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CORPORATE CASH HOLDING IN ASIA

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ABSTRACT: In this paper, we analyze the determinants of corporate saving in the form of changes in the stock of cash for 11 Asian economies using firm-level data from the Oriana Database for the 2002–2011 period. We find some evidence that cash flow has a positive impact on the change in the stock of cash, which suggests that Asian firms are borrowing constrained and that they save more when their cash flow increases so that they will be able to finance future investments. Moreover, we find in the developed economy sample that, as expected, cash flow has a positive impact on the change in the stock of cash only in the case of the smallest firms, which are more likely to be borrowing constrained, and find in the developing economy sample that, as expected, the positive impact of cash flow on the change in the stock of cash declines with firm size. In addition, we find that the cash flow sensitivity of cash declined after the global financial crisis. Finally, we find some evidence that Tobin's q has a positive impact on the change in the stock of cash.

Keywords: corporate saving, corporate investment, borrowing constraints, liquidity constraints, cash flow, cash holdings, cash flow sensitivity of cash, Tobin's q, firm size, productivity shocks, Asia, Oriana Database, financial sector development, global financial crisis
JEL Classification: D92, E21, E22, G11, O53

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I. INTRODUCTION

Corporate saving has always played an important role, but it has shown a substantial upward trend in many, if not most, of the developed and Asian economies for the past 2 decades, as pointed out by Karabarbounis and Neiman (2012), and thus is of even more importance now. Yet most previous analyses of saving have focused on household (or personal) saving or national (or domestic) saving, and there have been relatively few analyses of corporate (or firm) saving (refer to the papers in the references section for a representative sampling of previous theoretical and empirical analyses of corporate saving).

Why do firms accumulate liquid assets? In other words, why do firms channel their cash flow into liquid assets rather than into physical capital (capital formation) or into shareholder distributions (dividends)? The high saving rates in Asia have been called a "saving glut" and have been blamed for the pre-global financial crisis "global imbalances," and both academics and policy makers have expended much effort in trying to understand the saving behavior of this region generally (see, for example, Horioka and Terada-Hagiwara (2011), but the factors driving the surge in corporate saving in Asia have yet to be disentangled. The objective of this paper is to fill this void by doing an empirical analysis of the saving behavior of Asian firms.

The recent literature on corporate saving has proposed two main explanations for the excess corporate saving in emerging markets. First, emerging markets have a limited supply of financial assets and are financially constrained (see, for example,

Dooley, Folkerts-Landau, and Garber 2005; Matsuyama 2007; Ju and Wei 2006, 2010; and Caballero, Farhi, and Gourinchas 2008). In this explanation, the underdeveloped financial sector serves as the main driver of corporate saving behavior.

The second strand of the literature on corporate saving focuses on the role of the precautionary motive. In this explanation, excess saving and thence net capital outflows result from precautionary saving arising from idiosyncratic risk (see, for example, Mendoza, Quadrini, and Rios-Rull 2009, Sandri, 2010, and Benhima, 2010). In these precautionary saving models, rising uncertainties cause a decline in corporate investment, as has been particularly noticeable in some of the Southeast Asian economies.

The goal of this paper is not to directly address the macroeconomic phenomenon of the saving glut, but rather to understand the process whereby firms accumulate liquid assets or saving by analyzing firm-level income statement data. In particular, we are interested in why firms channel their cash flow into liquid assets (defined to include cash as well as other financial assets) rather than into physical capital. We also seek to determine whether and when corporate saving behavior can serve as a useful indicator of the extent to which firms face external borrowing constraints. Thus, we focus on two specific determinants of corporate saving: income uncertainty and the cost of external finance.

In this paper, we analyze the determinants of corporate saving in the form of changes in the stock of cash for 11 Asian economies using firm-level data from the

Oriana Database for the 2002–2011 period. Figure 1 shows trends in our measure of corporate saving during the sample period. The change in the stock of cash (as a share of total assets) was positive throughout the sample period, which indicates that cash holdings have been increasing throughout this period. This supports the view that there was a "saving glut" in Asia. However, some variations can be observed across time and among groupings of economies. Firms in our sample continued to save more cash until 2010 despite the slight dip in 2008, and the cash saving rate peaked in 2010 before dropping quite sharply in 2011. This general trend can be observed in both developed and developing economies, but firms' cash holdings increased significantly more in developing economies than in developed economies after 2007, until they dropped sharply in 2011.

To preview our main findings, we find some evidence that cash flow has a positive impact on the change in the stock of cash, which suggests that Asian firms are borrowing constrained and that they save more when their cash flow increases so that they will be able to finance future investments. Moreover, we find in the developed economy sample that, as expected, cash flow has a positive impact on the change in the stock of cash only in the case of the smallest firms, which are more likely to be borrowing constrained, and find in the developing economy sample that, as expected, the positive impact of cash flow on the change in the stock of cash declines with firm size. In addition, we find that the cash flow sensitivity of cash declined after the global financial crisis. Finally, we find some evidence that Tobin's q has a positive impact on the change in the stock of cash.

The remainder of the paper is organized as follows. We discuss theoretical considerations in Section II, the estimation model and the estimation method in Section III, the data source in Section IV, the estimation results in Section V, and the summary and conclusions in Section VI.

II. THEORETICAL CONSIDERATIONS

In this section, we consider the determinants of corporate saving from a theoretical perspective. Our discussion draws heavily on the analyses on Almeida, Campello, and Weisbach (2004), Khurana, Martin, and Pereira (2006), Riddick and Whited (2009), and Almeida, et al. (2013) (see also Karabarbounis and Neiman (2012) and Huang (2011), who also discuss the importance of borrowing constraints as a motive for corporate saving).

Households and firms are very different economic entities with very different objective functions, with households consuming in order to maximize their utility and firms investing in plant and equipment and using that plant and equipment in order to produce goods and services and make profits. However, there are many similarities between the two types of economic entities nonetheless. For example, in the same way that households save in order to finance their future consumption, firms save in order to finance their future investment. Moreover, in the same way that households have a choice between financing their consumption by borrowing or by drawing down their previously accumulated saving, firms have a choice between financing investment by borrowing or by drawing down their previously accumulated saving. Furthermore, in the

same way that borrowing constraints and borrowing costs will influence households' decisions about how to finance their consumption, borrowing constraints and borrowing costs will also influence firms' decisions about how to finance their investment.

As the Fisher Separation Theorem states, the firm's decision regarding physical investment is, of course, paramount, and once this decision is made, the firm will then decide how to finance the investment, whether it be from internal funds (cash) and/or external funds (loans and bond and equity issues). It is in this context that firms will decide whether and how much financial assets (cash) to hold, and it is this decision upon which we will focus in this paper.

If firms did not face borrowing constraints, they could finance their investment in plant and equipment by borrowing as much as they needed from external sources at market rates and therefore would not need to hold financial assets in preparation for the sudden and unexpected appearance of profitable investment projects (projects with a positive net present value). However, if firms faced borrowing constraints, as a result of which they had to pay more than the market rate of interest when borrowing from external sources, they might choose to hold at least some financial assets at all times to ensure that they were able to take advantage of any profitable investment projects that might suddenly and unexpectedly arise without having to borrow from external sources, thereby saving on expected future financing costs.

Note, however, that holding financial assets confers costs as well as benefits. One cost of holding financial assets is that doing so reduces the amount of current

investments that can be financed from internal sources, and in the case of borrowing constrained firms, this in turn may reduce the amount of current investments the firm can do. Another cost of holding financial assets is that the firm must pay taxes on the interest income earned on holdings of financial assets. Thus, firms must balance the costs of holding financial assets (the cost of foregone current investment projects and the tax liability on the interest income accruing to holdings of financial assets) against the benefits of doing so (the reduction in expected future financing costs) when deciding how much of their assets to hold in the form of financial assets.

We turn next to what these theoretical considerations imply concerning the "cash flow sensitivity of cash," the impact of cash flow on how much firms save in the form of cash, where cash is construed broadly to include all liquid financial assets. According to the analysis of Almeida, Campello, and Weisbach (2004), an increase in cash flow will cause firms to want to increase current investment as well as future investment. A firm that is not borrowing constrained will not necessarily increase its cash holdings in response to an increase in its cash flow and may use the entire increase in its cash flow to finance current investment because it knows that it will be able to finance future investment using external funds without any difficulty. Thus, an increase in cash flow will not have a systematic impact on how much unconstrained firms save in the form of cash (that is, the so-called "cash flow sensitivity of cash" of unconstrained firms would be expected to be zero).

However, a firm that is borrowing constrained will use at least part of the increase in its cash flow to increase its cash holdings so that it will be able to increase its

future investment without relying on external funds. Thus, an increase in cash flow will cause borrowing constrained firms to save more in the form of cash (that is, the "cash flow sensitivity of cash" of borrowing constrained firms will be positive).

By contrast, Riddick and Whited (2009) extend the theoretical analysis of Almeida, Campello, and Weisbach (2004) and show that the cash flow sensitivity of cash may be negative in the case of borrowing constrained firms. They obtain a very different prediction regarding the sign of the cash flow sensitivity of cash because they assume that the firm faces positively serially correlated productivity shocks. As a result, a positive productivity shock will cause the firm's cash flow to increase and its capital to become more productive, and its productivity will revert to its mean only slowly. This will induce the firm to shift its assets from cash to physical capital, and if this substitution effect is strong enough to offset the income effect identified by Almeida, Campello, and Weisbach (2004) and discussed above, the firm will invest and draw down its cash holdings in response to an increase in cash flow caused by a positive productivity shock. Thus, an increase in cash flow will cause firms to save less in the form of cash (that is, the "cash flow sensitivity of cash" will be negative).

Thus, the sign and magnitude of the "cash flow sensitivity of cash" is theoretically ambiguous and will depend on whether or not firms are borrowing constrained and on whether or not increases in cash flow are accompanied by increases in productivity. Empirical analysis is needed to determine the sign and magnitude of the "cash flow sensitivity of cash."

III. ESTIMATION MODEL AND ESTIMATION METHODS

In this section, we describe our econometric model, which is based on the theoretical considerations discussed in the previous section, as well as the estimation methods used to estimate our model.

Following Almeida, Campello, and Weisbach (2004), Khurana, Martin, and Pereira (2006), and Riddick and Whited (2009), we estimate the following baseline equation:

$$CHCASHA(i,t) = a0 + a1 * CFA(i,t) + a2 * q(i,t) + a3 * SIZE(i,t) + e(i,t) \quad (1)$$

where $CHCASHA(i,t)$ is the ratio of the change in the stock of cash to total assets, $CFA(i,t)$ is the ratio of cash flow to total assets, $q(i,t)$ is Tobin's q, and $SIZE(i,t)$ is firm size measured by total assets of firm i at time t. $e(i,t)$ is an error term of firm i at time t.

As explained in the previous section, Almeida, Campello, and Weisbach (2004) predict that the coefficient of cash flow, *a1*, will be positive in the case of borrowing constrained firms but that it will be indeterminate in the case of unconstrained firms. This prior implies that firms should increase their stocks of liquid assets in response to positive cash flow innovations if they are borrowing constrained. By contrast, unconstrained firms should not display such systematic behavior when managing their liquidity; i.e., their cash flow sensitivity of cash should not be statistically different from

zero.

This prediction of a positive propensity to save out of cash flow for borrowing constrained firms is due primarily to Almeida, Campello, and Weisbach's (2004) assumption that an increase in cash flow is not accompanied by higher capital productivity. Therefore, the firm has no incentive to transform liquid assets into physical assets, and an increase in cash flow produces a pure positive income effect on saving. Riddick and Whited (2009), on the other hand, stress the importance of the substitution effect. The substitution effect implies that the firm saves less in the form of liquid assets because it wants to shift some of its liquid assets into physical assets that have become relatively more productive.

We use two definitions of Tobin's q (*q1*, the ratio of market price to book value, and *q2*, the sum of market capitalization and debt as a ratio of total assets). However, as the results were not very sensitive to the definition of Tobin's q, we report only the results for *q1*.

We do the estimations with and without one-digit industry dummies, and although the results were not found to be very sensitive to the inclusion of industry dummies, we report the results with and without industry dummies.

Finally, in addition to estimating the baseline regression [equation (1)], we also tried augmenting the regression with three additional explanatory variables (capital expenditures, working capital, and short-term debt).

We estimate this equation using three estimation methods: ordinary least squares (OLS), the procedure proposed by Fama and MacBeth (1973), and the generalized method of moments (GMM). The Fama and MacBeth (1973) procedure consists of estimating the equation for each year using OLS, then pooling the yearly estimates. Since it is likely that there is measurement error in Tobin's q, we follow Riddick and Whited (2009) in using GMM to control for measurement error in Tobin's q.

We do the estimates for the full sample, for the subsamples of developed economies and developing economies, and for individual economies.

In addition, in order to gauge the impact of the global financial crisis on the saving behavior of firms, we try dividing the time period of our analysis into pre-crisis (2002–2007) and post-crisis (2008–2011).

Finally, we try dividing the sample into various subsamples by firm size on the grounds that firm size will be a good proxy for borrowing constraints. In particular, we try dividing the sample into firms above and below the mean (median) and into firm size quintiles on the grounds that firms that are relatively small will be more likely to be borrowing constrained whereas firms that are relatively large will be less likely to be borrowing constrained.

IV. DATA SOURCE

In this section, we discuss the source of the data used in our analysis. The data we use in our analysis are taken from the Bureau Van Dijk Oriana Database (https://oriana.bvdinfo.com/), a comprehensive database that contains financial information on public and private companies. We use data from 11 Asian economies: Australia; the People's Republic of China (PRC); Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; the Philippines; Singapore; Thailand; and Viet Nam. We use data for the 10-year period from 2002–2011.

When we divide the sample into developed economies and developing economies, we classify Australia; Hong Kong, China; Japan; New Zealand; and Singapore as developed economies and, the PRC, Indonesia, the Republic of Korea, Malaysia, the Philippines, Thailand, and Viet Nam as developing economies.

Comparing our sample to those of previous firm-level analyses of the determinants of corporate saving, Almeida, Campello, and Weisbach (2004) conduct their analysis only for firms in the United States (US), whereas Riddick and Whited (2009) conduct their analysis only for firms in Canada, Japan, France, Germany, the United Kingdom, and the US. Thus, this paper is the first analysis to include Asian economies other than Japan in the sample and also the first analysis to include developing economies in the sample.

Turning to sample selection, following Riddick and Whited (2009), we deleted firm-year observations with missing data and for which total assets, the gross capital stock, or sales are either zero or negative, selected the longest consecutive time series

of data for each firm, and deleted firms with only one observation. Following Riddick and Whited (2009), we also omitted all firms whose primary Standard Industrial Classification (SIC) code is between 4900 and 4999, between 6000 and 6999, or greater than 9000 because our model is not appropriate for regulated, financial, or quasi-public firms. Finally, we also excluded outliers (defined as the top and bottom 1% of firms) and firms from economies with relatively few observations.

Appendix Table 1 shows the variable definitions and data sources for the variables used in the empirical analysis whereas Appendix Table 2 shows the summary statistics for these variables.

V. ESTIMATION RESULTS

In this section, we discuss our estimation results. Our estimation results are shown in Tables 1–9. The first three tables show estimation results by economy. Table 1 shows the OLS estimates, Table 2 shows the Fama and MacBeth (1973) estimates, and Table 3 shows the GMM estimates. Two measures of Tobin's q were used in the estimations, with the first being the ratio of market price to book value and the second being the sum of market capitalization and debt divided by total assets. The left-hand panel of Tables 1 and 2 shows the estimates using the first definition of Tobin's q, while the right-hand panel shows the estimates using the second definition of Tobin's q. Only the first measure of Tobin's q based on the ratio of market price to book value is used in Table 3.

As can be seen from Table 1, in the OLS estimates, the coefficient of greatest

interest (the coefficient of cash flow) is positive and statistically significant in all of the 11 economies in our sample regardless of whether or not industry dummies are included.

As can be seen from Table 2, the Fama and MacBeth (1973) estimates are generally consistent with the OLS estimates with a positive coefficient on cash flow, but the coefficient of cash flow is statistically significant in a fewer number of economies. The coefficient of cash flow is positive and statistically significant in six out of the 11 economies in the sample when industry dummies are included and in nine out of the 11 economies in the sample when industry dummies are not included.

As can be seen from Table 3 in the GMM estimates, the coefficient of cash flow is statistically significant in nine out of the 11 economies in the sample and is positive in all cases in which it is statistically significant.

Turning to the coefficient of Tobin's q, in the OLS estimates, it is statistically significant in seven (six) out of the 11 economies in the sample (positive and significant in five (five) economies, and negative and significant in two (one) economies when industry dummies are included (omitted). In the Fama and MacBeth (1973) estimates, it is not statistically significant in any of the 11 economies in the sample regardless of whether or not industry dummies are included. In the GMM estimates, the coefficient of Tobin's q is statistically significant in only four out of the 11 economies in the sample and is positive in three out of the four economies in which it is statistically significant.

We also obtained the GMM results for the full sample of economies, the

developed economy sample, and the developing economy sample, and the results are shown in Tables 4, 5, and 6, respectively. As can be seen from these tables, the coefficient of cash flow is positive and statistically significant in every case in the baseline regressions and positive and statistically significant in every case in the augmented regressions except in the developed economy sample.

The coefficient of Tobin's q is positive and statistically significant in the full sample of economies and the developing economy sample in the case of the baseline regressions and in the full sample of economies only in the case of the augmented regressions.

The fact that the coefficient of cash flow is generally positive suggests that the income effect analyzed by Almeida, Campello, and Weisbach (2004) is more important than the substitution effect analyzed by Riddick and Whited (2009), as a result of which the net impact of cash flow on the change in the stock of cash is positive (i.e., firms save more in the form of cash when their cash inflows are higher).

As for the impact of Tobin's q, there is some evidence that its impact on the change in the stock of cash is positive but the results are not very clear-cut.

Turning to the results for the pre- and post-global financial crisis periods, the coefficient of cash flow is almost always higher during the pre-crisis period than during the post-crisis period, which is reasonable since the greater pessimism about future prospects caused by the global financial crisis presumably reduced the demand for

cash holdings in preparation for the sudden and unexpected appearance of profitable investment opportunities. The only exception to this pattern is in the case of the baseline regression results for the developing economy sample, but the aforementioned pattern holds in the case of the augmented regression results for this sample, which are presumably more reliable than the baseline regression results due to the inclusion of more explanatory variables.

We now divide the sample into subsamples according to firm size (asset size) in order to test for the possibility of the differential sensitivity of the change in the stock of cash to the cash flow variable by asset size. In this exercise, we use the asset size of firms to divide the sample of firms in each economy into five groups (quintiles). The grouping is based on the average or median asset size of firms in each economy, and thus, for firms in an economy in which average (median) asset size is relatively large such as the PRC, Japan, or the Republic of Korea, some of the firms in the bottom quintile might be larger than those in the highest quintile in other economies such as Viet Nam where average asset size is relatively small.

The results are shown in Tables 7, 8, and 9, for the full sample of economies, the sample of developed economies, and the sample of developing economies, respectively (only the results for the variants with industry dummies are shown due to space limitations). The estimates for both the developed economy sample and the developing economy sample show that the coefficient of cash flow is almost always positive and is often statistically significant when it is positive whereas it is never negative and statistically significant, contrary to what Riddick and Whited (2009)

predicted. This is true even when we augmented the specification by adding capital expenditures, working capital, and short-term debt and estimated the equation using GMM. This finding constitutes strong support for the income effect posited by Almeida, Campello, and Weisbach (2004), and there is no evidence of a shift from cash flow to physical assets.

Turning to patterns by firm size, as explained earlier, Almeida, Campello, and Weisbach (2004) predict that the coefficient of cash flow, *a1*, will be positive in the case of borrowing constrained firms but that it will be indeterminate in the case of unconstrained firms. Since smaller firms are more likely to be borrowing constrained, we would expect the coefficient of cash flow, *a1*, to be larger and more highly significant in the case of smaller firms, and our results are consistent with this expectation.

As the results for developed economies in Table 5 show, the coefficient of cash flow is positive and significant in the case of the lowest firm size quintile but is not statistically significant in any other quintile. Moreover, as the results for developing economies in Table 6 show, the coefficient of cash flow is positive and statistically significant in the case of all firm sizes, but its significant level and absolute magnitude decline with firm size in the case of the baseline regressions (although the coefficient of cash flow is not significant for any firm size in the case of the augmented regressions). Thus, the results for both developed and developing economies are consistent with our prior that smaller firms are more likely to be borrowing constrained and that they would be expected to have a stronger tendency to save when cash flow is high.

VI. SUMMARY AND CONCLUSIONS

In this paper, we analyzed the determinants of corporate saving in the form of changes in the stock of cash for 11 Asian economies using firm-level data from the Oriana Database for the 2002–2011 period. We found some evidence that cash flow has a positive impact on the change in the stock of cash, which suggests that Asian firms are borrowing constrained and that they save more when their cash flow increases so that they will be able to finance future investments. Moreover, we found in the developed economy sample that, as expected, cash flow has a positive impact on the change in the stock of cash only in the case of the smallest firms, which are more likely to be borrowing constrained, and find in the developing economy sample that, as expected, the positive impact of cash flow on the change in the stock of cash declines with firm size. In addition, we find that the cash flow sensitivity of cash declined after the global financial crisis. Finally, we found some evidence that Tobin's q has a positive impact on the change in the stock of cash.

Turning finally to the policy implications of our findings, our findings suggest that the behavior of Asian firms is heavily influenced by borrowing constraints and that financial sector development would induce Asian firms to invest more in physical assets and do less saving in the form of cash holdings. In order to better understand the behavior of Asian firms, particularly in developing countries, future research might include measures of uncertainty (such as the serial correlation and variance of income), following Riddick and Whited (2009), to test the hypothesis that uncertainty is at least as

important a determinant of the change in the stock of cash as borrowing constraints.

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Appendix

Appendix Table 1: Variable Definitions and Data Sources

Variable List	Source	Definition (Oriana) / Derivation
Cash and cash equivalents (CCE)	raw data	Amount of cash in the bank and on hand of the company
Change in cash and cash equivalents	derived	Change in cash and cash equivalents between time *(t)* and time *(t-1)*
Cash savings: Ratio of change in cash and cash equivalents to total assets	derived	Change in cash and cash equivalents divided by total assets
Ratio of cash and cash equivalents to total assets	derived	Cash and cash equivalents divided by total assets
Cash flow	raw data	Profit for period + Depreciation
Ratio of cash flow to total assets	derived	Cash flow divided by total assets
Firm size	derived	ln(total assets)
Total assets	raw data	Fixed assets + Current assets
Market price to book value ratio	derived	Market price year-end divided by book value per share
Tobin's Q	derived	Ratio of the sum of market capitalization and total debt to total assets
Market capitalization	raw data	Market value of a listed company is calculated by multiplying its share price by the number of shares outstanding
Total debt	derived	Sum of current and non-current liabilities

Source: Bureau Van Dijk Oriana Database (https://oriana.bvdinfo.com/).

Appendix Table 2: Summary Statistics

	Cash & cash equivalents (thous USD)	Cash savings	Ratio of cash & cash equiv. to total assets	Cash flow (thous USD)	Ratio of cash flow to total assets	Total assets	Tobin's q (Market Price to Book Ratio)	Market Capitalization (million USD)	Total debt (thous USD)	No. of obs.
Australia										1,025
Mean	10,663	0.0401	0.1898	9,463	0.1270	85,804	1.478033	80	37,583	
Median	3,686	0.0153	0.1222	3,012	0.0934	32,852	1.127082	24	10,527	
SD	24,472	0.1472	0.1915	28,345	0.1180	247,991	1.086585	253	144,802	
Min	3	-0.7069	0.0001	16	0.0033	1,796	0.4073761	1	127	
Max	333,277	0.6848	0.9875	404,430	1.0212	3,290,548	8.819387	5,847	2,425,978	
China										6,418
Mean	123,838	0.0292	0.1823	55,651	0.0728	728,842	1.707129	595	433,903	
Median	52,634	0.0163	0.1503	20,873	0.0626	332,192	1.407937	301	164,333	
SD	252,950	0.0911	0.1297	112,392	0.0439	1,172,018	0.9964765	1,135	798,796	
Min	26	-0.2304	0.0005	147	0.0081	17,286	0.4903343	4	959	
Max	4,267,429	0.4716	0.9283	1,480,427	0.2760	9,698,238	7.377475	31,849	8,374,440	
Hong Kong										2,773
Mean	183,554	0.0251	0.1833	133,949	0.1008	1,428,113	1.214296	1,034	704,121	
Median	50,578	0.0143	0.1429	29,678	0.0886	339,544	0.9479343	174	111,400	
SD	417,158	0.0925	0.1460	410,626	0.0611	3,497,721	0.832922	3,329	1,872,649	
Min	68	-0.3451	0.0001	149	0.0047	5,115	0.304493	2	510	
Max	7,315,390	0.5430	0.8717	7,964,317	0.4064	37,509,104	7.012769	75,388	24,100,000	
Indonesia										1,082
Mean	53,000	0.0146	0.1213	47,667	0.1016	399,197	1.397483	458	222,228	
Median	8,471	0.0059	0.0847	9,207	0.0807	112,208	1.076081	59	57,760	
SD	122,384	0.0669	0.1167	115,729	0.0730	769,314	0.9046853	1,279	468,067	
Min	5	-0.2289	0.0003	36	0.0039	2,164	0.3800052	1	68	
Max	1,211,231	0.2867	0.6618	1,003,891	0.4348	5,752,184	7.326864	13,896	3,743,013	
Japan										13,289
Mean	188,815	0.0144	0.1672	100,953	0.0646	1,450,882	1.065206	838	829,441	
Median	46,593	0.0098	0.1360	19,909	0.0594	364,332	0.9704849	148	168,632	
SD	575,574	0.0498	0.1242	276,970	0.0361	3,411,980	0.4045207	2,398	2,230,589	
Min	81	-0.1973	0.0002	99	0.0041	11,654	0.4544477	3	1,096	
Max	16,833,098	0.2378	0.8707	5,763,806	0.2043	30,768,990	3.770925	58,428	26,200,000	
Korea										4,134
Mean	56,802	0.0093	0.0892	42,975	0.0644	722,769	1.132627	454	422,999	
Median	8,552	0.0055	0.0647	6,477	0.0522	123,370	0.9741384	61	54,135	
SD	178,748	0.0620	0.0836	165,775	0.0488	2,080,305	0.5468624	1,552	1,364,849	
Min	1	-0.2675	0.0000	96	0.0026	7,744	0.4364686	4	263	
Max	2,158,257	0.2884	0.7325	3,380,055	0.3272	18,927,784	4.204416	24,405	17,700,000	
Malaysia										3,103
Mean	29,691	0.0142	0.1328	18,381	0.0851	213,869	1.012785	147	103,367	
Median	6,608	0.0079	0.0927	4,921	0.0758	69,309	0.8749134	29	25,677	
SD	96,961	0.0606	0.1253	47,836	0.0559	482,002	0.5203002	484	268,006	
Min	2	-0.2663	0.0001	35	0.0033	3,815	0.4107196	1	108	
Max	1,608,228	0.2602	0.9258	636,646	0.3629	5,363,550	4.924468	7,142	3,589,091	
Philippines										471
Mean	69,438	0.0201	0.1421	65,325	0.1114	480,806	1.337886	467	266,322	
Median	11,992	0.0071	0.1001	8,238	0.0919	120,753	1.077721	69	53,703	
SD	175,276	0.0759	0.1372	190,022	0.0841	981,950	0.8583651	1,320	634,766	
Min	29	-0.2735	0.0011	6	0.0019	1,086	0.3818043	1	145	
Max	1,389,315	0.4401	0.7848	1,646,965	0.5729	6,330,523	6.121884	14,475	4,200,584	
Singapore										2,193
Mean	60,832	0.0259	0.1902	34,439	0.0999	363,540	1.169542	279	199,856	
Median	15,408	0.0171	0.1550	8,805	0.0887	98,321	1.005973	55	41,909	
SD	184,797	0.0872	0.1389	86,956	0.0607	919,174	0.5635185	792	619,628	
Min	46	-0.3542	0.0017	61	0.0071	4,558	0.4465593	2	452	
Max	2,707,978	0.4526	0.9218	1,050,150	0.4465	10,234,409	5.150048	8,663	8,407,740	
Thailand										1,604
Mean	29,274	0.0105	0.0997	39,700	0.1130	322,233	1.190743	270	160,908	
Median	4,965	0.0038	0.0594	7,979	0.1027	83,364	1.018209	46	35,801	
SD	81,863	0.0572	0.1084	118,171	0.0703	710,762	0.5927649	828	398,097	
Min	1	-0.2020	0.0001	90	0.0055	2,919	0.4034556	1	269	
Max	862,824	0.2937	0.7972	1,585,838	0.4636	5,045,682	4.20016	8,797	4,125,462	
Viet Nam										1,084
Mean	6,029	0.0036	0.1254	4,766	0.1045	47,479	1.060225	27	28,226	
Median	1,763	0.0009	0.0816	1,685	0.0865	22,057	0.978878	8	11,920	
SD	16,797	0.0919	0.1317	12,104	0.0724	75,044	0.3640701	89	48,223	
Min	6	-0.2812	0.0002	18	0.0077	1,166	0.4633949	1	96	
Max	203,160	0.3527	0.9437	206,185	0.3914	579,422	3.280699	1,604	419,968	

Source: Bureau Van Dijk Oriana Database (https://oriana.bvdinfo.com/).

Table 1: OLS Estimates by Economy

	OLS Estimation (excluding top and bottom 1% outliers, small country firms, and industries related to finance, real estate, management & government)									
Country	q1	CF	Firm Size	Constant	No. of obs.	q1	CF	Firm Size	Constant	No. of obs.
	Without industry dummies					*With industry dummies*				
Australia	0.006587*	0.2875***	0.004983	-0.0599018	1067	0.007387**	0.2727***	0.004529	-0.0762584	1067
	(0.0028)	(0.0393)	(0.0039)	(0.04189)		(0.0028)	(0.0399)	(0.0041)	(0.0610)	
China, People's Rep. of	0.000617	0.1412***	0.003445**	-0.026289	6630	0.0005105	0.1530***	0.003908***	-0.0137352	6630
	(0.0005)	(0.0255)	(0.0011)	(0.0138)		(0.0005)	(0.0261)	(0.0011)	(0.0176)	
Hong Kong,China	0.006485***	0.1619***	0.0002541	-0.0041642	2951	0.006422***	0.1718***	0.0007893	-0.0062904	2951
	(0.0013)	(0.0300)	(0.0011)	(0.0149)		(0.0013)	(0.0305)	(0.0012)	(0.0210)	
Indonesia	0.0005568	0.1696***	0.001069	-0.016289	1088	0.000603	0.1784***	0.001351	-0.0177784	1088
	(0.0012)	(0.0290)	(0.0013)	(0.0147)		(0.0012)	(0.0292)	(0.0013)	(0.0219)	
Japan	-0.002921***	0.2169***	-0.001390***	0.0223395***	13448	-0.003404***	0.2207***	-0.0006122*	0.0205063***	13423
	(0.0005)	(0.0127)	(0.0003)	(0.0037)		(0.0005)	(0.0131)	(0.0003)	(0.0046)	
Korea, Rep. of	0.004381***	0.09530***	0.0001762	-0.004607	4210	0.004316***	0.09274***	0.0004233	-0.0150734	4210
	(0.0009)	(0.0205)	(0.0007)	(0.0081)		(0.0010)	(0.0208)	(0.0007)	(0.0130)	
Malaysia	-0.001007	0.1802***	0.001215	-0.0137298	3172	-0.001755	0.1904***	0.00114	0.0025149	3172
	(0.0014)	(0.0217)	(0.0008)	(0.0097)		(0.0014)	(0.0224)	(0.0009)	(0.0131)	
Philippines	0.005674*	0.1509**	-0.0002967	-0.0037754	487	0.006522*	0.1773***	0.0007429	0.0474772	487
	(0.0026)	(0.0462)	(0.0023)	(0.0269)		(0.0027)	(0.0472)	(0.0024)	(0.0432)	
Singapore	0.001985	0.3187***	-0.001823	0.0130733	2285	0.001785	0.3264***	-0.001651	0.0024863	2285
	(0.0016)	(0.0314)	(0.0014)	(0.0165)		(0.0016)	(0.0319)	(0.0014)	(0.0226)	
Thailand	-0.002903*	0.1329***	-0.0003985	0.0048742	1686	-0.001997	0.1382***	-0.0002268	-0.0047171	1686
	(0.0014)	(0.0219)	(0.0010)	(0.0118)		(0.0014)	(0.0225)	(0.0010)	(0.0170)	
Viet Nam	0.01691***	0.09799*	0.003492	-0.0605037	1112	0.01688***	0.1041*	0.002998	-0.106211***	1112
	(0.0036)	(0.0405)	(0.0023)	(0.0236)		(0.0037)	(0.0427)	(0.0024)	(0.0321)	

CF = the ratio of cash flow to total assets, OLS = ordinary least squares

Note: q1 ≡ Market price to book standard errors are reported below estimates in parentheses, * p<0.05, ** p<0.01, *** p<0.001

Table 2: Fama–Macbeth Estimates by Economy

	Fama-Macbeth Estimation (excluding top and bottom 1% outliers, small country firms, and industries related to finance, real estate, management & government)									
Country	q1	CF	Firm Size	Constant	Ave no. of obs. (No. of years)	q1	CF	Firm Size	Constant	Ave no. of obs. (No. of years)
	Without industry dummies					*With industry dummies*				
Australia	0.006731	0.3211*	0.003181	-0.0454576	1067	0.008999	0.3161*	0.003338	-0.0620332	1067
	(0.0046)	(0.1005)	(0.0044)	(0.0575)		(0.0053)	(0.0999)	(0.0036)	(0.0654)	
China, People's Rep. of	0.004071	0.2677	0.005726	-0.0693159	6630	0.004872	0.2356	0.003152	-0.225584	6630
	(0.0032)	(0.1854)	(0.0044)	(0.0564)		(0.0052)	(0.1365)	(0.0029)	(0.0622)	
Hong Kong,China	0.002808	0.1585*	-0.00243	0.0360237	2951	-0.00247	0.2572**	0.001725	-0.0128939	2951
	(0.0023)	(0.0520)	(0.0031)	(0.0468)		(0.0053)	(0.0693)	(0.0012)	(0.0246)	
Indonesia	0.001154	0.1574**	0.0005429	-0.00199	1088	0.001463	0.1660**	0.001176	-0.0105716	1088
	(0.0025)	(0.0327)	(0.0016)	(0.0179)		(0.0023)	(0.0361)	(0.0015)	(0.0189)	
Japan	0.001272	0.1790***	-0.001982	0.0269692	13448	0.000943	0.1882***	-0.001248	0.0186758	13423
	(0.0012)	(0.0284)	(0.0008)	(0.0145)		(0.0011)	(0.0261)	(0.0006)	(0.0140)	
Korea, Rep. of	0.003344	0.1017***	0.0003711	-0.0063699	4210	0.003364	0.09840***	0.0005865	-0.0185968	4210
	(0.0018)	(0.0155)	(0.0012)	(0.0160)		(0.0018)	(0.0153)	(0.0013)	(0.0194)	
Malaysia	-0.001753	0.1239	0.001974	-0.0205728	3172	-0.006746	0.1649**	0.005964	-0.059852	3172
	(0.0022)	(0.0629)	(0.0015)	(0.0167)		(0.0043)	(0.0355)	(0.0051)	(0.0579)	
Philippines	-0.001156	0.1617	0.0008731	-0.0110197	487	-0.00149	0.1915*	0.001909	-0.0179934	487
	(0.0052)	(0.0755)	(0.0018)	(0.0221)		(0.0052)	(0.0737)	(0.0018)	(0.0302)	
Singapore	-0.02095	0.2655***	-0.09129	1.040566	2285	-0.04604	0.2710***	-0.001306	0.0751535	2285
	(0.0216)	(0.0464)	(0.0897)	(1.0287)		(0.0461)	(0.0498)	(0.0024)	(0.0798)	
Thailand	0.0495	-7.0126	0.0553	-0.3825077	1686	0.003103	0.1196*	0.0001142	-0.0005547	1686
	(0.0477)	(7.1468)	(0.0555)	(0.3780)		(0.0068)	(0.0399)	(0.0012)	(0.0158)	
Viet Nam	0.01192	0.0133	0.006061	-0.0715611	1112	0.01261	0.003742	0.005661	-0.0659916	1112
	(0.0065)	(0.0953)	(0.0047)	(0.0406)		(0.0076)	(0.0957)	(0.0050)	(0.0563)	

Note: q1 ≡ Market price to Book, Fama-Macbeth standard errors are reported below estimates in parentheses, * p<0.05, ** p<0.01, *** p<0.001

Table 3: GMM Estimates by Economy

Without industry dummies, excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government					
	q1	CF	Firm Size	Constant	No. of Obs.
Australia	0.005834	0.05223	0.001593	-0.008168	506
	(0.0065)	(0.1074)	(0.0044)	(0.0504)	
China	0.0007004	0.1239***	0.004780***	-0.04473**	5837
	(0.0007)	(0.0274)	(0.0011)	(0.0151)	
Hong Kong	0.01075***	0.09956**	-0.0001322	0.00142	2139
	(0.0022)	(0.0383)	(0.0011)	(0.0149)	
Indonesia	0.00142	0.1560***	0.002531	-0.03506*	790
	(0.0025)	(0.0392)	(0.0015)	(0.0168)	
Japan	-0.007000***	0.2204***	-0.0003701	0.01238**	10751
	(0.0008)	(0.0156)	(0.0003)	(0.0040)	
Korea	0.003975**	0.08211**	0.000245	-0.003612	3132
	(0.0013)	(0.0273)	(0.0006)	(0.0079)	
Malaysia	0.003636	0.1709***	0.001449	-0.02009	2293
	(0.0030)	(0.0298)	(0.0010)	(0.0113)	
Philippines	0.003541	0.1597*	0.001958	-0.03836	219
	(0.0037)	(0.0691)	(0.0037)	(0.0421)	
Singapore	0.0002139	0.2828***	-0.000837	0.004674	1063
	(0.0033)	(0.0496)	(0.0016)	(0.0203)	
Thailand	-0.0009633	0.1003**	-0.000432	0.00405	1282
	(0.0024)	(0.0326)	(0.0011)	(0.0130)	
Viet Nam	0.01778*	-0.01343	0.002742	-0.04496	423
	(0.0075)	(0.0642)	(0.0031)	(0.0332)	
Note: q1 ≡ Market price to Book					
Robust standard errors are reported below estimates in parentheses					
* p<0.05, ** p<0.01, *** p<0.001					

Table 3: GMM Estimates by Economy (cont'd)

With industry dummies, excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government					
	q1	CF	Firm Size	Constant	No. of Obs.
Australia	0.002591	0.1335	0.0008672	-0.01304	506
	(0.0055)	(0.0943)	(0.0036)	(0.0409)	
China	0.0007998	0.1242***	0.004727***	-0.04488**	5837
	(0.0007)	(0.0272)	(0.0011)	(0.0149)	
Hong Kong	0.01101***	0.09472*	-0.0001486	0.001305	2139
	(0.0022)	(0.0379)	(0.0011)	(0.0146)	
Indonesia	0.001956	0.1617***	0.001227	-0.02134	790
	(0.0024)	(0.0382)	(0.0014)	(0.0151)	
Japan	-0.007211***	0.2150***	-0.0001852	0.009503*	10751
	(0.0008)	(0.0154)	(0.0003)	(0.0040)	
Korea	0.003778**	0.07744**	0.000335	-0.004584	3132
	(0.0012)	(0.0270)	(0.0006)	(0.0077)	
Malaysia	0.004382	0.1631***	0.00167	-0.02312*	2293
	(0.0028)	(0.0290)	(0.0010)	(0.0110)	
Philippines	0.005612	0.1163*	0.001099	-0.02692	219
	(0.0031)	(0.0588)	(0.0029)	(0.0332)	
Singapore	0.001944	0.2702***	-0.001099	0.006726	1063
	(0.0031)	(0.0488)	(0.0016)	(0.0198)	
Thailand	-0.003503	0.1072***	-0.00005619	0.001397	1282
	(0.0023)	(0.0316)	(0.0011)	(0.0122)	
Viet Nam	0.01797*	0.001126	0.001828	-0.03583	423
	(0.0072)	(0.0593)	(0.0029)	(0.0313)	
Note: q1 ≡ Market price to Book					
Robust standard errors are reported below estimates in parentheses					
* p<0.05, ** p<0.01, *** p<0.001					

Table 4: GMM Estimates: Full Sample

Baseline Regressions

	FULL SAMPLE : excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government				
	q1	CF	Firm Size	Constant	No. of Obs.
Full period (2002 - 2011)					
Without industry dummies	0.002770***	0.1111***	0.0009037***	-0.009476**	28435
	(0.0004)	(0.0122)	(0.0002)	(0.0031)	
With industry dummies	0.002796***	0.1092***	0.0009457***	-0.01021***	28435
	(0.0004)	(0.0119)	(0.0002)	(0.0030)	
Pre-GFC period (2002 - 2007)					
Without industry dummies	0.003318***	0.1494***	-0.0006043	0.0003078	11309
	(0.0007)	(0.0159)	(0.0004)	(0.0044)	
With industry dummies	0.003392***	0.1471***	-0.0004437	-0.002051	11309
	(0.0007)	(0.0156)	(0.0003)	(0.0043)	
GFC period (2008 - 2011)					
Without industry dummies	0.002042***	0.07024***	0.002071***	-0.01623***	17126
	(0.0005)	(0.0163)	(0.0003)	(0.0042)	
With industry dummies	0.002024***	0.06894***	0.002066***	-0.01630***	17126
	(0.0005)	(0.0158)	(0.0003)	(0.0041)	
Note: q1 ≡ Market price to Book					
Robust standard errors are reported below estimates in parentheses					
* p<0.05, ** p<0.01, *** p<0.001					

Table 4: GMM Estimates: Full Sample (cont..)

Augmented Regressions

	FULL SAMPLE : excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government							
	q1	CF	Firm Size	Capital Expenditures	Working Capital	Short-term Debt	Constant	No. of Obs.
Full period (2002 - 2011)								
Without industry dummies	0.003426**	0.09622***	-0.0009364***	-0.08290*	0.01992	0.5601***	0.01352***	20287
	(0.0010)	(0.0182)	(0.0003)	(0.0392)	(0.0602)	(0.0996)	(0.0037)	
With industry dummies	0.003062**	0.1016***	-0.0006604*	-0.1076**	0.1193*	0.5095***	0.009024*	20287
	(0.0010)	(0.0180)	(0.0003)	(0.0357)	(0.0500)	(0.0943)	(0.0036)	
Pre-GFC period (2002 - 2007)								
Without industry dummies	0.004911**	0.1082***	-0.001201**	0.04361	0.2963**	0.3445**	0.0006364	7588
	(0.0019)	(0.0313)	(0.0005)	(0.0722)	(0.0905)	(0.1208)	(0.0055)	
With industry dummies	0.005275**	0.1008***	-0.001182**	0.04061	0.3096***	0.3052**	-0.00002382	7588
	(0.0017)	(0.0297)	(0.0004)	(0.0623)	(0.0728)	(0.1127)	(0.0051)	
GFC period (2008 - 2011)								
Without industry dummies	0.003851**	0.02789	-0.000202	-0.1529***	-0.1344	0.4505***	0.01665**	12699
	(0.0013)	(0.0225)	(0.0004)	(0.0461)	(0.0778)	(0.1246)	(0.0052)	
With industry dummies	0.002724*	0.05257*	0.00005659	-0.1831***	-0.002699	0.4275***	0.01150*	12699
	(0.0013)	(0.0214)	(0.0004)	(0.0424)	(0.0651)	(0.1133)	(0.0050)	
Note: q1 ≡ Market price to Book								
Robust standard errors are reported below estimates in parentheses								
* p<0.05, ** p<0.01, *** p<0.001								

Table 5: GMM Estimates: Developed Economy Sample

Baseline Regressions

	POOLED DEVELOPED COUNTRIES : excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government				
	q1	CF	Firm Size	Constant	No. of Obs.
Full period (2002 - 2011)					
Without industry dummies	-0.0005918	0.1963***	-0.0007222*	0.01053*	14459
	(0.0012)	(0.0235)	(0.0003)	(0.0043)	
With industry dummies	-0.0007207	0.1844***	-0.0005972	0.009401*	14459
	(0.0011)	(0.0216)	(0.0003)	(0.0043)	
Pre-GFC period (2002 - 2007)					
Without industry dummies	-0.001994	0.2569***	-0.0002982	-0.00486	6499
	(0.0018)	(0.0261)	(0.0005)	(0.0058)	
With industry dummies	-0.001794	0.2428***	-0.000125	-0.00685	6499
	(0.0016)	(0.0248)	(0.0005)	(0.0057)	
GFC period (2008 - 2011)					
Without industry dummies	0.002911	0.07187*	-0.001155*	0.02742***	7960
	(0.0017)	(0.0318)	(0.0005)	(0.0061)	
With industry dummies	0.002015	0.06617*	-0.001089*	0.02742***	7960
	(0.0016)	(0.0292)	(0.0004)	(0.0060)	
Note: q1 ≡ Market price to Book					
Robust standard errors are reported below estimates in parentheses					
* p<0.05, ** p<0.01, *** p<0.001					

Table 5: GMM Estimates: Developed Economy Sample (cont..)

Augmented Regressions

	POOLED DEVELOPED COUNTRIES : excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government							
	q1	CF	Firm Size	Capital Expenditures	Working Capital	Short-term Debt	Constant	No. of Obs.
Full period (2002 - 2011)								
Without industry dummies	0.001523	0.1069	-0.0015	-0.02218	0.1748	0.2005	0.02194***	10268
	(0.0089)	(0.0812)	(0.0010)	(0.0534)	(0.1301)	(0.1445)	(0.0063)	
With industry dummies	0.007413*	0.04742	-0.001836***	-0.06856	0.2991***	0.2569*	0.02157***	10268
	(0.0037)	(0.0441)	(0.0005)	(0.0485)	(0.0868)	(0.1187)	(0.0049)	
Pre-GFC period (2002 - 2007)								
Without industry dummies	-0.0128	0.2842***	0.0002795	0.09941	0.2316	-0.07001	-0.002424	4241
	(0.0083)	(0.0788)	(0.0010)	(0.0891)	(0.1199)	(0.1802)	(0.0075)	
With industry dummies	0.001469	0.1475**	-0.001195	0.0848	0.2330**	0.1056	0.00334	4241
	(0.0040)	(0.0495)	(0.0006)	(0.0787)	(0.0880)	(0.1331)	(0.0059)	
GFC period (2008 - 2011)								
Without industry dummies	-0.03737*	0.4507**	0.00162	-0.2437*	-0.8606	0.06685	0.02123	6027
	(0.0161)	(0.1543)	(0.0014)	(0.1130)	(0.4584)	(0.3530)	(0.0115)	
With industry dummies	0.00155	0.06785	-0.0006621	-0.1870**	0.2899*	-0.3902*	0.02457***	6027
	(0.0050)	(0.0552)	(0.0006)	(0.0645)	(0.1447)	(0.1989)	(0.0074)	
Note: q1 ≡ Market price to Book								
Robust standard errors are reported below estimates in parentheses								
* p<0.05, ** p<0.01, *** p<0.001								

Table 6: GMM Estimates: Developing Economy Sample

Baseline Regressions

	POOLED DEVELOPING COUNTRIES : excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government				
	q1	CF	Firm Size	Constant	No. of Obs.
Full period (2002 - 2011)					
Without industry dummies	0.003107***	0.09630***	0.003165***	-0.03635***	13976
	(0.0004)	(0.0119)	(0.0004)	(0.0047)	
With industry dummies	0.003089***	0.09510***	0.003199***	-0.03689***	13976
	(0.0004)	(0.0118)	(0.0004)	(0.0047)	
Pre-GFC period (2002 - 2007)					
Without industry dummies	0.003572***	0.08204***	0.002300***	-0.02607***	4810
	(0.0007)	(0.0190)	(0.0006)	(0.0076)	
With industry dummies	0.003550***	0.07592***	0.002624***	-0.03011***	4810
	(0.0007)	(0.0189)	(0.0006)	(0.0074)	
GFC period (2008 - 2011)					
Without industry dummies	0.002888***	0.1058***	0.003597***	-0.04175***	9166
	(0.0005)	(0.0151)	(0.0005)	(0.0060)	
With industry dummies	0.002880***	0.1042***	0.003551***	-0.04118***	9166
	(0.0005)	(0.0149)	(0.0005)	(0.0060)	
Note: q1 ≡ Market price to Book					
Robust standard errors are reported below estimates in parentheses					
* p<0.05, ** p<0.01, *** p<0.001					

Table 6: GMM Estimates: Developing Economy Sample (cont…)

Augmented Regressions

	POOLED DEVELOPING COUNTRIES : excluding outliers, countries with small no. of firms, and industries related to finance, real estate, management & government							
	q1	CF	Firm Size	Capital Expenditures	Working Capital	Short-term Debt	Constant	No. of Obs.
Full period (2002 - 2011)								
Without industry dummies	0.003139*	0.1280***	-0.0008322	-0.03306	0.3080***	0.5162***	-0.0001075	10019
	(0.0014)	(0.0255)	(0.0006)	(0.0612)	(0.0727)	(0.1568)	(0.0072)	
With industry dummies	0.003120*	0.1264***	-0.0006897	-0.03292	0.3095***	0.4934***	-0.001672	10019
	(0.0013)	(0.0240)	(0.0006)	(0.0550)	(0.0618)	(0.1392)	(0.0068)	
Pre-GFC period (2002 - 2007)								
Without industry dummies	0.001252	0.1788***	0.0008062	-0.1699*	0.1195	0.6403***	-0.01141	3347
	(0.0023)	(0.0399)	(0.0009)	(0.0844)	(0.1097)	(0.1777)	(0.0100)	
With industry dummies	0.001622	0.1758***	0.001048	-0.1656*	0.1238	0.5386***	-0.01487	3347
	(0.0020)	(0.0352)	(0.0008)	(0.0705)	(0.0864)	(0.1439)	(0.0090)	
GFC period (2008 - 2011)								
Without industry dummies	0.002366	0.1396***	-0.001830*	0.0006248	0.3067***	0.6175***	0.0109	6672
	(0.0017)	(0.0295)	(0.0008)	(0.0774)	(0.0861)	(0.1805)	(0.0096)	
With industry dummies	0.002396	0.1331***	-0.001725*	0.03337	0.2768***	0.5740***	0.01014	6672
	(0.0015)	(0.0266)	(0.0007)	(0.0664)	(0.0751)	(0.1505)	(0.0089)	
Note: q1 ≡ Market price to Book								
Robust standard errors are reported below estimates in parentheses								
* p<0.05, ** p<0.01, *** p<0.001								

Table 7: GMM Estimates: Full Economy, Breakdown by Firm Size

Baseline Regressions

		GMM Estimation on Base Model (FULL SAMPLE with industry dummies)				
	Grouing based on Firm Size	q1	CF	Size	Constant	No. of obs.
FULL SAMPLE	*All firms grouped by quintiles based on median size of each firm*					
	Bottom quintile	0.0002721	0.1845***	0.009070***	-0.09566***	3505
		(0.0010)	(0.0299)	(0.0015)	(0.0170)	
	2nd quintile	0.002113*	0.1576***	0.006712***	-0.07959***	4173
		(0.0009)	(0.0244)	(0.0012)	(0.0142)	
	3rd quintile	0.002458**	0.1430***	0.005672***	-0.07182***	4381
		(0.0009)	(0.0241)	(0.0010)	(0.0127)	
	4th quintile	0.001915*	0.1055***	0.002270*	-0.02737*	4611
		(0.0008)	(0.0225)	(0.0009)	(0.0125)	
	Upper quintile	0.003005**	0.08452***	-0.0007737	0.01342	4367
		(0.0010)	(0.0196)	(0.0007)	(0.0102)	
	All firms grouped by quintiles based on mean size of each firm					
	Bottom quintile	-0.00008039	0.1743***	0.008159***	-0.08502***	3489
		(0.0010)	(0.0303)	(0.0015)	(0.0171)	
	2nd quintile	0.002493**	0.1613***	0.006677***	-0.07958***	4183
		(0.0009)	(0.0238)	(0.0012)	(0.0142)	
	3rd quintile	0.001987*	0.1384***	0.005349***	-0.06679***	4364
		(0.0009)	(0.0253)	(0.0010)	(0.0131)	
	4th quintile	0.002361**	0.09121***	0.002077*	-0.02453	4609
		(0.0009)	(0.0209)	(0.0009)	(0.0125)	
	Upper quintile	0.002925**	0.09593***	-0.0008623	0.01414	4392
		(0.0009)	(0.0196)	(0.0006)	(0.0093)	

Note: q1 ≡ Market Price to Book Ratio

Robust standard errors are reported below estimates in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 7: GMM Estimates: Full Economy, Breakdown by Firm Size (cont..)

Augmented Regressions

		GMM Estimation on Augmented (1) Model (FULL SAMPLE with industry dummies)							
	Grouing based on Firm Size	q1	CF	Size	Capital Expenditure	Working Capital	Short-term Debt	Constant	No. of obs.
FULL SAMPLE	*All firms grouped by quintiles based on median size of each firm*								
	Bottom quintile	0.0007668	0.07152	0.01137***	-0.05363	0.5590***	-0.2606	-0.1206***	2347
		(0.0018)	(0.0575)	(0.0027)	(0.1562)	(0.1274)	(0.2979)	(0.0295)	
	2nd quintile	-0.0003107	0.1337**	0.005933**	-0.1117	0.6390***	0.2244	-0.07491**	3001
		(0.0020)	(0.0511)	(0.0022)	(0.1090)	(0.1219)	(0.2770)	(0.0261)	
	3rd quintile	0.003476	0.1113**	0.006660***	0.08205	0.4558***	-0.137	-0.09182***	3208
		(0.0018)	(0.0380)	(0.0014)	(0.0821)	(0.0826)	(0.1831)	(0.0180)	
	4th quintile	0.0009535	0.08361*	0.004559***	0.03851	0.4554***	0.102	-0.06429***	3465
		(0.0019)	(0.0388)	(0.0012)	(0.0743)	(0.0853)	(0.1300)	(0.0159)	
	Upper quintile	0.0004138	0.08466*	0.0000666	-0.05565	0.3894***	0.3409**	-0.001305	3369
		(0.0029)	(0.0330)	(0.0008)	(0.0515)	(0.0511)	(0.1081)	(0.0115)	
	All firms grouped by quintiles based on mean size of each firm								
	Bottom quintile	-0.002124	0.06524	0.01129***	0.000602	0.5151***	-0.4514*	-0.1158***	2333
		(0.0016)	(0.0554)	(0.0026)	(0.1641)	(0.1287)	(0.2241)	(0.0287)	
	2nd quintile	0.004076*	0.08296	0.005272**	0.001542	0.5866***	-0.1266	-0.06952**	3034
		(0.0021)	(0.0452)	(0.0019)	(0.0939)	(0.1047)	(0.2411)	(0.0232)	
	3rd quintile	0.003368	0.05772	0.006937***	0.2060*	0.5932***	-0.3938	-0.09554***	3201
		(0.0018)	(0.0449)	(0.0016)	(0.1003)	(0.1163)	(0.2363)	(0.0208)	
	4th quintile	0.003274	0.08188*	0.003910***	-0.02245	0.3733***	0.1133	-0.05555***	3416
		(0.0020)	(0.0381)	(0.0011)	(0.0745)	(0.0829)	(0.1459)	(0.0157)	
	Upper quintile	-0.0002324	0.1021**	-0.0001569	-0.05641	0.3467***	0.3860***	0.002234	3406
		(0.0031)	(0.0367)	(0.0008)	(0.0528)	(0.0723)	(0.1170)	(0.0112)	

Note: q1 ≡ Market Price to Book Ratio

Robust standard errors are reported below estimates in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Instruments: Two lags of tangible fixed assets, lagged working capital, lagged short-term debt , twice-lagged sales growth, and country dummies.

Table 8: GMM Estimates: Developed Economy Sample, Breakdown by Firm Size

(Australia, Hong Kong, Japan, New Zealand, and Singapore)

Baseline Regressions

		GMM Estimation on Base Model (POOLED DEVELOPED COUNTRIES with industry dummies)				
	Grouing based on Firm Size	q1	CF	Size	Constant	No. of obs.
POOLED DEVELOPED COUNTRIES	*All firms grouped by quintiles based on median size of each firm*					
	Bottom quintile	-0.007304	0.2541***	0.002576	-0.01951	1801
		(0.0044)	(0.0424)	(0.0031)	(0.0359)	
	2nd quintile	-0.002171	0.1928***	0.007598**	-0.08909**	2175
		(0.0024)	(0.0386)	(0.0027)	(0.0329)	
	3rd quintile	-0.002923	0.2433***	0.004896*	-0.06344*	2280
		(0.0020)	(0.0319)	(0.0020)	(0.0261)	
	4th quintile	-0.004134*	0.1713***	0.001675	-0.01732	2401
		(0.0019)	(0.0331)	(0.0019)	(0.0261)	
	Upper quintile	-0.005367**	0.1704***	0.001482	-0.01545	2322
		(0.0019)	(0.0333)	(0.0009)	(0.0128)	
	All firms grouped by quintiles based on mean size of each firm					
	Bottom quintile	-0.004538	0.2405***	0.003686	-0.03426	1789
		(0.0044)	(0.0426)	(0.0031)	(0.0358)	
	2nd quintile	-0.001983	0.1752***	0.006542*	-0.07557*	2186
		(0.0022)	(0.0379)	(0.0027)	(0.0327)	
	3rd quintile	-0.005083*	0.2679***	0.005023**	-0.06385**	2269
		(0.0021)	(0.0325)	(0.0019)	(0.0246)	
	4th quintile	-0.002738	0.1578***	0.001953	-0.02221	2409
		(0.0019)	(0.0325)	(0.0019)	(0.0263)	
	Upper quintile	-0.005739**	0.1842***	0.001625	-0.01803	2326
		(0.0018)	(0.0307)	(0.0008)	(0.0122)	
	Note: q1 ≡ Market Price to Book Ratio					
	Robust standard errors are reported below estimates in parentheses					
	* p<0.05, ** p<0.01, *** p<0.001					

Table 8 (continued)

Augmented Regressions

POOLED DEVELOPED COUNTRIES

Grouing based on Firm Size	GMM Estimation on Augmented (1) Model (POOLED DEVELOPED COUNTRIES with industry dummies)							
	q1	CF	Size	Capital Expenditure	Working Capital	Short-term Debt	Constant	No. of obs.
All firms grouped by quintiles based on median size of each firm								
Bottom quintile	-0.0002843	0.1524	-0.003823	-0.1749	0.5084**	0.5332*	0.04617	1229
	(0.0094)	(0.0831)	(0.0042)	(0.1440)	(0.1825)	(0.2570)	(0.0511)	
2nd quintile	0.01335**	0.1851***	0.004878	-0.05947	0.1909	0.6089*	-0.07458	1519
	(0.0051)	(0.0515)	(0.0041)	(0.1166)	(0.1073)	(0.2571)	(0.0500)	
3rd quintile	0.007347	0.1402**	0.006205*	-0.06466	0.5299***	0.21	-0.09089*	1634
	(0.0050)	(0.0515)	(0.0028)	(0.0755)	(0.1041)	(0.1110)	(0.0355)	
4th quintile	0.008216	0.01138	0.004018	0.01764	0.5306***	0.3727***	-0.06216	1779
	(0.0056)	(0.0647)	(0.0026)	(0.0696)	(0.1327)	(0.0959)	(0.0365)	
Upper quintile	0.01322*	-0.0655	-0.002365	-0.08174	0.5722***	0.5198***	0.02533	1852
	(0.0054)	(0.0562)	(0.0014)	(0.0592)	(0.1681)	(0.1193)	(0.0185)	
All firms grouped by quintiles based on mean size of each firm								
Bottom quintile	-0.003622	0.1451	-0.003811	-0.1589	0.6435**	0.4519	0.04906	1211
	(0.0100)	(0.0815)	(0.0044)	(0.1644)	(0.2090)	(0.2993)	(0.0526)	
2nd quintile	0.01105*	0.1735***	0.006536	-0.1435	0.2590*	0.4988*	-0.09099*	1540
	(0.0055)	(0.0496)	(0.0038)	(0.1117)	(0.1196)	(0.2517)	(0.0462)	
3rd quintile	0.002748	0.1572**	0.004974	-0.09206	0.5216***	0.2740**	-0.07088	1641
	(0.0043)	(0.0481)	(0.0031)	(0.0788)	(0.1040)	(0.1006)	(0.0394)	
4th quintile	0.009513	0.03631	0.003056	-0.04915	0.4272***	0.3692***	-0.04918	1766
	(0.0063)	(0.0588)	(0.0022)	(0.0576)	(0.1171)	(0.0974)	(0.0295)	
Upper quintile	0.01151*	-0.0397	-0.002026	-0.05061	0.4633**	0.4987***	0.02131	1855
	(0.0051)	(0.0554)	(0.0013)	(0.0564)	(0.1479)	(0.1149)	(0.0173)	

Note: q1 ≡ Market Price to Book Ratio

Robust standard errors are reported below estimates in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Instruments: Two lags of tangible fixed assets, lagged working capital, lagged short-term debt , twice-lagged sales growth, and country dummies.

Table 9: GMM Estimates: Developing Economy Sample, Breakdown by Firm Size
(People's Republic of China, Indonesia, Republic of Korea, Malaysia, Philippines, Thailand, and Viet Nam)
Baseline Regressions

		GMM Estimation on Base Model (POOLED DEVELOPING COUNTRIES with industry dummies)				
	Grouing based on Firm Size	q1	CF	Size	Constant	No. of obs.
POOLED DEVELOPING COUNTRIES	*All firms grouped by quintiles based on median size of each firm*					
	Bottom quintile	0.00004152	0.1599***	0.01191***	-0.1209***	1704
		(0.0011)	(0.0405)	(0.0024)	(0.0250)	
	2nd quintile	-0.0006656	0.1326***	0.01502***	-0.1628***	1998
		(0.0012)	(0.0312)	(0.0024)	(0.0255)	
	3rd quintile	-0.001056	0.1273***	0.01776***	-0.2037***	2101
		(0.0012)	(0.0324)	(0.0023)	(0.0267)	
	4th quintile	0.0005884	0.08414**	0.01290***	-0.1542***	2210
		(0.0011)	(0.0291)	(0.0022)	(0.0274)	
	Upper quintile	0.003701***	0.05135*	0.006222***	-0.07790***	2045
		(0.0011)	(0.0251)	(0.0017)	(0.0230)	
	All firms grouped by quintiles based on mean size of each firm					
	Bottom quintile	0.000005213	0.1273**	0.008906***	-0.08897***	1700
		(0.0011)	(0.0408)	(0.0025)	(0.0261)	
	2nd quintile	-0.0003153	0.1544***	0.01556***	-0.1702***	1997
		(0.0012)	(0.0307)	(0.0023)	(0.0249)	
	3rd quintile	0.0002169	0.09367**	0.01475***	-0.1680***	2095
		(0.0012)	(0.0330)	(0.0023)	(0.0263)	
	4th quintile	0.0003572	0.06870*	0.01283***	-0.1514***	2200
		(0.0012)	(0.0269)	(0.0023)	(0.0284)	
	Upper quintile	0.003899***	0.06009*	0.006068***	-0.07585***	2066
		(0.0011)	(0.0250)	(0.0016)	(0.0220)	

Note: q1 ≡ Market Price to Book Ratio
Robust standard errors are reported below estimates in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 9 (continued)

Augmented Regressions

		GMM Estimation on Augmented (1) Model (POOLED DEVELOPING COUNTRIES with industry dummies)							
	Grouing based on Firm Size	q1	CF	Size	Capital Expenditure	Working Capital	Short-term Debt	Constant	No. of obs.
POOLED DEVELOPING COUNTRIES	*All firms grouped by quintiles based on median size of each firm*								
	Bottom quintile	0.001414	0.08318	0.01069*	-0.106	0.4940**	-0.04551	-0.1154*	1118
		(0.0023)	(0.0662)	(0.0053)	(0.1377)	(0.1606)	(0.2941)	(0.0526)	
	2nd quintile	-0.0002005	0.1194	0.005291	-0.1559	0.6543***	0.2384	-0.06591	1482
		(0.0031)	(0.0619)	(0.0059)	(0.1251)	(0.1738)	(0.2773)	(0.0616)	
	3rd quintile	0.005696	0.06487	0.003424	0.2547*	0.3256**	-0.1072	-0.05621	1574
		(0.0036)	(0.0520)	(0.0061)	(0.1017)	(0.1224)	(0.2765)	(0.0674)	
	4th quintile	0.004151	-0.04439	0.005359	0.3196*	0.3338**	-0.3507	-0.07135	1686
		(0.0030)	(0.0632)	(0.0050)	(0.1254)	(0.1113)	(0.2254)	(0.0571)	
	Upper quintile	0.004541	0.03022	0.00121	0.06622	0.3819***	0.004591	-0.02207	1517
		(0.0036)	(0.0588)	(0.0023)	(0.1002)	(0.0635)	(0.2406)	(0.0315)	
	All firms grouped by quintiles based on mean size of each firm								
	Bottom quintile	-0.002123	0.06491	0.01498**	-0.09513	0.4721**	-0.4241*	-0.1538**	1122
		(0.0025)	(0.0680)	(0.0057)	(0.1160)	(0.1555)	(0.2079)	(0.0561)	
	2nd quintile	0.006543*	0.02687	-0.0009268	0.07778	0.6806***	-0.1	-0.004955	1494
		(0.0033)	(0.0615)	(0.0055)	(0.1260)	(0.1832)	(0.2814)	(0.0573)	
	3rd quintile	0.008755*	0.01616	-0.002367	0.4352***	0.3313*	-0.1425	0.00594	1560
		(0.0035)	(0.0605)	(0.0058)	(0.1311)	(0.1478)	(0.2534)	(0.0626)	
	4th quintile	0.003521	-0.07097	0.008245	0.2745*	0.3248**	-0.499	-0.1	1650
		(0.0033)	(0.0668)	(0.0052)	(0.1388)	(0.1159)	(0.2576)	(0.0603)	
	Upper quintile	0.005318	0.02096	0.0004496	0.08847	0.3747***	-0.02353	-0.01232	1551
		(0.0038)	(0.0636)	(0.0024)	(0.1019)	(0.0683)	(0.2420)	(0.0327)	

Note: q1 ≡ Market Price to Book Ratio

Robust standard errors are reported below estimates in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Instruments: Two lags of tangible fixed assets, lagged working capital, lagged short-term debt , twice-lagged sales growth, and country dummies.

Figure 1: Change in the Cash Holdings to Total Assets Ratio