## CORPORATE DASH FOR CASH AMID THE COVID-19 OUTBREAK AND WHAT IT MEANS FOR INVESTORS

### *Key points*

- *In this study, we explore the changes in cash positions among publicly listed corporates amid the COVID-19 outbreak, and the importance of liquidity buffers during times of crisis, from an Asian angle. Our findings suggest that Asian firms struggled to ramp up cash buffers at the onset of the pandemic; evidence also points to smaller corporates in emerging Asia facing greater barriers to securing financing than their larger peers headquartered in the more developed parts of the region.*

- *We explore whether investors had greater confidence in firms with higher ex-ante cash holdings during crisis times by conducting an event-study analysis. It reveals that Asian firms with higher levels of ex-ante liquidity experienced higher excess returns during the pandemic after controlling for firm-specific characteristics, especially for smaller and riskier corporates. This suggests that a firm's cash position plays a signalling role in times of uncertainty, helping financial markets differentiate relatively strong firms from more vulnerable ones. We also find that the relationship did not fade away in the subsequent stock market rebound period, suggesting that investors continued to attach importance to a firm's cash holdings even after the financial market turmoil subsided.*

- *Given the relatively underdeveloped corporate debt market in emerging Asia, banks remain a key avenue for corporates, especially small- and medium enterprises (SMEs), to obtain financing. As such, during times of crisis, direct government interventions, including loan guarantees or other forms of direct fiscal support, will be useful in bolstering firms' cash positions to inspire confidence.*

*Prepared by: Max Kwong and Leanne (Si Ying) Zhang\**
      *Economic Research Division, Research Department*
      *Hong Kong Monetary Authority*

## I.    INTRODUCTION

The outbreak of COVID-19 around the world dealt a significant adverse liquidity shock to corporates, as social distancing measures and lockdown restrictions taken by governments to contain it severely disrupted business activity and firms' cash flows. Corporate liquidity pressures were further exacerbated by a sharp tightening in global financial conditions in the early stages of the pandemic amid heightened uncertainty. These observations have prompted a growing body of research into firms' ability to access credit and accumulate cash ("dash for cash"), as well as the importance of liquidity buffers, in the midst of difficult market conditions such as those during the early phase of COVID-19 outbreak, leveraging the fact that the pandemic was an exogenous shock to most firms.

### 1.1    Review of selected literature

Research in this area has tended to focus on the US case. For example, Chodorow-Reich et al. (2020) and Acharya and Steffen (2020) studied US firms' access to financing and cash accumulation after the COVID-19 shock, documenting a significant "dash for cash" financed largely by credit line drawdowns in the early phase of the crisis, and finding that firm size and credit risk played important roles in determining liquidity access and cash holdings. Focusing on the equity market impact of a firm's liquidity buffers, Fahlenbrach, Rageth and Stulz (2020) found that US corporates with less debt and more cash exhibited smaller stock price declines in response to the COVID shock. Only a selected number of studies extend the geographical scope beyond the US. For example, the IMF's Global Financial Stability Report published in October 2020 examined corporate borrowing and cash holdings in the G7 economies, finding that firms with ex-ante weaker solvency or liquidity positions suffered relatively more financial stress.

### 1.2    Plan of this paper

In this study, we shed light on the corporate dash for cash and the importance of liquidity buffers amid the virus outbreak *from an Asian angle*, as the region was arguably among the hardest-hit in the early stages of the pandemic. This paper proceeds as follows. In Section II, we first examine whether and how Asian corporates accumulated cash buffers. We find little evidence of a sizable "dash for cash" among Asian corporates at the onset of the pandemic, suggesting Asian firms faced significant difficulty in obtaining short-term financing. We then explore the importance of cash buffers during the outbreak from the perspective of stock market

investors in Section III. In Section IV, we report our empirical findings and discuss a number of conjectures that might explain our findings. Finally, Section V provides policy implications and concludes.

## II.    DATA AND BROAD TRENDS IN CORPORATE CASH HOLDINGS

### 2.1    Data

Our sample consists of all publicly-listed firms headquartered in 11 major Asia economies[1] from S&P's Capital IQ (CIQ) database that have reported the size of their total assets in 2019[2]. Following Acharya and Steffen (2020) and other literature, we drop corporates in the Financials and Utilities industries, leaving us with a total of 16,466 firms.[3] We obtain quarterly firm financial statement data from CIQ, while the remaining financial market data are taken from Bloomberg. For details on sources and definitions for each variable, please refer to Table A1 in Appendix. We winsorise quarterly balance sheet data at the 1st and 99th percentiles to adjust for outliers.

### 2.2    Broad trends in corporate cash holdings - Asia vs. the US

To assess whether Asian corporates were able to accumulate cash buffers in the midst of the COVID-19 outbreak, we study their quarterly changes in cash and equivalents, which capture not only cash but also short-term, highly liquid investments that are readily convertible into cash. Chart 1 below presents the sample averages of Asian firms' change in cash holdings[4] (normalised by lagged assets) in the first and second quarters of 2019 and 2020. We compare firms in our Asian sample with a sample of publicly-listed, nonfinancial and non-utilities US firms, given that the "dash for cash" among US corporates has been well-documented in the literature, as previously noted. The grey bars show that, on average, US firms were able to accumulate cash in the first quarter of 2020, but Asian firms saw a deterioration in cash holdings (more negative change compared to the same quarter of 2019). As the pandemic hit Asia earlier than the US, this likely reflects the regional
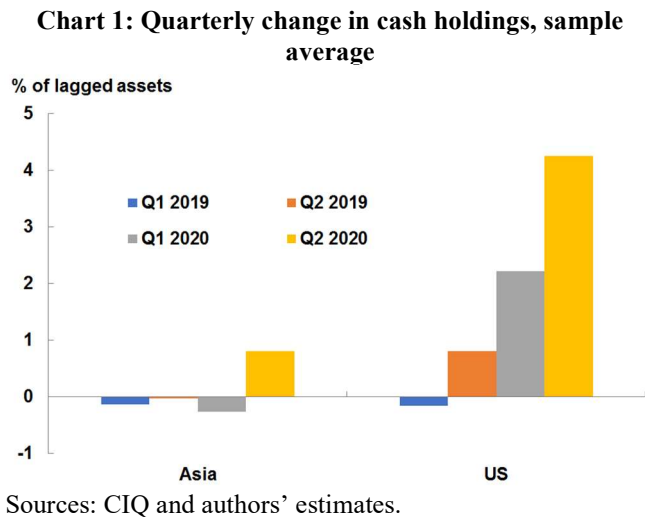
---

[1] Mainland China, Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, Thailand, and Vietnam.

[2] A total of 364 firms reports "NA" in their 2019 total assets. Most of these firms were listed during 2020.

[3] In the literature, it is a common practice to consider the cash-holding behaviour of firms in these two sectors separately, partly because they have different motivations for holding cash (e.g. for satisfying regulatory requirements).

[4] We will henceforth refer to "cash" and "cash and equivalents" synonymously. Note that the charts in this section show only firms with data available for all four quarters displayed, leaving out firms with missing data in one or more of the quarters.

differences in the timing of outbreaks and lockdown policy enforcement, with Asian firms in Q1 already facing the dire financial consequences of the COVID-19 shock. While cash holdings rebounded in Q2, as shown by the yellow bars, the scale of increase among Asian corporates was still much smaller compared to their US counterparts, despite the fact that the US, by this point, was also in the midst of its own outbreak.
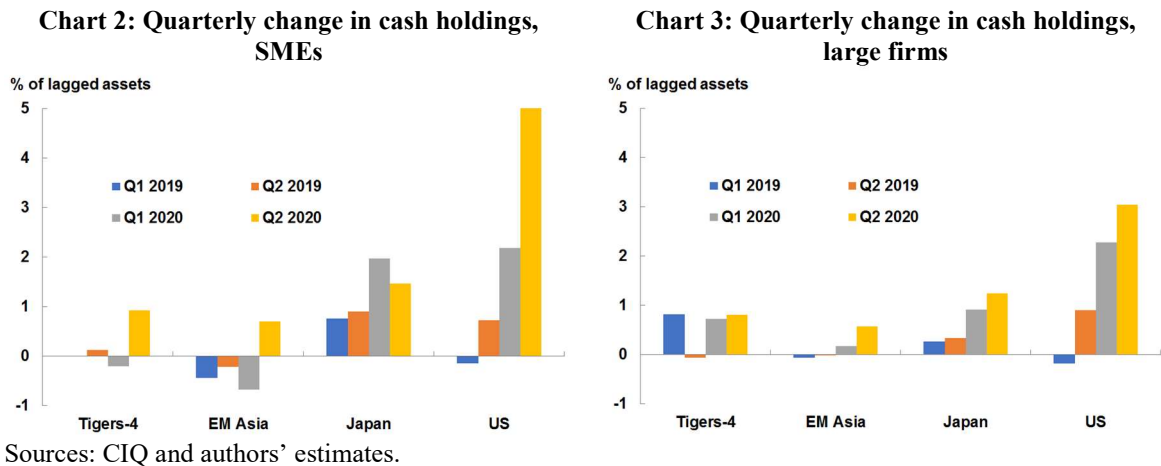
**Chart 1: Quarterly change in cash holdings, sample average**



Sources: CIQ and authors' estimates.

### 2.3    *Cash-holding pattern differed between smaller and larger firms*

To shed light on the possible driving factors behind these diverging trends in Asia and the US, we further break down our sample by firm size given its important role in determining credit access during the pandemic as documented in the literature, and by economy grouping to distinguish between advanced and emerging market (EM) economies. Specifically, we group Hong Kong SAR, Singapore, Taiwan and South Korea (traditionally referred to as the "four Asian tigers") into a "Tigers-4" category; Mainland China, Malaysia, Indonesia, Thailand, Vietnam, and the Philippines into an "EM Asia" category; and Japan in its own category. Following Goel and Serena (2020), we classify firms with 2019 annual revenues above USD 1 billion as large firms, while the rest are treated as small- and medium enterprises (SMEs).

Charts 2 and 3 below show the change in cash holdings for SMEs and large firms, respectively. While Japanese corporates of all sizes were able to accumulate cash in the first quarter of 2020, only large firms in EM Asia and the Tigers-4 economies increased their cash holdings, on average, and even so, the increase in Q1 cash holdings among large EM Asian firms was modest compared to other firms in the region. This suggests that, on average, *only large Asian corporates in more developed economies were able to build up their cash reserves in the first*

*quarter*[5]. Meanwhile, Q2 cash holdings generally rebounded across the board. Comparing across regions the charts show that, despite the intra-regional discrepancies, the scale of "dash for cash" among Asian corporates was still much smaller compared to that of US firms.

**Chart 2: Quarterly change in cash holdings, SMEs**

% of lagged assets



**Chart 3: Quarterly change in cash holdings, large firms**

% of lagged assets



Sources: CIQ and authors' estimates.

## 2.4    Financing difficulties in Asia – evidence from total and bank debt

The fact that 1) firms in emerging Asia saw a modest increase, if not outright deterioration, in cash reserves on average, and 2) Q1 cash holdings fell for SMEs in Asia (ex. Japan) while they increased for large firms, suggest that Asian corporates in less developed economies, and those of smaller size, may have faced greater difficulty in obtaining financing[6]. To determine whether this was indeed the case, we look at firms' change in total debt in early 2020, presented in Charts 4 and 5 below. Large firms in Asia saw an increase in debt in Q1, of a smaller scale compared to the same quarter in 2019 and compared to US firms. For SMEs, total debt remained relatively stagnant in Q1 for firms in EM Asia and the Tigers-4 economies, and registered a modest increase for Japanese corporates. This suggests that smaller firms in Asia likely faced greater barriers to accessing financing than their larger counterparts in the early stages of the pandemic. In Q2, however, debt

---

[5] We make the underlying assumption that a lack of cash accumulation during the COVID-19 pandemic is driven by supply factors rather than demand factors, hence the use of terms such as "unable to" or "able to" accumulate cash; i.e. we assume that all firms desired to accumulate cash due to the heightened uncertainty that the virus outbreak presented.

[6] The change in cash holdings, by construction, is the sum of net flows from operations, investment, and financing activities, and thus can be driven by factors affecting any of these categories. Since we are looking at the average change for a large sample of firms from numerous economies, we are unable to do a decomposition analysis attributing the overall change to each type of flow. Furthermore, quarterly cash flows in dollar terms at the individual firm level may not necessary sum up to the change in cash holdings due to currency fluctuations and the fact that some firms only report these variables at an annual or bi-annual frequency. For these reasons, we choose to only focus on the change in overall cash holdings and debt (which allows us to make some conjectures about credit access). Charts showing the average net flows from operations, investment, and financing can be found in the Appendix.

levels generally rebounded across firm sizes, in line with easing global financial conditions.

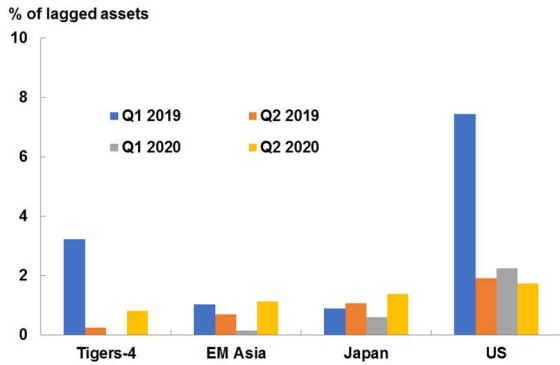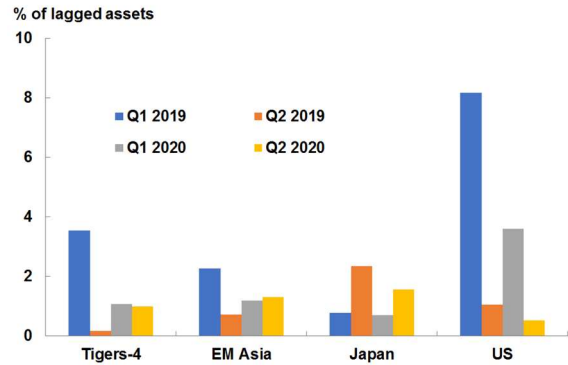**Chart 4: Quarterly change in total debt, SMEs**



**Chart 5: Quarterly change in total debt, large firms**



Sources: CIQ and authors' estimates.

Charts 6 and 7 show the average changes in bank debt for a subset of firms in our sample that have reported data in this category (around half of the original sample), to shed light on *what types* of debt Asian corporates were able to access in the first half of 2020. The discrepancy between EM firms and those in more developed economies becomes more apparent here, as bank debt contracted in Q1 for firms in EM Asia across the board (albeit at a slightly smaller scale for larger firms than SMEs), while registering a modest rise in other Asian economies, before rebounding in Q2. This observation is consistent with the BIS's aggregate data on bank credit to the non-financial sector, which showed large first-quarter declines in emerging Asian economies such as Indonesia, Thailand, and Malaysia, and subsequent rebounds in the second quarter (see Chart A7 in the Appendix).

As Charts 4 and 5 showed that Q1 total debt increased for large firms in EM Asia, this suggests that the contraction in bank debt was made up to some extent by access to non-bank financing; smaller firms in EM Asia, however, likely faced financing difficulties from both bank and non-bank sources, as bank debt contracted and total debt remained stagnant. Even among Asian corporates that saw an increase in bank debt in the first quarter, the scale was much smaller compared to their US counterparts, likely reflecting the damaging effects of the early virus outbreaks in the region on firms' credit quality[7]. For US firms, bank debt rose significantly in Q1, notably for larger firms (consistent with findings from the

---

[7] For example, S&P Global Market Intelligence found that the Asia-Pacific region exhibited the largest drop in average credit score between Q4 2019 and Q1 2020 compared to Europe and North America, suggesting that the COVID-19's impact on businesses was reflected in the APAC region earlier than others. See: https://www.spglobal.com/marketintelligence/en/news-insights/research/level-covid-19-s-early-impact-on-public-companies-fundamental-credit-risk-asia-pacific.

literature), driven in part by massive credit line drawdowns in March that were sizable even when compared to other G7 economies (see, for example, IMF (2020)).

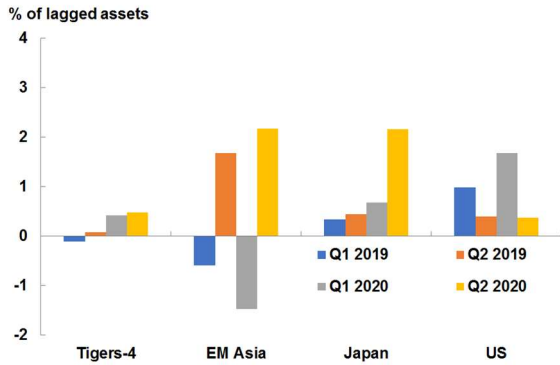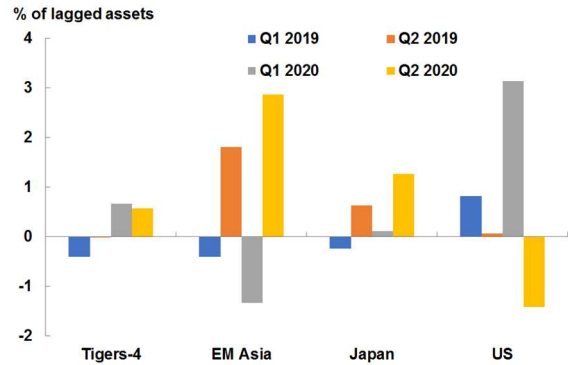**Chart 6: Quarterly change in bank debt, SMEs**



**Chart 7: Quarterly change in bank debt, large firms**



Sources: CIQ and authors' estimates.

*2.5    In sum, smaller corporates in emerging Asia faced greater barriers to financing*

Taken together, Charts 4 through 7 provide evidence that, while conditions generally improved in Q2, smaller and emerging-market corporates in Asia faced greater barriers to securing financing than their larger and more advanced regional peers at the onset of the pandemic in early 2020. The relatively greater financing difficulties faced by corporates in EMEs comes as no surprise, as funding challenges stemming from a tightening of domestic financial conditions are compounded by the simultaneous exodus of capital by international investors.[8] The apparent link between firm size and credit access is also consistent with findings from Goel and Serena (2020), who showed that large firms had easier access to the bond market during the pandemic, while small firms still relied heavily on the strained syndicated loan market; with banks' lending capacity shrinking after making massive loan loss provisions, smaller firms may have struggled to build up cash buffers to cushion an economic downturn.

And while focusing on the US case, Chodorow-Reich et al. (2020) and Greenwald et al. (2020) found that smaller firms incurred significantly greater difficulty in obtaining credit during the pandemic as bank liquidity flowed mostly

---

[8] Indeed, there is a large literature documenting the phenomenon of "sudden stops" and capital outflows from emerging market economies during crises (see, for example, Frank and Hess (2009), Pagliari et al. (2017), and Corsetti and Marin (2020)), and the COVID-19 outbreak proved to be no exception; for example, the International Institute of Finance (IIF) reported the largest monthly outflow of non-resident portfolio equity and debt from emerging markets in March of 2020, exceeding even the worst points of the global financial crisis (see Chart A8 in the Appendix). Data from EPFR also suggests a similar story as we observed unprecedented portfolio outflow during the outbreak (see Chart A9 in the Appendix).

toward larger borrowers. As SMEs form a greater share of firms in Asian economies than in the US (e.g. they represent 83% of the Asian firms in our sample, while the share for US firms is 57%), such findings may also partly explain why Asian corporates, on average, saw a limited increase (or even contraction) in bank debt at the height of the pandemic while their US counterparts significantly increased bank financing. As data on credit line usage for our sample of Asian firms is highly sparse, we leave it to future research to confirm this conjecture.

## III. IMPORTANCE OF LIQUIDITY BUFFERS – METHODOLOGY OF EVENT STUDY

Our findings from the previous section showed that Asian firms faced significant difficulties in obtaining short-term funding in the early stages of the pandemic, with smaller corporates bearing the brunt of the financing stress. In this section, we adopt an event study framework to explore whether investors had greater confidence in firms with higher ex-ante cash holdings during crisis times.

### 3.1 Baseline model

We infer changes in investors' perception from stock price fluctuations in the period following the outbreak of COVID-19 in the region. While corporate credit spread and credit default swap (CDS) spreads are natural candidates for measuring market perception of credit risk, these indicators are unavailable for many Asia firms as domestic corporate debt and CDS markets remain relatively underdeveloped in the region. We therefore investigate instead whether the stocks of Asian firms with greater liquidity buffers outperformed following the outbreak of COVID-19, and whether markets distinguished firms of different sizes given the additional barriers to financing faced by smaller corporates. Specifically, the regression model used in this study is specified as follows:

$$
\begin{aligned}
Excess\ Return_i = \beta_0 &+ \beta_1 Liquidity_i \\
&+ \beta_2 Return\ On\ Assets_i \\
&+ \beta_3 log(Market\ Capitalization_i) \\
&+ \beta_4 Price\ To\ Book\ Ratio_i \\
&+ \beta_5 Momentum_i \\
&+ \beta_6 Z\text{-}score_i \\
&+ \beta_7 Z\text{-}score_i \times Liquidity_i + \epsilon_i
\end{aligned}
$$

$$
\begin{aligned}
where\ Excess\ Return_i = Stock\ Return_i &- (\beta_{equity,i})Benchmark\ Return_i \\
&- (1 - \beta_{equity,i})Risk\text{-}free\ Rate_i
\end{aligned}
$$

(1)

In measuring stock performance, we use excess return (i.e., Alpha, as defined under the Capital Asset Pricing Model) instead of unadjusted return, to control for the systematic risk component of equity returns[9]. Meanwhile, the cash-to-asset ratio serves as a proxy of firms' liquidity buffers, and its coefficient, $\beta_1$ reveals how investors value firms' cash holdings.

## 3.2 Control variables

To ensure that the difference in return is attributed to the variation in firm-level liquidity rather than other firm-specific characteristics, we further include factors such as return-on-assets ratio, market capitalization value, price-to-book ratio (PB) and stock momentum, as control variables.

As Acharya and Steffen (2020) suggest that the value of liquidity may vary across firms depending on their credit ratings, we further include credit risk proxy and its interaction with liquidity as control variables in our model. While we note that similar studies typically use ratings from major credit rating agencies (CRAs) as the credit risk indicator[10], such information is not available for most Asian firms[11]. As such, we choose Altman z-score[12], another commonly used financial strength indicator, as our primary credit risk assessment tool. Table A2 in Appendix provides summary statistics of these variables.

To explore whether markets valued the liquidity positions of smaller versus large firms differently, we also conduct two sub-sample analyses of the regression model outlined in equation (1) by firm size, using the same revenue criterion as Charts 2-7 in section 2.3 (i.e. firms recording at least USD 1 billion revenue in 2019 are labelled as "large", and the rest are labelled as "SMEs").

## 3.3 Sample selection

Firms with market capitalization value of less than USD 5 million at the end of 2019 are excluded. Since regulatory reporting requirements vary across

---

[9] Excess return is calculated as the difference between stock return and the weighted sum of benchmark and risk-free returns. Both benchmark returns and risk-free rates are country-specific.

[10] See Khieu and Pyles (2012), Asimakopoulos and Asimakopoulos (2018)

[11] There are many reasons why companies may choose not to seek a credit rating from the major CRAs, including cost savings, infrequent bond issuance in foreign markets, and domestic investors' familiarity with the brand.

[12] Adjusted for emerging markets given that many of the firms in our sample are from emerging market economies (see Altman (2005) for details).

the economies of interest, some observations are also dropped due to missing values; this leaves a total sample of 13,314 Asian non-financial firms.

Given that the focus of this study is on factors influencing stock resiliency during a crisis, we restrict our event window to that in which the Asian equity markets were hit hardest by the pandemic (see Chart 8 below). To be specific, our sample period starts from 23 January 2020 (the date Wuhan, China entered lockdown) and ends 23 March 2020 (the trough of the MSCI Asia Index); we refer to this period as the "market downturn" period. We also subsequently examine the "market rebound" period, which we define as a 10-day event window between 23 Mar 2020 to 3 Apr 2020 following Ramelli and Wagner (2020), to assess whether liquidity buffers were perceived differently by markets after global financial conditions broadly eased.

**Chart 8: MSCI Asia Index**



Source: Bloomberg.
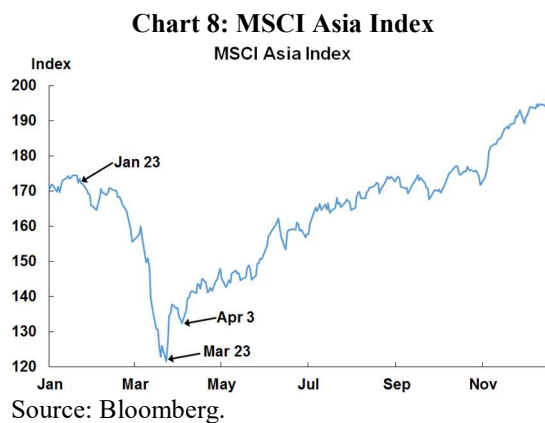
## IV. EMPIRICAL RESULTS

### 4.1 Market downturn period

Table 1 summarizes the regression results. The dependent variable is firms' excess stock return during the market downturn period.

Table 1: Results (2020-01-23 to 2020-03-23)

| | All | Alpha<br>Large firms | SMEs |
|---|---|---|---|
| | (1) | (2) | (3) |
| Cash to Assets Ratio$_{2019Q4}$ | 0.059*** | 0.091 | 0.050*** |
| | (0.017) | (0.061) | (0.019) |
| Return On Assets$_{2019Q4}$ | 0.0003 | 0.001 | 0.0004* |
| | (0.0002) | (0.001) | (0.0002) |
| log(Market Capitalization$_{2019Q4}$) | 0.010*** | 0.003 | 0.012*** |
| | (0.001) | (0.003) | (0.002) |
| Price to Book Ratio$_{2019Q4}$ | 0.001** | 0.003 | 0.001 |
| | (0.001) | (0.002) | (0.001) |
| Momentum | −0.022*** | −0.003 | −0.024*** |
| | (0.004) | (0.009) | (0.004) |
| Altman Z-score | 0.0002 | 0.001 | −0.001 |
| | (0.001) | (0.002) | (0.001) |
| Altman Z-score x Liquidity | −0.003** | −0.003 | −0.001 |
| | (0.001) | (0.007) | (0.001) |
| Constant | −0.039*** | −0.024 | −0.032*** |
| | (0.008) | (0.021) | (0.011) |
| Country Dummies? | Yes | Yes | Yes |
| Observations | 13,293 | 2,344 | 10,913 |
| $R^2$ | 0.104 | 0.087 | 0.116 |
| Adjusted $R^2$ | 0.103 | 0.081 | 0.115 |

Note: $^{*}$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01

The first column shows the regression results from our baseline model outlined in equation (1) using the full sample. The positive sign of $β_1$ suggests that firms with higher cash holdings tend to be more resilient than their peers during market downturns. [13] Apart from liquidity, other firm characteristics, such as market capitalization value, PB ratio, and stock momentum are also significant in explaining excess returns, and the estimated coefficients have the expected signs.

---

[13] This is consistent with Acharya and Steffen (2020), who conclude that the ex-ante balance sheet liquidity of US firms is priced in the cross-section of stock returns during the COVID-19 market downturn.

In columns 2 and 3, we further separate our sample into two groups based on firm size as specified in section III, and conduct individual analyses. Recall from section II that SMEs in Asia struggled to build up cash buffers in early 2020 compared to their larger peers as bank debt contracted and total debt remained stagnant, potentially making ex-ante liquidity particularly important to smaller firms. We now test whether investors valued liquidity buffers of smaller Asian corporates more in a troubled market.

Indeed, our findings show that SMEs are driving the positive and significant relationship between cash holdings and excess returns as seen in column (1), with a higher ex-ante liquidity level being correlated with better performance among these firms, while the effect of cash buffers for large firms is statically insignificant. This possibly reflects smaller firms' greater barriers to financing during market downturns, as we saw in section II.[14] We can see that markets also scrutinise smaller firms based on their profitability as shown by the significant coefficients on the return-on-assets; furthermore, even after splitting firms by a revenue threshold, the market capitalisation variable continues to be positive and significant for SMEs, underscoring the importance of firm size as a signal of resiliency during market downturns.

Meanwhile, the insignificant effect of cash holdings on stock returns of large firms appears consistent with their greater ability to tap the bond market and easier access to credit lines during market turmoil, making extra ex-ante cash holding less relevant. While a higher level of cash holdings in these firms would likely increase their chance of survival during the crisis, investors may however favour other stocks with less conservative cash flow strategy for their greater growth potential (Martínez-Sola, García-Teruel, and Martínez-Solano 2013).

Apart from the size aspect, the literature has also suggested that credit risk can play an important role in determining liquidity access. Indeed, we can see from column 1 that the interaction term between cash holding and credit strength has a negative coefficient, possibly suggesting that firms with lower probabilities of default benefit less from the extra cash holdings. In other words, while having extra cash would help weaker firms to weather the financial storm, its benefit may be more limited for creditworthy firms.[15]

---

[14] This finding is also in line with prior studies on US firms (e.g., Denis and Sibilkov (2010), who show that cash holdings are of more value to financially constrained firms in the US).

[15] We test this in another form by re-estimating our model and splitting firms by their z-scores depending on whether they are below or above the sample median. Our results, which are presented in Table A4 in the Appendix, confirm that stock markets scrutinised the liquidity positions of higher-credit-risk firms more than

## 4.2 Market rebound period

Acharya and Steffen (2020) also find that the significance of liquidity disappeared in Q2 2020, as stress in the funding markets was eased by the Fed's interventions. To investigate whether that phenomenon can be found among Asian firms, we examine the sample period that covers the subsequent global equity market rebound induced by the Fed's intervention. Following Ramelli and Wagner (2020), we set our event window to be 10 business days running from 23 March 2020 (the date the Fed announced backstop facilities) to 3 April 2020, and rerun our regression model. Table 2 summarises the results.

Table 2: Results (2020-03-23 to 2020-04-03)

| | Dependent variable: | | |
| --- | --- | --- | --- |
| | | Alpha | |
| | All | Large firms | SMEs |
| | (1) | (2) | (3) |
| Cash to Assets Ratio$_{2019Q4}$ | 0.048*** | −0.005 | 0.053*** |
| | (0.011) | (0.040) | (0.013) |
| Return On Assets$_{2019Q4}$ | 0.001*** | 0.002*** | 0.001*** |
| | (0.0001) | (0.001) | (0.0002) |
| log(Market Capitalization$_{2019Q4}$) | 0.001 | 0.001 | −0.001 |
| | (0.001) | (0.002) | (0.001) |
| Price to Book Ratio$_{2019Q4}$ | 0.001* | 0.002** | 0.001 |
| | (0.0004) | (0.001) | (0.0004) |
| Momentum | −0.178*** | −0.137*** | −0.181*** |
| | (0.006) | (0.013) | (0.007) |
| Altman Z-score | 0.001*** | 0.002 | 0.002*** |
| | (0.0004) | (0.001) | (0.0004) |
| Altman Z-score x Liquidity | −0.004*** | −0.002 | −0.004*** |
| | (0.001) | (0.004) | (0.001) |
| Constant | −0.063*** | −0.048*** | −0.056*** |
| | (0.006) | (0.014) | (0.007) |
| Country Dummies? | Yes | Yes | Yes |
| Observations | 13,772 | 2,370 | 11,364 |
| R$^2$ | 0.248 | 0.200 | 0.258 |
| Adjusted R$^2$ | 0.247 | 0.195 | 0.257 |
| Note: | | | *p<0.1; **p<0.05; ***p<0.01 |

those with relatively lower credit risk, with the cash holdings of firms with z-scores below the sample median registering a significant and positive effect on excess returns in the downturn period, while those of firms with z-scores above the sample median exhibited insignificant effects.

We find that while the influence of firms' liquidity has receded, the coefficient $\beta_1$ remained highly significant among SMEs in the market rebound period[16], contrary to the trend observed among US firms in Acharya and Steffen (2020). [17] The results suggest that investors continued to value liquidity buffers highly during the rebound period, potentially indicating investors' lingering concerns over the liquidity positions of Asian firms.

## V.    CONCLUSION AND POLICY IMPLICATIONS

Our study finds that Asian firms struggled to accumulate significant cash buffers in the early stages of the pandemic. Debt levels remained relatively stagnant for firms in the region in the first quarter of 2020, with bank debt either rising modestly or even deteriorating, notably for smaller corporates and firms in EM Asia. Then, turning to the stock market reactions to the virus shock, our findings show that the stocks of Asian firms with higher levels of liquidity experienced higher excess returns during the pandemic, consistent with findings from similar studies focused on US firms. In other words, a firm's ex-ante liquidity position can play an important signalling role in times of uncertainty, helping financial markets to distinguish between strong and weak firms. Our study then goes one step further, and assesses whether liquidity buffers accumulated prior to the pandemic were perceived differently by stock market investors during the market downturn for firms of different sizes and credit quality, finding that the positive effect of cash holdings on equity returns is significant only among riskier or smaller firms. We also find that the relationship did not fade away in the subsequent rebound period, conceivably suggesting lingering concerns among investors regarding the liquidity buffers of Asia firms despite the improved overall market sentiment.

In terms of policy implications, our study highlights the importance of timely interventions targeted at maintaining the flow of credit to SMEs during and after severe crises such as COVID-19. In comparison with major advanced economies, corporate bond markets in Asia are still underdeveloped and bank lending remains the main financing channel for firms in the region. While interest

---

[16] Results from our alternative model (where firms are split by their z-scores) are also consistent with this finding. For details, please refer to Table A5 in the Appendix.

[17] As a robustness check, we also repeat our above analysis using cash buffer ratio (the sum of cash and cash-equivalent short term investment minus the sum of short-term debt, current portion of long-term debt and interest expense in the current year, all of which were presented as a share of the firm's total asset) as an alternate liquidity proxy; the results are largely similar. For details, please refer to Tables A6-A7 in the Appendix. Our results for the rebound period also hold using the z-score criterion, shown in Table A5 of the appendix, with higher-credit-risk firms (with z-score below the sample median) exhibiting a positive and significant effect of cash holdings on stock returns.

rate cuts may help alleviate the cost of financing for the overall economy, banks may not be willing or able to pass on the lower rates completely to SMEs given their increased credit risks during and after crisis periods. Moreover, the already-low levels of interest rates in the region suggests limited space for further easing and potentially adverse impacts on bank profitability and financial stability. Therefore, supplementing conventional monetary easing with more targeted support to SMEs, such as providing loan guarantees or other forms of direct fiscal support, will be useful in bolstering confidence.

## REFERENCES

Acharya, Viral V, and Sascha Steffen. 2020. "The Risk of Being a Fallen Angel and the Corporate Dash for Cash in the Midst of Covid." *CEPR COVID Economics* 10.

Altman, Edward I. 2005. "An Emerging Market Credit Scoring System for Corporate Bonds." *Emerging Markets Review* 6 (2005): 311-323.

Asimakopoulos, Panagiotis, and Stylianos Asimakopoulos. 2018. "A Tale of Two Tails: Cross Credit Ratings and Cash Holdings." *Available at SSRN 3291498*.

Chodorow-Reich, Gabriel, Olivier M Darmouni, Stephan Luck, and Matthew Plosser. 2020. "Bank Liquidity Provision Across the Firm Size Distribution." Federal Reserve Bank of New York.

Corsetti, Giancarlo, and Emile Marin. 2020. "The Dollar and International Capital Flows in the COVID-19 Crisis." VoxEU.

Denis, David J., and Valeriy Sibilkov. 2010. "Financial Constraints, Investment, and the Value of Cash Holdings." *The Review of Financial Studies 23*(1): 247–69.

Fahlenbrach, Rudiger, and Rene M. Stulz. 2020. "How Valuable is Financial Flexibility when Revenue Stops? Evidence from the COVID-19 Crisis." *NBER Working Paper No. 27106*.

Frank, Nathaniel, and Heiko Hesse. 2009. "Financial Spillovers to Emerging Markets during the Globa Financial Crisis." *IMF Working Paper WP/09/104*.

Goel, Tirupam, and José María Serena. 2020. "Bonds and Syndicated Loans During the Covid-19 Crisis: Decoupled Again?" Bank for International Settlements.

Greenwald, Daniel L., John Krainer, and Pascal Paul. 2020. "The Credit Line Channel." *Federal Reserve Bank of San Francisco Working Paper 2020-26*.

IMF. 2020. "Corporate Funding: Liquidity Strains Cushioned by a Powerful Set of Policies." *Global Financial Stability Report (October 2020)*: Chapter 3.

Khieu, Hinh D, and Mark K Pyles. 2012. "The Influence of a Credit Rating Change on Corporate Cash Holdings and Their Marginal Value." *Financial Review* 47 (2): 351–73.

Li, Xiafei, and Di Luo. 2017. "Investor Sentiment, Limited Arbitrage, and the Cash Holding Effect." *Review of Finance* 21 (6): 2141–68.

Martínez-Sola, Cristina, Pedro J García-Teruel, and Pedro Martínez-Solano. 2013. "Corporate Cash Holding and Firm Value." *Applied Economics* 45 (2): 161–70.

Pagliari, Maria S., and Ahmed S. Hannan. 2017. "The Volatility of Capital Flows in Emerging Markets Measures and Determinants." *Rutgers University Working Papers No. 2017-10*.

Ramelli, S, and AF Wagner. 2020. "Feverish Stock Price Reactions to Covid-19." *Review of Corporate Finance Studies*.

# Appendix

## Average cash flows from financing, operations, and investment activities by firm size
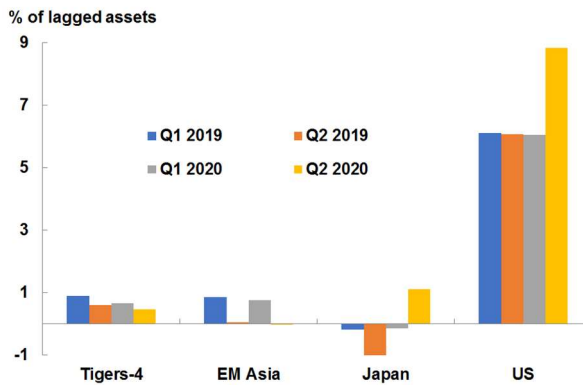
### Chart A1: Cash flows from financing, SMEs

% of lagged assets



Legend: Q1 2019, Q2 2019, Q1 2020, Q2 2020

Categories: Tigers-4, EM Asia, Japan, US

### Chart A2: Cash flows from financing, large firms

% of lagged assets



Legend: Q1 2019, Q2 2019, Q1 2020, Q2 2020

Categories: Tigers-4, EM Asia, Japan, US
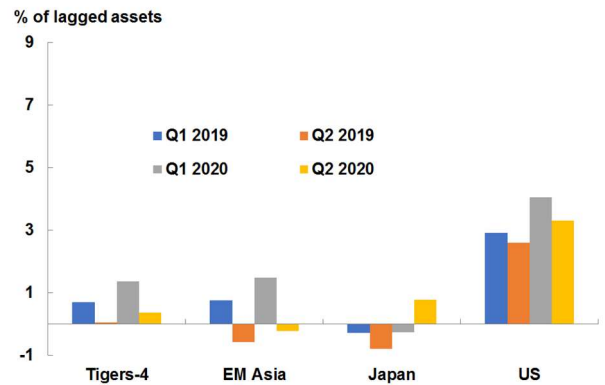
### Chart A3: Cash flows from operations, SMEs

% of lagged assets



Legend: Q1 2019, Q2 2019, Q1 2020, Q2 2020

Categories: Tigers-4, EM Asia, Japan, US
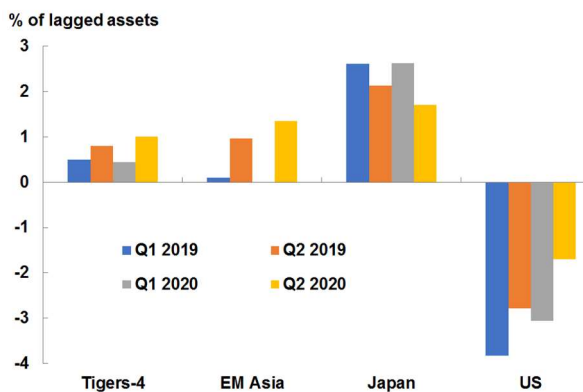
### Chart A4: Cash flows from operations, large firms

% of lagged assets



Legend: Q1 2019, Q2 2019, Q1 2020, Q2 2020

Categories: Tigers-4, EM Asia, Japan, US
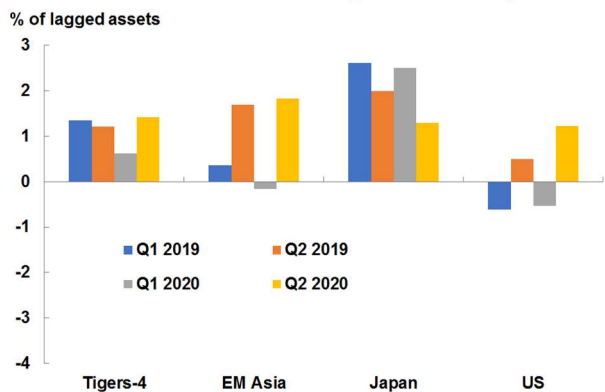
### Chart A5: Cash flows from investment, SMEs

% of lagged assets



Legend: Q1 2019, Q2 2019, Q1 2020, Q2 2020

Categories: Tigers-4, EM Asia, Japan, US
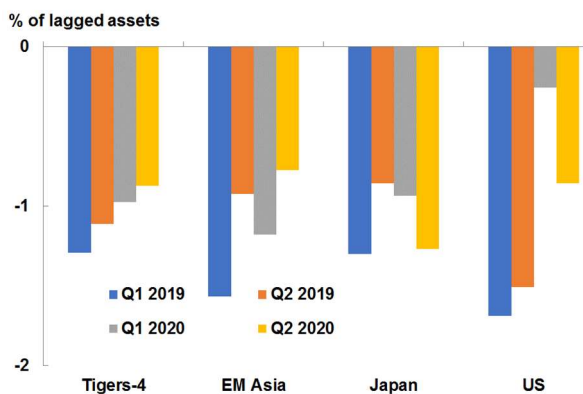
### Chart A6: Cash flows from investment, large firms

% of lagged assets



Legend: Q1 2019, Q2 2019, Q1 2020, Q2 2020

Categories: Tigers-4, EM Asia, Japan, US
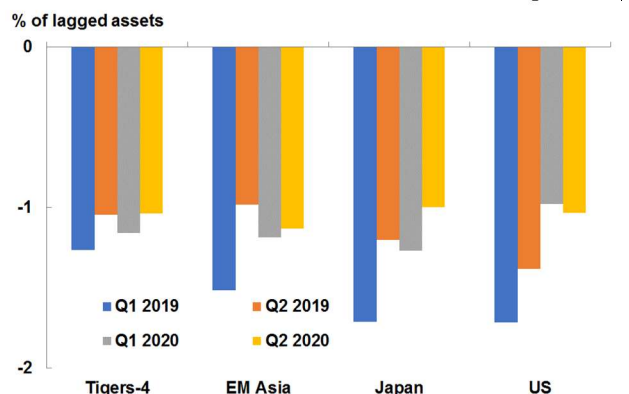
Sources: Bloomberg and authors' estimates.

### Chart A7: Bank credit to private non-financial sector

Bank credit to private non-financial sector

qoq %



Legend: Q1 2020, Q2 2020

Categories: ID, TH, SG, MY, KR, JP, CN, HK, US

Source: BIS.

# Appendix

**Chart A8: Monthly portfolio flows into emerging markets (IIF)**

*$ billion*



Source: IIF

.

**Chart A9: Monthly portfolio flows into emerging markets (EPFR)**

**$ billion**
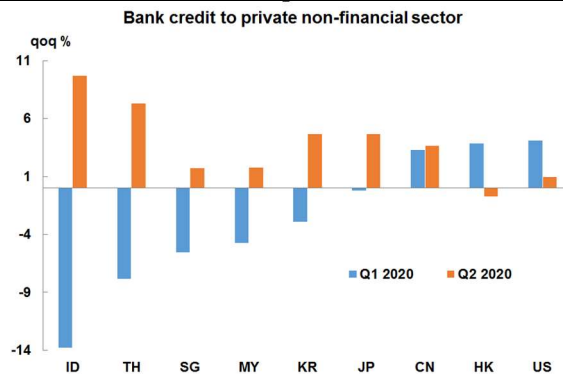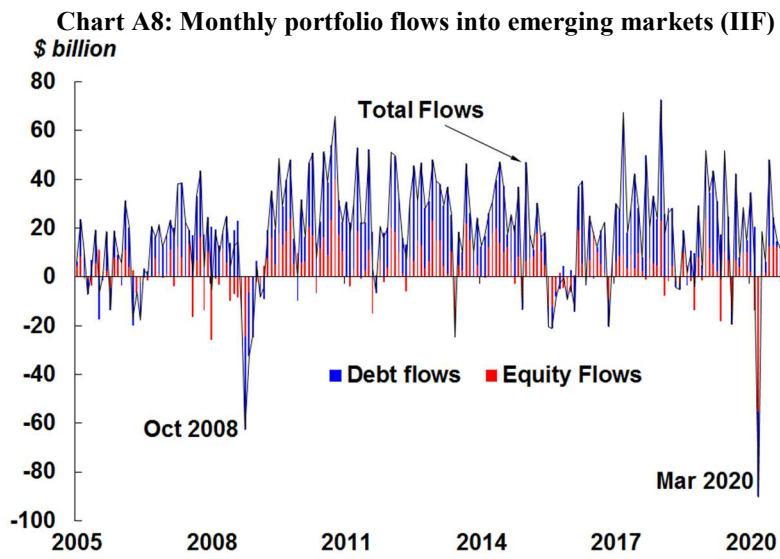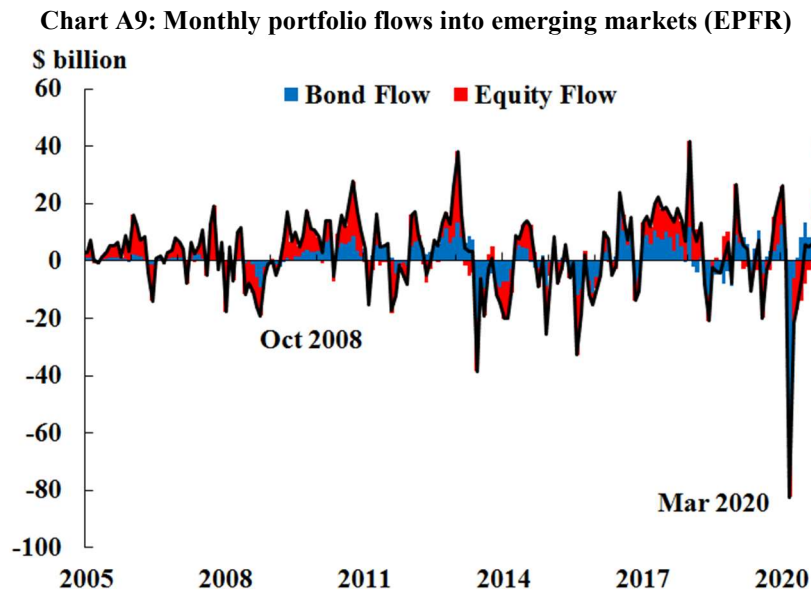


Source: EPFR.

# Appendix

Table A1: Summary Statistics

| Statistic | N | Mean | St. Dev. | Min | Pctl(25) | Median | Pctl(75) | Max |
|---|---|---|---|---|---|---|---|---|
| Stock Return* | 15,708 | −0.244 | 0.204 | −0.667 | −0.396 | −0.245 | −0.105 | 0.350 |
| Benchmark Return | 15,538 | −0.236 | 0.097 | −0.377 | −0.327 | −0.253 | −0.200 | −0.052 |
| Excess Return* | 14,445 | −0.039 | 0.193 | −0.974 | −0.151 | −0.046 | 0.057 | 1.009 |
| Risk-free Rate$_{2019Q4}$ | 14,953 | 2.102 | 1.154 | −0.011 | 1.478 | 1.742 | 3.144 | 7.668 |
| Equity Beta$_{2019Q4}$* | 15,003 | 0.886 | 0.508 | −0.836 | 0.556 | 0.915 | 1.228 | 2.345 |
| Stock Return$_{2019}$* | 14,971 | 0.128 | 0.432 | −0.689 | −0.116 | 0.055 | 0.275 | 2.000 |
| Market Capitalization$_{2019Q4}$* | 15,654 | 964.495 | 2,622.074 | 6.917 | 52.665 | 190.095 | 640.710 | 19,206.340 |
| log(Market Capitalization$_{2019Q4}$)* | 15,654 | 5.299 | 1.736 | 1.934 | 3.964 | 5.248 | 6.463 | 9.863 |
| Price to Book Ratio$_{2019Q4}$* | 15,345 | 2.328 | 2.925 | 0.186 | 0.767 | 1.390 | 2.647 | 19.264 |
| Return on Assets$_{2019Q4}$* | 15,373 | 1.529 | 8.367 | −40.800 | −0.508 | 2.260 | 5.190 | 21.800 |
| Cash to Assets Ratio$_{2019Q4}$* | 15,781 | 0.212 | 0.174 | 0.004 | 0.083 | 0.164 | 0.294 | 0.789 |
| Cash Buffer Ratio$_{2019Q4}$* | 11,191 | 0.015 | 0.208 | −0.577 | −0.110 | 0.010 | 0.138 | 0.568 |
| Altman Z-score* | 16,113 | 7.773 | 5.513 | −13.513 | 5.097 | 7.167 | 10.123 | 28.208 |

*Notes:*

1. Variables with asterisks have been winsorized at the 1% and 99% levels.

2. Our sample covers all listed non-financial companies located at China , Hong Kong , Indonesia , Japan , Korea, Malaysia , Philippines , Singapore, Taiwan, Thailand and Vietnam. Companies with market capitalization value of less than USD 5mn (as at 31 Dec 19) are excluded.

3. A benchmark index is assigned to each firm based on the classification by Bloomberg. Please refer to Table A3 for the list of benchmark indices used in this study.

# Appendix

Table A2: Variable Definitions

| Variable names | Definition | Source |
|---|---|---|
| Altman Z-score | Altman's Z-Score is an indicator used to predict a business's likelihood of bankruptcy | Capital IQ |
| Benchmark Return$_{t1}$ | (Index level$_{t1}$ - Index level$_{t0}$) / Index level$_{t0}$ | Bloomberg |
| Cash Buffer Ratio$_{2019Q4}$ | (Total cash & short-term investments - short-term debt - current portion of long-term debt - estimated interest expense in 2020) / total assets as at 31/12/2019 | Capital IQ |
| Cash Ratio$_{2019Q4}$ | Total cash & short-term investments / total assets as at 31/12/2019 | Capital IQ |
| Equity Beta$_i$ | CAPM equity beta from 01/01/2015 to 31/12/2019 | Bloomberg |
| Market Capitalization$_{2019Q4}$ | Market capitalization value of the stock as at 31/12/2019 in USD mn | Capital IQ |
| Momentum | Stock Return in the prior period | Capital IQ |
| Net Current Assets Ratio$_{2019Q4}$ | (Current assets - Current liabilities)/ total assets of the stock as at 31/12/2019 | Capital IQ |
| Price to Book Ratio$_{2019Q4}$ | Price-to-book value ratio of the stock as at 31/12/2019 | Capital IQ |
| Return on Assets$_{2019Q4}$ | Return-on-assets ratio of the stock as at 31/12/2019 | Capital IQ |
| Risk-free Rate$_i$ | 10 Year Government Bond Yield as at 31/12/2019 | Bloomberg |
| Stock Return$_{t1}$ | (Stock price$_{t1}$ - Stock price$_{t0}$) / Stock price$_{t0}$ | Capital IQ |
| Total Current Liabilities Ratio$_{2019Q4}$ | Current liabilities/ total assets of the stock as at 31/12/2019 | Capital IQ |

# Appendix

Table A3: Stock Benchmarks

| Country code | Benchmark | Bloomberg ticker |
|---|---|---|
| AU | S&P/ ASX 200 Index | AS51 Index |
| CA | S&P/ TSX Composite Index | SPTSX Index |
| CH | Shanghai Stock Exchange Composite Index | SHCOMP Index |
| CH | Shanghai Stock Exchange A Share Index | SHASHR Index |
| CH | Shanghai Stock Exchange B Share Index | SHBSHR Index |
| CH | Shenzhen Stock Exchange A Share Index | SZASHR Index |
| CH | Shenzhen Stock Exchange B Share Index | SZBSHR Index |
| CH | ChiNext Index | SZ399006 Index |
| GB | FTSE 100 Index | UKX Index |
| HK | Hang Seng Index | HSI Index |
| ID | Jakarta Stock Exchange Composite Index | JCI Index |
| JP | Tokyo Stock Price Index | TPX Index |
| MY | FTSE Bursa Malaysia KLCI Index | FBMKLCI Index |
| NO | Oslo Stock Exchange Index | OBX Index |
| PH | Philippines Stock Exchange Composite Index | PCOMP Index |
| SG | Straits Times Index | STI Index |
| KR | Korea Composite Stock Price Index | KOSPI Index |
| TW | Taiwan Stock Exchange Capitalization Weighted Stock Index | TWSE Index |
| TW | Taiwan TPEx Exchange Index | TWOTCI Index |
| TH | Stock Exchange of Thailand Index | SET Index |
| US | S&P 500 Index | SPX Index |
| US | Dow Jones Industrial Average | INDU Index |
| VN | Ho Chi Minh Stock Index | VNINDEX Index |

# Appendix

Table A4: Results (2020-01-23 to 2020-03-23)

| | Dependent variable: | | |
|---|---|---|---|
| | | Alpha | |
| | All | Z-score below median | Z-score above median |
| | (1) | (2) | (3) |
| Cash to Assets Ratio$_{2019Q4}$ | 0.020** | 0.059*** | −0.003 |
| | (0.009) | (0.020) | (0.012) |
| Return On Assets$_{2019Q4}$ | 0.0001 | −0.0001 | 0.001* |
| | (0.0002) | (0.0003) | (0.0003) |
| log(Market Capitalization$_{2019Q4}$) | 0.010*** | 0.008*** | 0.013*** |
| | (0.001) | (0.001) | (0.002) |
| Price to Book Ratio$_{2019Q4}$ | 0.002*** | 0.001* | 0.001 |
| | (0.001) | (0.001) | (0.001) |
| Momentum | −0.022*** | −0.018*** | −0.026*** |
| | (0.004) | (0.006) | (0.005) |
| Constant | −0.036*** | −0.026** | −0.046*** |
| | (0.008) | (0.011) | (0.011) |
| Country Dummies? | Yes | Yes | Yes |
| Observations | 13,314 | 6,752 | 6,540 |
| $R^2$ | 0.103 | 0.100 | 0.114 |
| Adjusted $R^2$ | 0.102 | 0.098 | 0.112 |

Note: $^*$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01

# Appendix

Table A5: Results (2020-03-23 to 2020-04-03)

| | Dependent variable: | | |
|---|---|---|---|
| | | Alpha | |
| | All | Z-score below median | Z-score above median |
| | (1) | (2) | (3) |
| Cash to Assets Ratio$_{2019Q4}$ | 0.018*** | 0.044*** | 0.001 |
| | (0.006) | (0.014) | (0.008) |
| Return On Assets$_{2019Q4}$ | 0.001*** | 0.001*** | 0.001*** |
| | (0.0001) | (0.0002) | (0.0002) |
| log(Market Capitalization$_{2019Q4}$) | 0.001* | 0.001 | 0.001 |
| | (0.001) | (0.001) | (0.001) |
| Price to Book Ratio$_{2019Q4}$ | 0.001 | −0.0002 | 0.001*** |
| | (0.0004) | (0.001) | (0.001) |
| Momentum | −0.177*** | −0.187*** | −0.164*** |
| | (0.006) | (0.009) | (0.009) |
| Constant | −0.053*** | −0.054*** | −0.051*** |
| | (0.005) | (0.007) | (0.007) |
| Country Dummies? | Yes | Yes | Yes |
| Observations | 13,793 | 6,878 | 6,893 |
| $R^2$ | 0.247 | 0.244 | 0.254 |
| Adjusted $R^2$ | 0.246 | 0.242 | 0.252 |

Note: $^*$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01

# Appendix

Table A6: Results (2020-01-23 to 2020-03-23)

| | All | Alpha Large firms | SMEs |
|---|---|---|---|
| | (1) | (2) | (3) |
| Cash Buffer Ratio$_{2019Q4}$ | 0.039*** | −0.001 | 0.045*** |
| | (0.015) | (0.038) | (0.016) |
| Return On Assets$_{2019Q4}$ | 0.0005 | 0.001 | 0.001** |
| | (0.0003) | (0.001) | (0.0003) |
| log(Market Capitalization$_{2019Q4}$) | 0.009*** | 0.003 | 0.012*** |
| | (0.001) | (0.003) | (0.002) |
| Price to Book Ratio$_{2019Q4}$ | 0.001* | −0.0004 | 0.001 |
| | (0.001) | (0.002) | (0.001) |
| Momentum | −0.025*** | 0.002 | −0.028*** |
| | (0.005) | (0.010) | (0.005) |
| Altman Z-score | −0.002*** | 0.001 | −0.003*** |
| | (0.001) | (0.002) | (0.001) |
| Altman Z-score x Liquidity | 0.002 | 0.004 | 0.003 |
| | (0.002) | (0.005) | (0.002) |
| Constant | −0.008 | −0.003 | −0.007 |
| | (0.009) | (0.022) | (0.013) |
| Country Dummies? | Yes | Yes | Yes |
| Observations | 9,670 | 1,995 | 7,666 |
| R$^2$ | 0.115 | 0.090 | 0.132 |
| Adjusted R$^2$ | 0.113 | 0.084 | 0.130 |
| Note: | | | *p<0.1; **p<0.05; ***p<0.01 |

# Appendix

## Table A7: Results (2020-03-23 to 2020-04-03)

|  | Dependent variable: | | |
|  | | Alpha | |
|  | All | Large firms | SMEs |
|  | (1) | (2) | (3) |
|---|---|---|---|
| Cash Buffer Ratio$_{2019Q4}$ | 0.026*** | 0.010 | 0.025** |
|  | (0.010) | (0.025) | (0.011) |
| Return On Assets$_{2019Q4}$ | 0.001*** | 0.002*** | 0.001*** |
|  | (0.0002) | (0.001) | (0.0002) |
| log(Market Capitalization$_{2019Q4}$) | −0.0001 | −0.001 | −0.003* |
|  | (0.001) | (0.002) | (0.001) |
| Price to Book Ratio$_{2019Q4}$ | 0.0005 | 0.002* | 0.0004 |
|  | (0.0005) | (0.001) | (0.001) |
| Momentum | −0.185*** | −0.152*** | −0.189*** |
|  | (0.007) | (0.014) | (0.008) |
| Altman Z-score | 0.001* | −0.0001 | 0.001** |
|  | (0.0004) | (0.001) | (0.0005) |
| Altman Z-score x Liquidity | −0.004*** | 0.003 | −0.004*** |
|  | (0.001) | (0.003) | (0.001) |
| Constant | −0.045*** | −0.030** | −0.035*** |
|  | (0.006) | (0.015) | (0.009) |
| Country Dummies? | Yes | Yes | Yes |
| Observations | 9,903 | 2,014 | 7,879 |
| $R^2$ | 0.269 | 0.215 | 0.283 |
| Adjusted $R^2$ | 0.268 | 0.210 | 0.282 |

Note:            *p<0.1; **p<0.05; ***p<0.01