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Abstract

In this paper, we investigate the cash holings of government linked corporations (GLCs) in Singapore, with different levels of Temasek Holdings ownership. We find evidence that Temasek owned public firms hold on average substantially more cash than otherwise similar public firms listed on SGX. This result is robust to different measures of Temasek ownership. We also show that when GLCs have excess cash, they do not spend it on capital expenditure, acquisition, dividends or share repurchase. Instead, they hoard these excess cash leading to an accumulation of cash. In addition, we show that Temasek firms are on average more profitable, however the accumulation of excess cash is reducing their profitability.

JEL classification: G32, G34, G35.

Keywords: Cash Holdings, Government-linked Corporation, Corporate Governance

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1 Introduction

The conflict between shareholders and managers and precautionary motivation are two of the most widely accepted mechanisms why firms hold cash. Because state ownership could affect firms' exposure to agency problem and their financing capability, it provides a suitable empirical setting to study on how agency problem and financing condition affect corporate cash holdings. In addition, this allows us to find new determinants that attribute to cross-sectional cash holding variations. Megginson, Ullah, and Wei (2014) indicate that state ownership has a negative impact on cash since the firms with more state ownership suffer from more soft budget constraint effects and hence need less cash. Using data on Chinese public firms, Kusnadi, Yang, and Zhou (2015) show that non-state-controlled firms hold less cash than state-controlled firms because of political extraction such as expensive bank loans; for non-state-controlled firms, the developed institutions has a more pronounced positive impact on corporate cash holdings than for state-controlled firms since the developed institutions can reduce the threat of political extraction. It has been shown that the impacts of state ownership on corporate operations are heterogeneous across countries. Specifically, in most countries including China, state ownership could help firms get cheap financing and more government-related investment opportunities, and it also adversely affects firms because of the dual agency problems (i.e. agency problems between managers and shareholders and those between shareholders and government). In Singapore, government-linked corporations which are usually under the control of Temasek Holdings (Temasek) have a reputation for being well-governed (Ang and Ding (2006)) and do not enjoy cheap fund because of their link to the government (Ramirez and Tan (2004)). Therefore, government-linked corporations in the Singapore context provides us a new setting in which the previous findings are unable to explain how Temasek holding affects corporate cash holdings. Do Temasek holding companies averagely hold more or less cash than non-Temasek companies? How Temasek holdings affect corporate cash holdings? In this paper, we hope to answer these questions.

Using the sample of Singapore-listed firms and the voting rights of Temasek from the

year 2004 to 2014 We find that on average GLCs hold more cash than otherwise similar non-GLCs, which is contrary to the findings using data from Chinese firms. Specifically, we observe GLCs hold 5%-12% more cash on average than the others. We also use the percentage of voting rights as a robustness check and find that on average, for every additional voting right, GLCs cash increases by 0.1% to 0.5% depending on how many controls we included.

We further explore the decision of GLCs with excess cash in order to understand how Temasek holdings affect corporate cash holdings. We find that government-linked corporations do not over spend excess cash through external channels like capital expenditure and acquisition, as well as internal channels like payout dividends or do any share repurchase. Instead, they allow the excess cash to hoard leading to an increase in cash holding over time by cutting off the dividend payout in the future. This is not the same as Harford, Mansi, and Maxwell (2008) in that they find that firms with worse governance tend to spend cash quickly while we find that firms with good corporate governance will hold the more cash and the manager do not over consume the excess cash. Additionally, we also show that on average GLCs are more profitable than other non-GLCs but GLCs with excess cash holding will harm their profitability in the future.

Our paper is the first to look at the cash holding of GLCs in Singapore. We contribute to the corporate cash policy literature. The decision of internal funds, such as cash and cash equivalents, is an essential issue which revolves around the conflict between shareholders and managers as Jensen (1986) suggested. Earlier studies by Opler, Pinkowitz, Stulz, and Williamson (1999) provide the determinants of corporate cash holdings for listed firms in the U.S. and find that firms determine their optimal cash balance by trading off the costs and benefits of holding cash. Agency problems and financing constraints are two main reasons why firms hold cash reserve. However for each case, the predictions and empirical results are quite different. Gao, Harford, and Li (2013) find that in the US, the aggregate effect is due to agency conflicts instead of financing constraints, by giving evidence that public firms (greater agency problems but lower financing constraints) hold more cash than private firms (lesser

agency problems but higher financing constraints). Their prediction supports the theoretical argument by Jensen (1986) that firms with greater agency conflicts hold more cash in order to increase perquisites consumptions. Using only public listed firms in U.S.,Harford et al. (2008) find that firms with poor corporate governance hold less cash because self-interested managers prefer to quickly spend excess cash even if the expenditure does not value add the firm in future. Using an international sample, Dittmar, Mahrt-Smith, and Servaes (2003) show that firms in strong investor protection countries hold less cash. They argue that this is the case because firms' shareholders in countries with strong investor protection are able to better limit the managers perquisite consumption by forcing them to disburse excess cash back to shareholders. All the three papers are in support of the agency theory as the main reason for firms cash policy decision, though their empirical results on cash holdings are mixed. On the other hand, Opler et al. (1999) and Sufi (2009) give predictions that financially constraint firms hold more cash than otherwise less financially constraint. This is because cash is required for either speculation on future investment opportunities or precautionary motives. That is to say, firms that have difficulty raising cash will prefer to hold more cash in preparation for future uncertainties. Based on the literature above, this paper extends the literature by using Singapore samples to examine the impact of agency problem and financial constraint on the cross section variations of cash holdings between GLCs and Non-GLCs.

We also contribute to the literature on the impacts of state ownership on firms financial decisions. In the early days, this strand of literature is mainly on how state ownership affects corporate performance and financial constraints. Fan, Wong, and Zhang (2007) show that performance measures are negatively related to the level of state ownership among Chinese firms while La Porta, Lopez-de Silanes, and Shleifer (2002) find that government ownership of banks is associated with slower subsequent financial development. Unlike SOEs in other countries, Temasek acts as a commercial investment company, promoting good corporate governance as well as transparency in their portfolio of companies. Extensive research has

already been done to suggest that GLCs in Singapore practice better corporate governance and therefore allowing these firms to be more profitable than otherwise similar firms (Ang and Ding (2006), Ramirez and Tan (2004) and Sim, Thomsen, and Yeong (2014)). Recently, regarding why firms are holding lots of assets as cash, there are some papers trying to explore whether corporate cash holdings is affected by state ownership using data of Chinese public firms (Megginson et al. (2014),Kusnadi et al. (2015)) Since GLCs in Singapore have lots of different features in terms of governance, financing advantages compared to SOEs in other countries, we expect Temasek holdings have different impacts on corporate cash holdings.

The rest of paper is organized as follows. Section 2 provides a brief introduction of Government Linked Corporations and Temasek Holdings. We present the data and summary statistics used in this paper in Section 3. Section 4 studied the determinant of cash holding by comparing GLCs v.s. non-GLCs. Section 5 explores the reasons for GLCs from an investment decision and future profitability point of view, and summary in section 6.

2 GLCs and Temasek Holdings

Government linked corporations are created by the Singapore government in late 1960s to promote industrialization and development in strategic industries of the economy. Pioneer GLCs are usually in the area that lack private sector funds or expertise, for example, ship-building and ship repair: Keppel, Sembawang, and Jurong Shipyards; finance: the Development Bank of Singapore; and strategic location industry: Neptune Orient Lines. These GLCs operate fully as for-profit commercial entities on the same basis with other private sector companies. Unlike SOEs in other countries, GLCs in Singapore do not receive any subsides or preferential treatment from the government.

Temasek Holding was formed in 1974 as a private commercial company wholly owned by the state's Ministy of Finance. At that time, 36 companies were transferred to Temasek's control. Temasek Holding directly holds 20 first-tier listed GLCs in 2004 which grow to 24

listed GLCs in 2013 in our sample. The first-tier GLCs can also directly or indirectly hold other public or private firms, therefore the total number of GLCs is estimated to be in the hundreds. The companies Temasek invested in are involved in a wide range of sectors, including financial services, telecommunications media & technology, transportation & industrials, consumer & real estate, energy & resources and life sciences & agriculture[1]. Temasek owns its assets outright as a commercial investment company and not as a fund manager. It pays taxes and contributes back to the government through annual dividends. There seems to be a clear separation between the government role as policy makers and as shareholders in Temasek Holdings. For example, one of the Singapore government's policy is to make Singapore an air-hub in the region, an aim that take precedence over its interest in Singapore Airlines (SIA) as a company[2]. In this paper, we use the time series information of Temasek voting rights of firms to determine if the firm is a government linked corporation. Since most government linked corporation are not fully controlled by the government, their objectives are much more like a private firms. Government ownership here serves much more like an influential monitors, with numerous research linking it to better performance (Ramirez and Tan (2004), Ang and Ding (2006)) due to better corporate governance (Mak and Li (2001), Kusnadi (2003)).

3 Hypothesis development

We test the following two hypotheses related to the control of agency problem and financing constraint with the management of firm cash resource. **Agency Theory Hypothesis**: GLCs hold more cash. Temasek owned firms usually practice better corporate governance and thereby reducing agency problems within the firm. Consistent with the spending hypothesis in Harford et al. (2008), the managers are unable to quickly spend on cash on value destroying projects, leading to the accumulation of excess cash (also consistent with the

[1]See http://www.temasekreview.com.sg/major-investments/index.html

[2]see http://business.asiaone.com/news/temaseks-one-kind-sovereign-wealth-fund

agency theory in Jensen and Meckling (1976)). This accumulation of excess cash lead to Temasek owned firms holding more cash than non-Temasek owned firms. **Financing Constraint Hypothesis**: GLCs hold less cash. Temasek owned firms enjoy low cost of debt due to the implicit debt guarantee by the government (Borisova, Fotak, Holland, and Megginson (2013)). Therefore, those firms are less financially constraint and they can raise money easily from the market at very low cost whenever they need. The less financially constraint firms would hold less cash in advance therefore GLCs hold less cash than non-GLCs.

4 Data and summary statistics

4.1 The database

The main database used in this paper is the S&P Capital IQ (McGRAW HILL FINANCIAL) database. The Capital IQ database provides annual historical financial statements of Singapore Stock Exchange (SGX) listed companies. These financial statements consisting of 12 different sections: Key Stats, Income Statement, Balance Sheet, Cash Flow, Multiples, Historical Capitalization, Capital Structure Summary, Capital Structure Details, Ratio, Supplemental, Pension OPEB and Segments, are downloaded and the required financial data is than extracted. In our sample, we only consider firms listed on SGX main board and have their headquarters situated in Singapore, and exclude firms that are defined as funds or trust. The firms Industry classification is based on Fama French 17 industry classification using their respective 4-digit SIC code. We exclude the financial firms and utility firms since they have different disclosure regulations and their liquidity position are different from the rest. Considering the impact of extreme value and outliers, we winsorize all firm characteristics at the 1st and 99th percentiles. Thus the full sample consists of 485 unique firms with 4195 firm-year observations from 2004 to 2013.

In addition to collecting firm's annual financial statements, we also collected Temasek's ownership of listed SGX firms in terms of percentage of common equity owned by Temasek

Holdings (Private) Limited. Although Temasek Holdings is a private company, and therefore do not require to disclose their holdings under their portfolio, the public firms on the other hand require to disclose who owns them. Since in this paper we are interested in the implicit influence by Temasek owned firms, it is the voting rights held by Temasek that we need to measure instead of the cash flow rights. As documented in Lin, Ma, Malatesta, and Xuan (2011), large shareholders can exercise effective control over a company with a relative small direct stake in the cash flow rights by using pyramid ownership structures and cross-holdings. Therefore to compute voting rights we sum all the voting rights held by Temasek up to the secondary chain of corporate control using a threshold of 10% indicating a major shareholder. For example, suppose firm A owns 50% of firm B and firm B owns 20% of firms C. Therefore the cash flow rights of firm A onto C is 10% (= 50% × 20%) and the voting rights of firm A onto C is 20% (since 50% implies that firm A has full control over firm B). Voting rights are winsorized to 0 if it is less than 1%. An additional Temasek variable is computed, the Temasek dummy, which takes the value one if Temasek has voting rights on the firm (Temasek Voting Rights > 0) and takes the value zero otherwise. Evidence shown using the Temasek indicator variable will be robust to using both the cash flow rights and voting rights variable.

4.2 Cash holdings

The main focus of our analysis is to analyse firm's target level of cash holdings and eventually how it affect the firm's profitability or valuation. Generally, larger size firms tends to hold more cash than smaller size firms, therefore the variable of interest in this paper is actually the firm's cash ratio. The Cash ratio is calculated using the variable Total Cash and Short Term Investments scaled by Net Assets, where Net Assets is Total Assets less Total Cash and Short Term Investments, similar to Yun (2009). Yun (2009) point out that scaling by total assets will cause mechanical negative correlation for an increase in cash. As an alternative measure, we also compute the Industry-adjusted cash which is the industry-median-adjusted

cash scaled by Net Assets. Our results are robust to either of the measure.

4.3 Alternative liquidity vehicles

A firm's level of cash holdings for their corporate liquidity also depends on the amount of lines of credit available to them. Firm with no access to bank's lines of credit would inevitably hoard more cash as a precautionary hedge or savings for future unexpected investment opportunities. Yun (2009) provides evidence that firms with poor governance increase their level of cash holdings relative to lines of credit when the level of takeover threat decrease. Sufi (2009) documents that firms with low cash flow are less likely to obtain bank's line of credit and therefore have to rely more heavily on cash for liquidity. Given the above evidence, controlling for whether the firm has access to lines of credit will give a more accurate measure of a firm's level of cash holdings. In the Capital IQ database, data on the firm's line of credit can be found in the capital structure summary page, under debt summary. Two forms of line of credit data can be extracted namely the Total Revolving Credit, the amount of debt incurred from using lines of credit, and Undrawn Revolving Credit, the amount of lines of credit promised to the firm but not used. For the purpose of our analysis, we reconstruct two different variables using the given line of credit data. They are the Line of Credit variable, Undrawn Revolving Credit scaled by Total Liquidity Demand, and the Line of Credit Dummy, an indicator variable that take the value one if the firms has access to a bank's line of credit and zero otherwise. Total Liquidity Demand is calculated by adding Total Cash and Short Term Investments with Undrawn Revolving Credit.

4.4 The corporate governance index

Using an index measure of corporate governance to estimate the degree of agency problems a firm faces has been popularised since the publication of Gompers, Ishii, and Metrick (2003), naming it the GIndex. Using similar motivation and based on the Singapore Code of Corporate Governance, Singapore Management Univeristy, Sim kee Boon Institute for

Financial Economics (SKBI) developed an index for companies listed in the Singapore Stock Exchange (SGX), namely the Singapore Corporate Governance Index (CGI). This index is a weighted average questionnaire score of five different categories; rights of shareholder, equitable treatment of shareholders, roles of stakeholders, disclosure and transparency and board responsibilities and composition. The resulting CGI sample provided by SKBI consist of 2534 firm year observations from 2007 to 2013, and ranges from 0 to 100. A higher score means that a firm practices better corporate governance than a firm with a lower score.

4.5 Firm characteristics

Motivated by Gao et al. (2013) the following variables are firm characteristics that may explain variations in a firm's cash holdings: firm size, Cash Flow, Revenue Growth, Leverage, Net Working Capital, Capex, Acquisition, R&D, Dividend Dummy, Payout Ratio, Tobin's Q, Foreign Revenue and MNC. Size is the natural log of Net Assets. Cash Flow is the operating cash flow scaled by Net Assets, where operating cash flow is computed as EBITDA minus Net Interest Expense minus Income Tax Expense. Revenue Growth is percentage change in Revenue. Leverage is the Long Term Debt scaled by Net Assets. Net Working Capital is Current Assets minus Current Liabilities minus Total Cash and Short Term Investments and scaled by Net Assets. Capex is Capital Expenditure scaled by Net Assets. Acquisition is the Acquisition Expenditures scaled by Net Assets. R&D is the R&D Expenditure scaled by Net Assets. Dividend Dummy is an indicator variable that takes the value one if the firm pays dividend, and zero otherwise. Tobin's Q is calculated using Total Assets minus Total Common Equity plus Market Value of Equity scaled by Total Assets. Foreign Revenue is the Total Revenue minus Revenue earned in Singapore scaled by Total Revenue. MNC is an indicator variable that takes the value one if the firm Foreign Revenue is more than 20%, and zero otherwise. In addition, in all our regression, we control for year and industry fixed effects.

4.6 Summary statistics and uni-variate analysis

Table 1 provides the summary statistics of main variables in full sample and in sub-sample (Temasek v.s. non-Temasek). In each sample, we report the number of observation and the mean value of the variables. The difference in mean and the t-statistic of Wilcoxon-Test of the differences in mean are reported in columns 7 and 8. In full sample, we see that cash ratio of firms in Singapore is 34%, which is much higher than the average cash ratio of firms in U.S. (about 17% to 18% in U.S listed firms). As for the firm characteristics, firms in Singapore are less leverage, have less net working capital, spend less capital expenditure and R&D investment but give more dividend payout as compared to firms listed in U.S.. As for Temasek firms, they on average hold less cash but they are much larger in size than non-Temasek firms. On average Temasek firms net assets is about twice as large as non-Temasek firms. Therefore we should employ multivariate analysis to exam the cash ratio by controlling the size effect.

[Insert Table 1 near here]

Most firms listed in Singapore pays dividends. In the U.S., only 33% [3] of public firms pays dividend, whereas in this sample, 65% of public firms pays dividend. In addition, within Singapore, 84% of Temasek listed firms pays dividends in contrast to the 64% of non-Temasek firms. Similarly, the payout ratio of Temasek firms is on average larger than non-Temasek firms. In terms of investment opportunities, Temasek firms have larger Tobin's Q than non-Temasek firms. Lastly, using the CGI measure for corporate governance, Temasek firms on average practice better corporate governance than non-Temasek firms. This is consistent with the findings by Sim et al. (2014).

[3] Figure borrowed from Gao et al. (2013)

4.7 Correlation matrix

Table 2 presents the correlation matrix for the main variables used in the study. We can see that the Temasek dummy is positively highly correlated with value-weighted CGI, size, cash flow, leverage, capital expenditure, payout ratio, Tobins Q and negatively highly correlated with lagged cash ratio, net working capital. Thus, we should controlled these variables when doing the multivariate analysis.

[Insert Table 2 near here]

5 Empirical results

5.1 Determinant of Cash Holding

Determinants of corporate cash policy and how cash policy eventually affect firm value are some of the interesting questions academics want to find answers for. Using similar empirical exercises used by Gao et al. (2013), and additional variables such as the corporate governance index and lines of credit, motivated by Harford et al. (2008) and Sufi (2009) respectively, we hope to shed some light on the determinants of cash policy in Singapore.

[Insert Table 3 near here]

Table 3 presents the cross-sectional regression results of a model of cash holdings. Explanatory variables are adapted from various extended literature, in particular by Gao et al. (2013). The dependent variable is cash, cash holdings scaled by net assets. In addition to the explanatory variables mentioned in the data section, industry and year fixed effects are included to control for the industry-adjusted and year-adjusted unobserved effect.

The results in column 1 show some evidence that the determinants of cash policy for US firms may be different from those for Singapore firms. This may not be that surprising because the business and geographical environment of Singapore and US is different in many

aspect. For example, the domestic market in Singapore is not as big as US, therefore firms in Singapore tend to expand overseas to look for greater demand. The following are evidence similar to Gao et al. (2013). Larger firms hold less cash which support the economics of scale story. Firms with greater cash flow, greater investment opportunities and less networking capital hold more cash. Firms that spent more on capital expenditures hold less cash supporting the spending hypothesis and firms that does more research and development hold more cash supporting the financing constraint story for information asymmetry firms.

The following are evidence found different from the study on US firms. In the US, firms with greater leverage hold more cash because external debt increases external monitoring which limit the agency problems faced by public US firms. This in turn prevents these firms from unnecessary spending cash, resulting in more cash holding. However in Singapore, there is no relation between leverage and cash. After controlling for agency problems, in column 3, we found an opposite result from the US: higher leveraged firms hold more cash. This may be due to the low cost of debt in a business friendly environment such that investing with debt can be more profitable than investing with cash, causing excess cash to be hoard and not spent. Firms that pay more dividend hold more cash which contradicts the financial constraint story and suggests that firms that are financially constraints do not pay dividends and hold more cash. However after controlling for the level of agency problems in each firms using the CGI, the relation disappears. Lastly, multinational firms or firms with greater foreign revenue do not hold more cash. This is not surprising when we compare the corporate tax laws between US and Singapore. In the US, foreign cash are taxed when repatriate, therefore US firms with greater foreign cash hold more cash because these cash are kept abroad even though there are no existing investment opportunity. In contrast, Singapore do not practice double taxation on the same revenue, and in conjunction of having one of the lowest corporate tax rate of 17% (MENON and ASSOCIATES (2014)), before tax exemptions, most repatriated cash are not taxed. Therefore consistent with the repatriation tax story, we should not expect any relation between foreign cash and cash

holdings for Singapore firms.

Motivated by theoretical research that argues both cash and lines of credit are substitutes in an efficient market without financing frictions, we regress cash with line of credit dummy and the usual controls to empirically test this hypothesis. Consistent with the theory, we found that on average, firm with lines of credit hold 12.5% less cash. After controlling for agency problems, this number is reduced to 4.3% and still significant. Since there is a possibility that cash policy and governance are jointly determined, prior literature suggest to use lagged cash as an instrumental variable. After controlling for lagged cash, we found evidence suggesting that on average firms with better corporate governance hold more cash.

5.2 GLCs and cash holdings

Papers such as Sim et al. (2014) and Ang and Ding (2006) give evidence that Temasek firms practice better corporate governance. Since most of the firms in Temasek's portfolio are there since inception, there exist minimal selection bias,i.e, Temasek chooses firms which already have better corporate governance. However care has to be taken when interpreting the results using the Temasek variable. The result can only explain the cash holding of firms if the firm uses Temasek unique good corporate governance practices and engage in business activities in a business environment similar to Singapore.

[Insert Table 4 near here]

Table 4 presents the cash model regression results with the Temasek dummy and voting rights as additional explanatory variables. In column 2, after controlling for the usual suspects, we show that Temasek firms hold 12% more cash than otherwise similar public firms. This number monotonically decrease after adding additional controls such as the Line of credit Dummy, to control for firm access to alternative liquidity, and the CGI index, to control for agency problems. However the coefficient on the Temasek dummy still remains positive and significant. Using Temasek voting rights instead of a Temasek dummy gives

similar results. In terms of economic significance, from column 8, for every 1% increase in Temasek voting rights onto the firm leads to a 0.1% increase in cash holdings. This result is consistent with our hypothesis that Temasek owned firms on average hold more cash because they practice better corporate governance and thereby reducing agency problems within the firm. The next natural question will be to investigate why Temasek firms hold more cash and whether holding more cash today is related to increasing future profitability thereby increasing future firm value or decreasing future profitability leading to a decrease in future firms value. Prior research by Ramirez and Tan (2004), Sim et al. (2014) and Ang and Ding (2006) show consistent evidence that Temasek firms are more profitable than other similar public firms. In addition,Ramirez and Tan (2004) found evidence that Temasek firms are valued 20% more than similar non-Temasek firms in the market. Although Temasek firms are more profitable, the question of whether holding more cash is associated with Temasek firms being more profitable still remains unanswered.

5.3 GLCs and their investment and payout decisions on excess cash

In this section, we try to examine why Temasek firms hold more cash than other similar public firms by analysing how Temasek owned firms use excess cash. Here we define excess cash as the firm unexplained cash portion of cash holdings. Specifically, the residual from regressing cash on firm-specific characteristics (table 3, column 1) represents the firms excess cash. We focus on three different possible decisions a firm can make when presented with excess cash. Firstly, a firm can use its excess cash to make external investments. We investigate this possibility by looking at the capital expenditure and acquisition variables in our sample. Secondly, a firm can return these excess cash back to the shareholders in a form of dividends or share repurchases. We can investigate this by looking at the payout ratio and the share repurchases variable. Lastly, a firm can also choose to do nothing and accumulate the excess cash with the current level of cash. We examine the excess cash, the relation with

being Temasek owned and the interaction of these variables on the firms future investment decisions. The dependent variable is one of the four investment decisions and the main explanatory variables is the lagged Temasek variable and the interaction variable between lagged Temasek and excess cash. The other control variables include: lagged dependent variable, lagged excess cash, lagged change in excess cash, lagged size, net working capital, leverage, revenue growth, and year and industry fixed effects.

[Insert Table 5 near here]

Results of the analysis are presented in table 5. Results from Model 1 and 2 suggest that Temasek firms when on average do not do more capital expenditure and acquisition. However when faces with excess cash, they spend it on acquisitions. However this results is not robust to the Temasek variable. The relation disappear when we use Temasek Voting Rights instead of the Temasek dummy. Results from model 3 and model 4 on payout policy is somewhat surprising. On average, Temasek firms pay more dividends. When faces with excess cash, Temasek firms reduces their payout ratio instead. This result is similar when using Temasek Voting Rights instead of the Temasek dummy. This suggest that Temasek firms are hoarding more cash when they have excess cash. This is consistent with our hypothesis that when firms have excess cash, it is a signal that the demand for investments are less than the usual levels. Therefore firms will hoard cash during these times in preparation for future investment opportunities. One possible way a firm can increase cash holdings is to decrease their payout ratio.

5.4 GLCs, excess cash and profitability

The analysis made in Table 5 suggest that the only decision made by Temasek firms when they have excess cash is to decrease dividend payout and hoard more cash. Taken together with the conclusion made on Table 4, we have shown some evidence on why Temasek firms hold more cash: Temasek firms do not spent excess cash. In this section, we turn our

attention to how these excess cash affects Temasek firms profitability. What we are interested in this section is how this period decisions affect next period profitability. To measure profitability, we use 4 different measures: Tobins Q, Return on Equity (ROE), Return on Sales (ROS) and Return on Assets (ROA). As for the main independent variable, we are examining the relation between Temasek firms and the interaction with excess cash. Excess cash is define similar to table 5: the firms unexplained cash portion of cash holdings. Other control variables in the cross-sectional analysis includes: lagged dependent variable, lagged excess cash, lagged change in excess cash, lagged size, net working capital, leverage, revenue growth, and year and industry fixed effects. Table 6 presents the regression results.

[Insert Table 6 near here]

We begin our examination by looking at the coefficients on the Temasek Dummy and Temasek voting rights variable. Consisting with existing literature, Temasek firms are on average more profitable than otherwise similar public firms. The evidence seemed compelling as the only coefficient that is not positively significant is the regression on model 3. However when we examine the coefficients on the interaction term between excess cash and Temasek, 7 out of 8 of the models gives negative coefficients and 3 of the negative coefficients are significant. This suggest that holding on to excess cash may result in the reduction in firm future profitability.

6 Conclusion

In this study, we gain insights into the determinants of cash policy for Singapore listed public firms which differ from the US case in some areas. We have also provided evidence that Temasek-owned firms on average hold more cash than non-Temasek-owned firms. This is consistent with the argument that firms with more agency problems tend to overspend excess cash leading to a lower cash holdings. In addition, we have shown that Temasek-owned firms do not spend excess cash on investments, dividend payouts or repurchases. Instead these

excess cash are accumulated and overtime leading to an increase in cash holdings. Adding to our evidence, we show that Temasek-owned firms on average practice better corporate governance and are more profitable. However the accumulation of excess cash is causing them to be less profitable.

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Table 1

Summary statistics

The sample consist of 4195 firm-year observations from 2004 to 2013, collected from Capital IQ. Firm's industry classification is based on Fama French 17 industry classification using their respective 4-digit SIC code. Cash is the Total Cash and Short Term Investments scaled by Net Assets where the Net Assets is computed as Total Assets less Total Cash and Short Term Investments. Industry-adjusted cash is the industry-median-adjusted cash scaled by Net Assets.Δ cash is the change is cash ratio. Size is the natural log of Net Assets. Cash Flow is the operating cash flow scaled by Net Assets, where operating cash flow is computed as EBITDA minus Net Interest Expense minus Income Tax Expense. Revenue Growth is percentage change in Revenue. Leverage is the Long Term Debt scaled by Net Assets. Net Working Capital (NWC) is Current Assets minus Current Liabilities minus Total Cash and Short Term Investments and scaled by Net Assets. Capex is Capital Expenditure scaled by Net Assets. Acquisition is the Acquisition Expenditures scaled by Net Assets. R&D is the R&D Expenditure scaled by Net Assets. Dividend Dummy is an indicator variable that takes the value 1 if the firm pays dividend, and zero otherwise. Tobin's Q is calculated using Total Assets minus Total Common Equity plus Market Value of Equity scaled by Total Assets. Foreign Revenue is the Total Revenue minus Revenue earned in Singapore scaled by Total Revenue. MNC is an indicator variable that takes the value 1 if the firm Foreign Revenue is more than 20%, and zero otherwise. Line of Credit (LOC) is the Undrawn Revolving Credit scaled by Total Liquidity Demand, where Total Liquidity Demand is calculated using Total Cash and Short Term Investments + Undrawn Revolving Credit. Line of Credit Dummy (LOC Dummy) is an indicator variable that takes the value 1 if the firm has access to banks' line of credit, and zero otherwise. Corporate Governance Index (CGI) is the CGI index of all SGX listed firms provided by SKBI(SMU). The CGI is a continuous number ranges from 0 to 100. All continuous variables are winsorized at the 1% and 99% levels. Superscript ***,**,and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	Full Sample		Non-Temasek		Temasek			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Obs.	Mean	Obs.	Mean	Obs.	Mean	Difference	t-stat
cash	4178	0.3417	3933	0.3482	245	0.2380	0.1102***	3.2473
Industry-adjusted cash	4178	0.1522	3933	0.1583	245	0.0537	0.1046***	3.1248
Δcash	4169	0.0375	3924	0.0385	245	0.0216	0.0169	1.2525
Firm Characteristics								
Size	4178	4.9260	3933	4.7794	245	7.2791	-2.4997***	-26.1887
Cash Flow	4149	0.0848	3904	0.0823	245	0.1254	-0.0431***	-3.7471
Revenue Growth	3981	0.1691	3738	0.1702	243	0.1521	0.0181	0.5198
Leverage	4178	0.0899	3933	0.0855	245	0.1609	-0.0754***	-8.7165
NWC	4178	.0258	933	0.0319	245	-0.0720	0.1039 ***	4.6708
Capex	4121	0.0675	3876	0.0670	245	0.0761	-0.0091	-1.6388
Acquisition	4178	0.0088	3933	0.0088	245	0.0099	-0.0011	-0.5116
R&D	4178	0.0008	3933	0.0008	245	0.0008	0.0000	-0.0008
Dividend Dummy	4195	0.6529	3950	0.6410	245	0.8449	-0.2039***	-6.5366
Payout Ratio	4195	0.3126	3950	0.3028	245	0.4710	-0.1682***	-4.8952
Tobin's Q	3937	1.3155	3693	1.2889	244	1.7184	-0.4296***	-6.0997
Foreign Revenue	4195	0.5732	3950	0.5753	245	0.5401	0.0352	1.3369
MNC	4195	0.7213	3950	0.7246	245	0.6694	0.0552*	1.8693
Alternative Liquidity Vehicles								
LOC	4181	0.0625	3936	0.0624	245	0.0630	-0.0005	-0.0426
LOC Dummy	4195	0.5502	3950	0.5514	245	0.5306	0.0208	0.6343
Corporate Governance Measure								
CGI (Value Weighted)	2534	62.5979	2370	62.0401	164	70.6584	-8.6183***	-10.9504
CGI (Equally Weighted)	2534	61.1272	2370	60.5126	164	70.0101	-9.4975***	-11.3147

Table 2

Correlation matrix

The sample consist of 4195 firm-year observations from 2004 to 2013, collected from Capital IQ. All continuous variables are winsorized at the 1% and 99% levels. p-values are reported in brackets.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. TEMASEK$_t$	1													
2. LOC Dummy$_t$	-0.01	1												
	[0.53]													
3. CGI(VW)$_{t-1}$	0.21	0.03	1											
	[0.00]	[0.11]												
4. Cash$_{t-1}$	-0.05	-0.22	-0.09	1										
	[0.00]	[0.00]	[0.00]											
5. Size$_t$	0.38	0.13	0.33	-0.35	1									
	[0.00]	[0.00]	[0.00]	[0.00]										
6. Cash Flow$_t$	0.06	-0.10	0.12	0.20	0.04	1								
	[0.00]	[0.00]	[0.00]	[0.00]	[0.02]									
7. Leverage$_t$	0.13	0.05	0.09	-0.18	0.36	-0.08	1							
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]								
8. NWC$_t$	-0.07	0.10	0.00	-0.21	0.08	0.18	-0.03	1						
	[0.00]	[0.00]	[0.98]	[0.00]	[0.00]	[0.00]	[0.07]							
9. Capex$_t$	0.03	-0.15	0.09	0.13	-0.03	0.20	0.10	-0.23	1					
	[0.10]	[0.00]	[0.00]	[0.00]	[0.05]	[0.00]	[0.00]	[0.00]						
10. Acquisition$_t$	0.01	-0.02	0.02	0.07	0.03	0.01	0.04	-0.04	-0.01	1				
	[0.61]	[0.20]	[0.37]	[0.00]	[0.03]	[0.37]	[0.02]	[0.01]	[0.63]					
11. R&D$_t$	0.00	-0.05	-0.02	0.07	0.05	0.04	-0.01	0.00	0.03	0.00	1			
	[1.00]	[0.00]	[0.30]	[0.00]	[0.00]	[0.01]	[0.69]	[0.91]	[0.08]	[0.89]				
12. Payout Ratio$_t$	0.08	-0.03	0.12	0.10	0.06	0.12	-0.03	0.07	-0.01	-0.01	0.03	1		
	[0.00]	[0.09]	[0.00]	[0.00]	[0.00]	[0.00]	[0.03]	[0.00]	[0.47]	[0.64]	[0.06]			
13. Foreign Revenue$_t$	-0.02	0.02	-0.03	-0.09	0.10	-0.03	-0.08	0.05	0.02	0.03	0.11	-0.04	1	
	[0.18]	[0.26]	[0.13]	[0.00]	[0.00]	[0.03]	[0.00]	[0.00]	[0.25]	[0.09]	[0.00]	[0.01]		
14. Tobin's Q$_t$	0.10	-0.11	-0.02	0.24	-0.16	-0.06	0.04	-0.40	0.14	0.10	0.06	-0.02	-0.07	1
	[0.00]	[0.00]	[0.46]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.24]	[0.00]	

Table 3

Determinants of Cash holdings

This table examines the determinants of cash holdings of firms listed in SGX. To do this, we regress Cash on various firm characteristics, alternative liquidity vehicles and the corporate governance index. The sample consist of 4195 firm-year observations from 2004 to 2013, collected from Capital IQ. Firm's industry classification is based on Fama French 17 industry classification using their respective 4-digit SIC code. The standard errors are clustered at industry level. Superscript ***,**,and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

$Cash_t$	(1)	(2)	(3)	(4)
$Cash_{t-1}$			0.660***	0.653***
			(0.044)	(0.044)
LOC $Dummy_t$		-0.125***		-0.043***
		(0.013)		(0.014)
$CGI(VW)_{t-1}$			0.002**	0.002**
			(0.001)	(0.001)
$Size_t$	-0.135***	-0.129***	-0.080***	-0.078***
	(0.008)	(0.007)	(0.011)	(0.011)
Cash $Flow_t$	0.809***	0.772***	0.294**	0.290**
	(0.105)	(0.104)	(0.145)	(0.144)
Tobin's Q_t	0.032**	0.028**	0.038*	0.036
	(0.013)	(0.013)	(0.022)	(0.022)
$Leverage_t$	0.007	0.021	0.228***	0.228***
	(0.062)	(0.062)	(0.077)	(0.077)
NWC_t	-0.446***	-0.440***	-0.263***	-0.263***
	(0.048)	(0.047)	(0.050)	(0.049)
$Capex_t$	-0.278**	-0.345***	-0.639***	-0.660***
	(0.115)	(0.114)	(0.159)	(0.159)
$Acquisition_t$	-0.011	-0.044	-1.506***	-1.493***
	(0.262)	(0.258)	(0.258)	(0.258)
$R\&D_t$	7.727***	7.138***	2.766	2.675
	(1.746)	(1.675)	(1.905)	(1.888)
Payout $Ratio_t$	0.050***	0.047***	0.007	0.007
	(0.014)	(0.014)	(0.017)	(0.017)
Foreign $Revenue_t$	-0.011	-0.011	-0.007	-0.008
	(0.020)	(0.020)	(0.024)	(0.024)
Constant	0.801***	0.867***	0.435***	0.459***
	(0.053)	(0.055)	(0.074)	(0.077)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Sample Size	3881	3881	2096	2096
Adjusted R^2	0.327	0.342	0.624	0.626

Table 4

Determinants of Cash with Temasek Holding

This table examines the cash holdings of Temasek's publicly listed firms relative to firms listed on SGX. To do this, we regress Cash on the Temasek variables, various firm characteristics, alternative liquidity vehicles and their respective corporate governance index. Columns 1-4 are regressions with Temasek dummy as an independent variable, whereas columns 5-8 are regressions with Temasek Voting Rights (Temasek VR) as an independent variable. The sample consist of 4195 firm-year observations from 2004 to 2013, collected from Capital IQ. Firm's industry classification is based on Fama French 17 industry classification using their respective 4-digit SIC code. The standard errors are clustered at industry level. Superscript ***,**,and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

$Cash_t$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$TEMASEK_t$	0.235***	0.120***	0.114***	0.058**				
	(0.026)	(0.026)	(0.026)	(0.026)				
TEMASEK VR_t					0.005***	0.002***	0.002***	0.001***
					(0.001)	(0.000)	(0.000)	(0.000)
$Cash_{t-1}$				0.652***				0.652***
				(0.044)				(0.044)
LOC $Dummy_t$			-0.124***	-0.043***			-0.124***	-0.043***
			(0.013)	(0.014)			(0.013)	(0.014)
$CGI(VW)_{t-1}$				0.002**				0.002**
				(0.001)				(0.001)
$Size_t$	-0.155***	-0.142***	-0.136***	-0.081***	-0.154***	-0.142***	-0.136***	-0.082***
	(0.009)	(0.008)	(0.008)	(0.011)	(0.009)	(0.008)	(0.008)	(0.011)
Cash $Flow_t$		0.801***	0.765***	0.288**		0.802***	0.766***	0.288**
		(0.105)	(0.104)	(0.144)		(0.105)	(0.104)	(0.144)
TOBIN's Q_t		0.028**	0.024*	0.033		0.028**	0.025*	0.033
		(0.014)	(0.013)	(0.023)		(0.013)	(0.013)	(0.022)
$Leverage_t$		0.013	0.026	0.231***		0.018	0.030	0.232***
		(0.062)	(0.062)	(0.076)		(0.062)	(0.062)	(0.076)
NWC_t		-0.443***	-0.437***	-0.262***		-0.442***	-0.437***	-0.262***
		(0.048)	(0.047)	(0.049)		(0.048)	(0.047)	(0.049)
$Capex_t$		-0.254**	-0.321***	-0.649***		-0.252**	-0.320***	-0.650***
		(0.116)	(0.116)	(0.159)		(0.116)	(0.115)	(0.159)
$Acquisition_t$		0.016	-0.018	-1.482***		0.021	-0.013	-1.470***
		(0.260)	(0.256)	(0.259)		(0.260)	(0.257)	(0.259)
$R\&D_t$		7.923***	7.330***	2.664		7.800***	7.213***	2.564
		(1.729)	(1.658)	(1.884)		(1.733)	(1.661)	(1.888)
Payout $Ratio_t$		0.048***	0.045***	0.005		0.048***	0.045***	0.005
		(0.014)	(0.014)	(0.017)		(0.014)	(0.014)	(0.017)
Foreign $Revenue_t$		-0.007	-0.007	-0.007		-0.007	-0.007	-0.008
		(0.020)	(0.020)	(0.024)		(0.020)	(0.020)	(0.024)
Constant	0.982***	0.834***	0.898***	0.485***	0.979***	0.833***	0.897***	0.486***
	(0.050)	(0.055)	(0.057)	(0.080)	(0.050)	(0.055)	(0.057)	(0.081)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	4178	3881	3881	2096	4178	3881	3881	2096
Adjusted R^2	0.207	0.330	0.344	0.626	0.208	0.330	0.345	0.626

Table 5

Temasek's cash holdings in relation to their Investment and payout decisions

This table examines Temasek's decisions in relation to investments and payout decisions. For Investment decisions, the dependent variables are Capital Expenditure ($Capex_t$) and $Aquisition_t$. For Payout decisions, the dependent variables are Payout Ratio ($Payout\ Ratio_t$) and Repurchases ($Repurchases_t$). Columns 1-4 are regressions with Temasek dummy as an independent variable, whereas columns 5-8 are regressions with Temasek Voting Rights (Temasek VR) as an independent variable. The firm's excess cash (E.Cash) is the saved residue from the regression in Table 4 column 1. The sample consist of 4195 firm-year observations from 2004 to 2013, collected from Capital IQ. Firm's industry classification is based on Fama French 17 industry classification using their respective 4-digit SIC code. The standard errors are clustered at industry level. Superscript ***,**,and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	(A)TEMASEK DUMMY				(B)TEMASEK VR			
	Investment Decision		Payout Policy		Investment Decision		Payout Policy	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$Capex_t$	$Acquisition_t$	$Payout_t$	$Repurchase_t$	$Capex_t$	$Acquisition_t$	$Payout_t$	$Repurchase_t$
$TEMASEK_{t-1}$*E.Cash	-0.024	0.016*	-0.387***	0.013	-0.000	0.000	-0.007***	0.001
	(0.015)	(0.010)	(0.100)	(0.064)	(0.000)	(0.000)	(0.003)	(0.002)
$TEMASEK_{t-1}$	-0.000	0.000	0.155***	0.022	-0.000	0.000	0.003***	0.000
	(0.004)	(0.002)	(0.036)	(0.015)	(0.000)	(0.000)	(0.001)	(0.000)
$Capex_{t-1}$	0.600***				0.600***			
	(0.025)				(0.025)			
$Acquisition_{t-1}$		0.139***				0.140***		
		(0.034)				(0.035)		
$Payout\ Ratio_{t-1}$			0.215***				0.217***	
			(0.028)				(0.028)	
$Repurchase_{t-1}$				0.167***				0.167***
				(0.046)				(0.046)
$E.Cash_{t-1}$	0.001	0.006**	0.136***	0.013*	0.001	0.006**	0.131***	0.013*
	(0.005)	(0.003)	(0.044)	(0.007)	(0.005)	(0.003)	(0.044)	(0.007)
$\Delta E.Cash_{t-1}$	0.010	-0.003	0.016	0.018**	0.010	-0.003	0.018	0.018**
	(0.007)	(0.003)	(0.052)	(0.008)	(0.007)	(0.003)	(0.052)	(0.008)
$Size_{t-1}$	-0.002**	-0.001*	0.013*	0.003	-0.002**	-0.001*	0.013*	0.003
	(0.001)	(0.001)	(0.007)	(0.002)	(0.001)	(0.001)	(0.007)	(0.002)
NWC_t	-0.025***	-0.003**	0.119***	0.001	-0.025***	-0.003**	0.117***	0.001
	(0.005)	(0.002)	(0.024)	(0.005)	(0.005)	(0.002)	(0.024)	(0.005)
$leverage_t$	0.021*	0.010*	-0.226***	-0.015	0.022**	0.010*	-0.227***	-0.014
	(0.011)	(0.005)	(0.066)	(0.018)	(0.011)	(0.005)	(0.066)	(0.018)
Revenue $Growth_t$	0.004*	0.006***	-0.100***	0.002	0.004*	0.006***	-0.099***	0.003
	(0.002)	(0.002)	(0.016)	(0.006)	(0.003)	(0.002)	(0.015)	(0.006)
Constant	0.034***	0.013***	0.130**	-0.011	0.035***	0.013***	0.130**	-0.010
	(0.007)	(0.004)	(0.053)	(0.012)	(0.007)	(0.004)	(0.053)	(0.012)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	2842	2852	2852	2850	2842	2852	2852	2850
Adjusted R^2	0.499	0.050	0.086	0.042	0.499	0.050	0.085	0.042

Table 6

Temasek's cash holdings in relation to Profitability

This table examines Temasek's firms profitabiltiy in relation to holding excess cash. The dependent variables are all different profitability measures namely Tobin's Q, Return on Equity (ROE), Return on Sales or profit margins (ROS) and Return on Assets (ROA). Columns 1-4 are regressions with Temasek dummy as an independent variable, whereas columns 5-8 are regressions with Temasek Voting Rights (Temasek VR) as an independent variable. The firm's excess cash (E.Cash) is the residue from the regression in Table 4. The sample consist of 4195 firm-year observations from 2004 to 2013, collected from Capital IQ. Firm's industry classification is based on Fama French 17 industry classification using their respective 4-digit SIC code. The standard errors are clustered at industry level. Superscript ***,**,and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	(A)TEMASEK DUMMY				(B)TEMASEK VR			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	TOBIN's Q_t	ROE_t	ROS_t	ROA_t	TOBIN's Q_t	ROE_t	ROS_t	ROA_t
$TEMASEK_{t-1}$*E.Cash	-0.243	-0.174*	-0.027	-0.054***	0.001	-0.002	-0.002	-0.001***
	(0.204)	(0.089)	(0.131)	(0.016)	(0.007)	(0.002)	(0.002)	(0.000)
$TEMASEK_{t-1}$	0.253***	0.090***	0.010	0.025***	0.003*	0.001***	0.001*	0.000***
	(0.068)	(0.025)	(0.033)	(0.006)	(0.002)	(0.000)	(0.000)	(0.000)
Tobin's Q_{t-1}	0.670***				0.674***			
	(0.041)				(0.040)			
ROE_{t-1}		0.268***				0.271***		
		(0.057)				(0.057)		
ROS_{t-1}			0.430***				0.429***	
			(0.077)				(0.077)	
ROA_{t-1}				0.653***				0.657***
				(0.028)				(0.028)
$E.Cash_{t-1}$	-0.012	-0.032	-0.039	-0.010*	-0.019	-0.035*	-0.037	-0.011*
	(0.057)	(0.021)	(0.043)	(0.006)	(0.057)	(0.021)	(0.043)	(0.006)
$\Delta E.Cash_{t-1}$	-0.048	0.058*	0.023	0.012	-0.045	0.058*	0.023	0.012*
	(0.089)	(0.030)	(0.059)	(0.007)	(0.089)	(0.030)	(0.059)	(0.007)
$Size_{t-1}$	-0.047***	0.003	0.038***	0.002*	-0.045***	0.004	0.038***	0.003**
	(0.014)	(0.007)	(0.009)	(0.001)	(0.014)	(0.007)	(0.009)	(0.001)
NWC_t	0.265	0.259***	-0.193**	-0.023*	0.276*	0.262***	-0.198**	-0.023
	(0.167)	(0.079)	(0.079)	(0.014)	(0.168)	(0.080)	(0.079)	(0.014)
$Leverage_t$	-0.069**	0.085***	0.195***	0.040***	-0.069**	0.085***	0.195***	0.040***
	(0.032)	(0.019)	(0.038)	(0.005)	(0.032)	(0.019)	(0.038)	(0.005)
Revenue $Growth_t$	-0.580***	-0.024	0.188***	0.035***	-0.580***	-0.026	0.188***	0.034***
	(0.107)	(0.054)	(0.053)	(0.011)	(0.107)	(0.054)	(0.053)	(0.011)
Constant	0.757***	0.007	-0.175***	0.009	0.742***	0.003	-0.173***	0.008
	(0.095)	(0.054)	(0.066)	(0.010)	(0.093)	(0.054)	(0.065)	(0.010)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	2851	2850	2850	2851	2851	2850	2850	2851
Adjusted R^2	0.582	0.111	0.221	0.524	0.581	0.109	0.221	0.523

Appendix

Industry Classification

This table presents the distribution of Temasek firms and non-Temasek firms in each of the 17 industry. Firm's industry classification is based on Fama French 17 industry classification using their respective 4-digit SIC code.

	Non-Temasek				TEMASEK		
INDUSTRY	Freq.	Percent	Cum.	INDUSTRY	Freq.	Percent	Cum.
1 Food	296	7.49	7.49	1 Food	17	6.94	6.94
2 Mines	84	2.13	9.62	3 Oil	29	11.84	18.78
3 Oil	171	4.33	13.95	5 Durables	3	1.22	20
4 Clothings	70	1.77	15.72	8 Construction	5	2.04	22.04
5 Durables	297	7.52	23.24	11 Machn	29	11.84	33.88
6 Chems	65	1.65	24.89	12 Automobile	2	0.82	34.69
7 Consumer	40	1.01	25.9	13 Transport	105	42.86	77.55
8 Construction	504	12.76	38.66	15 Retail	6	2.45	80
9 Steel	117	2.96	41.62	17 Other	49	20	100
10 FabPr	80	2.03	43.65				
11 Machn	619	15.67	59.32				
12 Automobile	52	1.32	60.63				
13 Transport	242	6.13	66.76				
15 Retail	213	5.39	72.15				
17 Other	1,100	27.85	100				
Total	3,950	100		Total	245	100	