	-0.0006	-0.0003
	(0.280)	(0.262)	(0.785)	(0.885)
Num. of segments	-0.0091***	-0.0087***	-0.0090***	-0.0088***
-	(0.000)	(0.000)	(0.000)	(0.000)
ln (assets)	-0.0128***	-0.0127***	-0.0126***	-0.0126***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry Q volatility	0.0547***	0.0547***	0.0624***	0.0639***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry CF volatility	-0.0010	-0.0029	0.0018	0.0031
	(0.963)	(0.897)	(0.939)	(0.893)
Firm CF	-0.0602***	-0.0597***	-0.0572***	-0.0570***
	(0.000)	(0.000)	(0.000)	(0.000)
Firm CF volatility	0.1010***	0.1008***	0.1032***	0.1034***
	(0.000)	(0.000)	(0.000)	(0.000)
Tobin's Q	0.0658***	0.0659***	0.0683***	0.0681***
	(0.000)	(0.000)	(0.000)	(0.000)
Net working capital	-0.0250***	-0.0248***	-0.0309***	-0.0313***
	(0.000)	(0.000)	(0.000)	(0.000)
Import penetration	0.0003	0.0045	0.0043	0.0049
	(0.980)	(0.672)	(0.679)	(0.641)
Stock market development	0.0496***	0.0441***	0.0373***	0.0414***
	(0.000)	(0.000)	(0.000)	(0.000)
Debt market development	0.1330***	0.1331***	0.1391***	0.1370***
	(0.000)	(0.000)	(0.000)	(0.000)
Shareholder rights	-0.0224***	-0.0229***	-0.0259***	-0.0260***
	(0.000)	(0.000)	(0.000)	(0.000)
Legal origin fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
R ²	0.2144	0.2148	0.2178	0.2185
Num. of Observations	65905	65905	64883	64883

Table A1: Variables Description

Variable	Definition
Panel A: Firm-level variables	
Is diversified	A firm is diversified if it has two or more operating segments by 2-digit SIC
	code
Is multinational	A firm is multi-national if it reports foreign sales
Size	Total assets, in millions USD
Cash holdings	(Cash + short-term investment) / total assets
EBITDA	Earnings before interest, taxes, depreciation and amortization / total assets
Operating cash flow	(Income before extraordinary items + depreciation and amortization) / total assets
Tobin's Q	Market value of assets $/(0.9*book value of assets + 0.1*market value of$
	assets), where market value of assets is book assets - common equity +
	shares outstanding* share price - deferred taxes
Pavout	(Dividends + share repurchases) / total assets
CAPFX	Capital expenditure / total assets
Net working capital	(Current assets - current liabilities - cash holdings) / total assets
Price-cost margin	(Income before extraordinary items + depreciation and amortization) /
	sales
Herhindahl - Hirschman Index	For a given industry, it is the sum of squared market shares of firms
Governance	A dummy variable indicating whether a firm's CEO is also a member of the
	firm's board
Panel B: Cross-segment diversificat	ion and allocation measures
Tobin's Q correlation	Following Duchin (2010) equation (7) and (8), it is the difference between a
	firm's sales-weighted volatility in Q considering actual inter-segment
	correlations and the volatility assuming perfect inter-segment correlation
	of 1
Cash flow correlation	Calculation in analogue to Q correlation, using cash flow
Q-CF correlation	Sales-weighted correlation between Tobin's Q and cash flow.
Industry Tobin's Q volatility	Sales-weighted volatility in Q assuming inter-segment correlation of 1
Industry cash flow volatility	Calculation in analogue to industry Q volatility, using cash flow
Firm cash flow volatility	Volatility of firm-level cash flow
Efficiency of allocation	Following Rajan et al. (2000), it is the value added by inter-segment
	allocation
Panel C: Country-level variables	
Legal origin	A country's legal origin, identified by La Porta et al. (1998)
Shareholder rights	An index constructed by La Porta et al. (1998) to capture the rights of
	minority shareholders
Stock market development	An index constructed by McLean and Zhao (2014) to measure a country's
	stock market development
Debt market development	An index constructed by McLean and Zhao (2014) to measure a country's
	debt market development
Import penetration	The value of imports divided by the sum of imports and domestic
	production

Table A2 Firm characteristics by country, diversifed firm group and focused firm group

The table presents the accounting variables for firms by country. Diversified firms are those with two or more operating segments by the 2-digit SIC.

Danel A· All firms

Panel A: All fi	irms													
				operating		long-term		net debt	net equity			Net working	price-cost	
	size	cash holding	EBITDA	cash flow	Tobin's Q	debt	total debt	issaunce	issuance	payout	CAPEX	capital	margin	HH
Australia	635.30	22.43%	-12.06%	-15.91%	1.182	8.50%	14.61%	0.71%	13.06%	1.71%	7.54%	-4.52%	0.396	0.354
Canada	516.10	20.08%	-20.69%	-24.81%	1.323	6.77%	12.89%	0.94%	15.25%	1.48%	9.00%	-8.35%	0.416	0.258
Germany	339,536.80	16.39%	0.01%	2.91%	1.607	11.79%	20.07%	0.14%	0.61%	1.68%	5.26%	5.87%	3.769	0.507
France	388,865.20	15.62%	0.00%	4.75%	1.609	12.31%	20.93%	0.10%	0.05%	1.67%	4.61%	0.49%	8.291	0.442
UK	1,820.88	18.51%	-2.69%	-5.97%	1.932	10.41%	17.39%	0.15%	1.51%	1.90%	4.67%	-5.01%	0.465	0.248
Hong Kong	1,193.10	21.78%	2.26%	-0.48%	1.632	8.20%	19.44%	0.21%	0.71%	1.72%	4.34%	-1.72%	-0.151	0.226
Indonesia	305,028.30	12.12%	0.01%	5.69%	1.358	14.26%	31.45%	-0.51%	1.20%	1.26%	5.81%	-4.04%	4.313	0.410
India	379.94	7.35%	11.06%	6.58%	1.508	17.66%	31.45%	0.40%	-0.40%	1.23%	7.38%	7.24%	0.045	0.140
Israel	251,324.10	18.68%	0.01%	-2.95%	1.610	13.52%	25.28%	0.19%	1.62%	2.28%	3.34%	5.05%	1.478	0.629
Japan	1,898.88	17.41%	7.00%	4.50%	1.377	10.20%	22.86%	-0.52%	0.35%	1.17%	3.55%	1.27%	0.005	0.089
Korea	1,014.81	13.28%	8.06%	4.65%	1.407	8.61%	24.43%	0.07%	-0.12%	1.12%	5.58%	3.18%	0.005	0.223
Malaysia	305.97	13.17%	7.48%	4.75%	1.199	8.48%	21.71%	0.25%	1.18%	1.67%	4.40%	3.79%	0.036	0.190
Singapore	594.06	18.01%	6.84%	4.52%	1.297	8.62%	20.92%	-0.01%	3.48%	1.85%	4.93%	1.96%	-0.008	0.292
Sweden	255,501.30	15.10%	0.00%	-2.21%	1.950	11.89%	17.40%	0.08%	0.00%	2.87%	3.89%	5.11%	18.911	0.547
Thailand	223,029.10	10.28%	0.01%	7.45%	1.438	11.57%	29.01%	-0.78%	1.21%	2.75%	5.43%	-0.24%	0.640	0.548
Turkey	656.10	9.79%	11.90%	6.23%	1.556	8.36%	23.09%	0.24%	0.95%	1.95%	5.47%	5.05%	0.012	0.341
US	3,104.97	24.56%	-3.96%	-9.88%	2.160	15.66%	23.15%	0.56%	0.95%	2.15%	5.28%	-4.35%	0.465	0.109
Panel B: Dive	rsified firms													
				operating		long-term		net debt	net equity			Net working	price-cost	
	size	cash holding	EBITDA	cash flow	Tobin's Q	debt	total debt	issaunce	issuance	payout	CAPEX	capital	margin	Ħ
Australia	1,547.26	15.56%	1.62%	-2.05%	1.304	12.59%	18.78%	0.14%	8.26%	2.74%	5.63%	0.79%	1.942	0.378
Canada	2,027.30	11.25%	6.31%	2.92%	1.467	16.28%	22.52%	0.51%	2.32%	2.21%	7.02%	3.30%	2.871	0.361
Germany	427,586.80	13.81%	0.01%	5.49%	1.551	13.02%	21.36%	0.18%	0.41%	1.89%	5.59%	7.91%	8.407	0.454
France	435,630.70	14.32%	0.01%	6.21%	1.539	13.50%	22.32%	0.04%	0.12%	1.69%	4.68%	-0.20%	16.965	0.465
UK	3,274.10	14.19%	6.47%	3.23%	1.763	13.21%	19.62%	-0.13%	0.12%	2.50%	4.68%	-2.07%	1.379	0.274
Hong Kong	1,287.77	20.91%	0.65%	-1.93%	1.591	8.63%	19.71%	0.32%	0.78%	1.56%	3.74%	-1.37%	-0.345	0.229
Indonesia	330,097.30	12.01%	0.01%	5.55%	1.322	14.11%	31.24%	-0.36%	0.59%	1.14%	5.33%	-3.78%	6.758	0.387
India	588.59	7.38%	12.00%	7.53%	1.528	17.83%	31.66%	0.29%	-0.59%	1.34%	7.47%	7.67%	0.206	0.160
Israel	609,610.60	17.96%	0.01%	3.72%	1.544	18.20%	31.20%	-0.17%	0.26%	2.25%	3.88%	0.36%	10.070	0.626
Japan	2,504.35	15.81%	6.39%	4.07%	1.330	10.95%	24.39%	-0.50%	0.39%	1.06%	3.47%	1.12%	0.012	0.096
Korea	1,842.08	13.35%	8.10%	4.18%	1.353	10.20%	27.16%	0.04%	0.16%	1.11%	5.06%	-1.65%	-0.025	0.254
Malaysia	330.34	12.50%	6.85%	4.18%	1.123	8.90%	22.54%	0.20%	0.98%	1.30%	4.03%	3.64%	0.060	0.196
Singapore	573.99	17.40%	6.36%	4.26%	1.267	%60.6	21.53%	~60.0-	3.23%	1.67%	4.57%	3.32%	-0.053	0.280
Sweden	385,260.70	10.75%	0.01%	4.69%	1.861	13.56%	20.30%	-0.04%	0.10%	3.26%	4.04%	7.23%	48.979	0.536
Thailand	269,374.50	9.97%	0.01%	6.76%	1.367	12.93%	29.70%	-0.77%	0.93%	2.50%	5.03%	-0.89%	2.974	0.522
Turkey	1,507.47	12.13%	13.06%	8.11%	1.497	9.46%	23.96%	0.73%	0.01%	1.33%	6.32%	1.75%	0.057	0.424
US	6,969.44	17.43%	8.41%	3.58%	1.903	18.74%	23.99%	0.17%	-0.18%	2.77%	4.82%	5.07%	2.008	0.133

Panel C: Focu	sed firms													
				operating		long-term		net debt	net equity			Net working	price-cost	
	size	cash holding	EBITDA	cash flow	Tobin's Q	debt	total debt	issaunce	issuance	payout	CAPEX	capital	margin	ΗH
Australia	294.59	25.15%	-17.44%	-21.31%	1.129	6.98%	13.05%	0.93%	15.03%	1.30%	8.27%	-6.56%	-0.199	0.345
Canada	379.04	20.84%	-23.91%	-27.86%	1.297	5.91%	12.02%	0.98%	16.64%	1.33%	9.19%	-9.36%	-0.054	0.241
Germany	284,808.30	18.28%	0.00%	1.19%	1.648	10.97%	19.23%	0.11%	0.75%	1.51%	5.03%	4.32%	0.259	0.541
France	358,512.40	16.64%	0.00%	3.58%	1.673	11.36%	19.81%	0.15%	-0.01%	1.66%	4.56%	1.04%	0.677	0.424
UK	1,136.91	20.57%	-7.15%	-10.40%	2.023	9.07%	16.34%	0.28%	2.19%	1.62%	4.66%	-6.43%	-0.022	0.234
Hong Kong	1,013.98	23.53%	5.31%	2.30%	1.720	7.39%	18.94%	-0.02%	0.57%	2.04%	5.48%	-2.39%	0.211	0.222
Indonesia	271,181.50	12.28%	0.00%	5.89%	1.410	14.46%	31.73%	-0.72%	2.04%	1.42%	6.46%	-4.38%	0.981	0.441
India	309.63	7.33%	10.73%	6.25%	1.500	17.61%	31.38%	0.44%	-0.34%	1.19%	7.34%	7.09%	-0.010	0.133
Israel	173,905.50	18.87%	0.01%	-4.62%	1.633	12.39%	23.85%	0.28%	1.96%	2.29%	3.22%	6.22%	-0.812	0.629
Japan	1,168.84	19.57%	7.76%	5.02%	1.437	9.28%	21.00%	-0.53%	0.29%	1.33%	3.64%	1.48%	-0.004	0.081
Korea	519.74	13.24%	8.04%	4.93%	1.451	7.67%	22.79%	0.08%	-0.29%	1.13%	5.89%	6.09%	0.023	0.204
Malaysia	262.13	14.48%	8.64%	5.80%	1.343	7.72%	20.21%	0.35%	1.55%	2.42%	5.06%	4.07%	-0.007	0.178
Singapore	628.02	19.12%	7.66%	4.97%	1.350	7.82%	19.87%	0.13%	3.91%	2.18%	5.54%	-0.42%	0.069	0.313
Sweden	192,804.20	18.47%	0.00%	-6.45%	2.012	10.89%	15.66%	0.16%	-0.07%	2.56%	3.79%	3.45%	-1.410	0.554
Thailand	191,076.30	10.51%	0.01%	7.94%	1.490	10.60%	28.53%	-0.79%	1.41%	2.94%	5.71%	0.23%	-0.884	0.566
Turkey	392.45	8.98%	11.53%	5.66%	1.576	8.02%	22.82%	0.08%	1.24%	2.22%	5.21%	6.19%	-0.001	0.315
US	1,908.66	26.58%	-8.08%	-14.25%	2.252	14.69%	22.88%	0.70%	1.32%	1.95%	5.43%	-7.02%	-0.046	0.101

Table A3 Cross-segment diversification and allocation by country, diversified firm group and focused firm group

The table presents the diversification measures by country. Diversified firms are those with two or more operating segments by the 2-digit SIC.

Panel A: All firms										
		number of	Tobin's Q	Cash flow	Q-CF	Industry Q	Industry CF	Firm cash flow	Relative value	Absolute value
	cash holding	segments	correlation	correlation	correlation	volatility	volatility	volatility	added	added
Australia	22.43%	1.0707	-0.0008	-0.0002	0.4372	0.3358	0.0447	0.2290	0.0000	-0.0001
Canada	20.08%	1.4891	-0.0048	-0.0012	0.1437	0.2006	0.0327	0.0551	0.0003	0.0011
Germany	16.39%	1.1993	-0.0011	-0.0003	0.2428	0.2657	0.0688	0.1110	0.0000	0.0000
France	15.62%	1.7214	-0.0018	-0.0006	0.2858	0.1335	0.0146	0.0353	-0.0003	-0.0018
UK	18.51%	1.8087	-0.0097	-0.0036	0.1688	0.2296	0.0807	0.1360	0.0000	0.0001
Hong Kong	21.78%	1.4506	-0.0049	-0.0015	0.3167	0.2184	0.0485	0.0904	0.0001	0.0015
Indonesia	12.12%	1.3778	-0.0023	-00000	0.2324	0.3511	0.0440	0.1164	0.0004	0.0015
India	7.35%	1.2360	-0.0015	-0.0007	0.2334	0.1765	0.0428	0.1313	0.0001	-0.0014
Israel	18.68%	1.2910	-0.0020	-0.0012	0.3130	0.2315	0.0837	0.1425	0.0000	-0.0004
Japan	17.41%	1.2905	-0.0018	-0.0004	0.3861	0.2699	0.0287	0.0484	0.0002	0.0006
Korea	13.28%	1.8838	-0.0039	-0.0015	0.1530	0.1129	0.0363	0.0585	-0.0004	-0.0041
Malaysia	13.17%	1.7858	-0.0090	-0.0026	0.2250	0.2257	0.0499	0.0879	0.0004	0.0001
Singapore	18.01%	1.6964	-0.0060	-0.0009	0.2246	0.2757	0.0397	0.0652	-0.0004	-0.0050
Sweden	15.10%	1.2622	-0.0019	-0.0006	0.0172	0.2089	0.0528	0.0681	-0.0001	-0.0007
Thailand	10.28%	1.3969	-0.0024	-0.0009	0.3178	0.2332	0.0482	0.0644	-0.0032	-0.0096
Turkey	9.79%	1.2267	-0.0004	-0.0001	0.3110	0.2684	0.0375	0.0680	-0.0002	-0.0005
US	24.56%	1.2377	-0.0037	-0.0008	0.4790	0.3352	0.0794	0.2262	0.0002	0.0001
Panel B: Diversifi	ed firms									
		number of	Tobin's Q	Cash flow	Q-CF	Industry Q	Industry CF	Firm cash flow	Relative value	Absolute value
	cash holding	segments	correlation	correlation	correlation	volatility	volatility	volatility	added	added
Australia	15.56%	1.8787	-0.0185	-0.0040	0.2586	0.3248	0.0721	0.1254	0.0009	0.0005
Canada	11.25%	1.8727	-0.0168	-0.0040	0.1531	0.2385	0.0532	0.0773	0.0007	-0.0011
Germany	13.81%	2.1387	-0.0176	-0.0050	0.2038	0.2185	0.0495	0.0629	0.0002	0.0052
France	14.32%	2.1045	-0.0149	-0.0035	0.1238	0.1940	0.0352	0.0451	0.0012	0.0046
UK	14.19%	1.9112	-0.0081	-0.0048	0.2263	0.1928	0.0508	0.0872	0.0000	-0.0015
Hong Kong	20.91%	2.2364	-0.0182	-0.0067	0.1168	0.2253	0.0809	0.1416	-0.0001	0.0001
Indonesia	12.01%	2.2122	-0.0143	-0.0022	0.1399	0.2672	0.0386	0.0550	-0.0007	-0.0101
India	7.38%	2.1572	-0.0107	-0.0024	0.2277	0.2520	0.0271	0.0405	0.0010	0.0034
Israel	17.96%	2.0332	-0.0111	-0.0032	0.1609	0.2498	0.0660	0.0755	0.0001	0.0003
Japan	15.81%	2.3198	-0.0041	-0.0013	0.1851	0.1228	0.0146	0.0339	-0.0006	-0.0040
Korea	13.35%	1.7005	-0.0061	-0.0018	0.0718	0.1985	0.0519	0.0606	-0.0005	-0.0024
Malaysia	12.50%	2.3790	-0.0074	-0.0028	0.1021	0.1084	0.0321	0.0555	-0.0006	-0.0069
Singapore	17.40%	2.2520	-0.0179	-0.0051	0.1602	0.2173	0.0477	0.0869	0.0007	0.0001
Sweden	10.75%	2.0095	-0.0098	-0.0037	0.2062	0.3039	0.0409	0.0682	0.0015	0.0058
Thailand	9.97%	1.9624	-0.0075	-0.0028	0.2563	0.2551	0.0477	0.0592	-0.0101	-0.0297
Turkey	12.13%	1.9597	-0.0031	-0.0010	0.1890	0.3078	0.0356	0.0550	-0.0011	-0.0025
US	17.43%	2.0336	-0.0091	-0.0040	0.1669	0.1704	0.0423	0.0733	0.0004	-0.0075

		number of	l obin's Q	Cash flow	Q-CF	Industry Q	Industry CF	Firm cash flow	Relative value	Absolute value
	cash holding	segments	correlation	correlation	correlation	volatility	volatility	volatility	added	added
Australia	25.15%	1.0000	0.0000	0.0000	0.5436	0.3380	0.0813	0.2684	0.0000	0.0000
Canada	20.84%	1.0000	0.0000	0.0000	0.4525	0.3401	0.0443	0.2501	0.0000	0.0000
Germany	18.28%	1.0000	0.0000	0.0000	0.3884	0.2183	0.0479	0.1093	0.0000	0.0000
France	16.64%	1.0000	0.0000	0.0000	0.1580	0.2048	0.0310	0.0637	0.0000	0.0000
UK	20.57%	1.0000	0.0000	0.0000	0.3475	0.2456	0.0958	0.1733	0.0000	0.0000
Hong Kong	23.53%	1.0000	0.0000	0.0000	0.2385	0.2352	0.0804	0.1240	0.0000	0.0000
Indonesia	12.28%	1.0000	0.0000	0.0000	0.3118	0.2835	0.0406	0.0801	0.0000	0.0000
India	7.33%	1.0000	0.0000	0.0000	0.4293	0.2738	0.0290	0.0513	0.0000	0.0000
Israel	18.87%	1.0000	0.0000	0.0000	0.2585	0.2681	0.0692	0.1215	0.0000	0.0000
Japan	19.57%	1.0000	0.0000	0.0000	0.3900	0.1445	0.0145	0.0370	0.0000	0.0000
Korea	13.24%	1.0000	0.0000	0.0000	-0.0089	0.2134	0.0532	0.0739	0.0000	0.0000
Malaysia	14.48%	1.0000	0.0000	0.0000	0.2236	0.1188	0.0416	0.0640	0.0000	0.0000
Singapore	19.12%	1.0000	0.0000	0.0000	0.3126	0.2360	0.0527	0.0896	0.0000	0.0000
Sweden	18.47%	1.0000	0.0000	0.0000	0.2449	0.3713	0.0454	0.1490	0.0000	0.0000
Thailand	10.51%	1.0000	0.0000	0.0000	0.3559	0.2208	0.0485	0.0682	0.0000	0.0000
Turkey	8.98%	1.0000	0.0000	0.0000	0.3361	0.2634	0.0377	0.0725	0.0000	0.0000
US	26.58%	1.0000	0.0000	0.0000	0.2503	0.1781	0.0429	0.1526	0.0000	0.0000

Panel C: Focused firms

Table A4 Product market competition by country and industry

The table presents price cost margin and Herfindahl - Hirschman Index by industry groups for each country. The sample consists of non-finanical and non-utility firms from 17 countries for the period from 1998 to 2013. According to the NAICS Association, industries are divided into eight groups using two-digit SIC code. We omit public utilities (46 - 49), financials (60 - 69), public administration and nonclassifiables (91-99).

Panel A: Price-cost n	nargin							
2-digit SIC	01-09	10-14	15-17	20-39	40-45	50-51	52-59	70-89
	agriculture	mining	construction	manufacturing	transportation	wholesale	retail	services
Australia	-2.6692	-12.8133	-3.4844	-1.5872	0.7024	-0.6062	0.0135	-1.1582
Canada	-2.4729	-8.2314	-2.4481	-4.4559	0.0987	-0.4911	-0.2170	-4.0041
Germany	207.4059	22.2414	64.6373	64.3584	134.9553	45.0262	37.5633	78.9944
France	41.5307	39.3501	50.2510	59.4468	135.6973	66.0638	62.8811	43.7454
United Kingdom	-6.1648	-5.5908	0.1369	-1.4937	0.2620	-0.0155	0.1856	-0.9799
Hong Kong	-1.9733	-2.2578	-0.3568	-0.3618	0.2576	-0.6994	-0.1496	-0.4759
Indonesia	82.4756	110.1011	65.1594	75.0548	124.3562	44.6529	55.1804	140.8289
India	-0.0626	0.1648	-0.1875	-0.1723	0.0691	-0.1432	0.1069	-0.2424
Israel		33.9214	58.5189	64.1557	68.2530	67.0131	81.1182	43.0510
Japan	0.0328	0.0307	0.0021	0.0551	0.3508	0.0052	0.0350	0.0206
Korea	0.0060	-0.3581	-0.2315	0.0482	0.0645	-0.0451	-0.2448	-0.3172
Malaysia	0.0719	-0.0052	-0.0210	-0.0743	0.0026	0.1294	0.0960	0.0230
Singapore	-0.3314	-0.1821	0.1395	0.1186	-0.2349	-0.0135	0.0866	-1.2545
Sweden	7.2380	38.2684	125.3741	55.5196	119.2664	44.5292	61.4842	73.8109
Thailand	66.4168	77.6892	94.8668	88.8896	46.5911	44.7179	74.3400	107.1529
Turkey	4.7120	-0.2068	-0.0749	0.0389	0.0704	-0.0197	0.1083	0.2164
United States	-0.5303	-2.7286	-0.7873	-1.7298	0.0573	-1.0255	-0.5754	-3.1032
Panel B: Herfindahl-h	Hirschman Index							
2-digit SIC	01-09	10-14	15-17	20-39	40-45	50-51	52-59	70-89
	agriculture	mining	construction	manufacturing	transportation	wholesale	retail	services
Australia	0.7103	0.4927	0.4788	0.5679	0.7372	0.2424	0.7019	0.6238
Canada	0.8447	0.3131	0.6325	0.5231	0.6378	0.3322	0.6025	0.6612
Germany	0.9280	0.9069	0.4761	0.4643	0.8855	0.3319	0.6897	0.7615
France	0.9662	0.9198	0.5140	0.5089	0.7084	0.4492	0.7120	0.8114
UK	0.7959	0.6144	0.2712	0.3919	0.4465	0.3189	0.5418	0.4214
Hong Kong	0.7774	0.4976	0.2138	0.3277	0.5557	0.2428	0.4366	0.5125
Indonesia	0.7334	0.6243	0.4619	0.6275	0.6952	0.3773	0.7058	0.6172
India	0.5242	0.6310	0.4989	0.2593	0.4775	0.3182	0.5644	0.4784
Israel		0.8646	0.6901	0.7248	0.8908	0.6873	0.8203	0.8178
Japan	0.6853	0.3263	0.0477	0.2078	0.2205	0.0695	0.1545	0.2832
Korea	0.8259	0.7775	0.3421	0.3276	0.6055	0.2949	0.6971	0.6335
Malaysia	0.2749	0.6670	0.2760	0.2785	0.6771	0.3023	0.5066	0.3949
Singapore	0.7335	0.7374	0.2470	0.4598	0.7060	0.3789	0.6372	0.6302
Sweden	0.9684	0.9689	0.6361	0.6994	1.0000	0.7105	0.8375	0.7359
Thailand	0.8586	0.9138	0.5793	0.6992	0.7898	0.6090	0.6878	0.6672
Turkey	0.8833	0.8758	0.6906	0.4894	0.7861	0.4920	0.8326	0.7833
NS	0.7743	0.2491	0.1417	0.1578	0.3819	0.0934	0.2538	0.3839