

Singapore Inc. Versus the Private Sector: Are Government-Linked Companies Different?

CARLOS D. RAMÍREZ and LING HUI TAN*

Government-linked companies (GLCs) have a significant presence in Singapore's corporate sector. Unlike parastatals in many other countries, these companies are run on a competitive, commercial basis, ostensibly without government privileges. Based on data from publicly listed GLCs and non-GLCs, we indeed find no evidence that GLCs have easier access to credit. However, we do find that being a GLC is rewarded in financial markets with a positive premium, over and above what can be explained by the usual determinants of Tobin's q . [JEL L32, L33, G32]

As part of its postindependence industrialization plan, the Singapore government assumed a proactive entrepreneurial role by establishing state enterprises (called government-linked companies, or GLCs) in key sectors such as manufacturing, finance, trading, transportation, shipbuilding, and services. In this respect, Singapore was different from Hong Kong SAR, whose economic growth was driven by private enterprises, and other East Asian economies like Japan, Taiwan Province of China, and the Republic of Korea, where active industrial policy did not involve widespread government ownership of enterprises. By most accounts, this strategy of “state capitalism” has been quite successful. GLCs have evolved into an important national institution, and the major companies have become well-recognized corporate names regionally and even—in the case of Singapore Airlines—globally.

*Carlos D. Ramírez is Associate Professor of Economics at George Mason University. Ling Hui Tan is a Senior Economist in the IMF Institute. The views expressed in this paper are those of the authors and do not necessarily represent those of the IMF or IMF policy. The authors thank Andrew Feltenstein, Robert Flood, Celine Sia, and seminar participants at the IMF Institute for helpful comments.

Unlike parastatals in many countries, Singapore's GLCs bear a close resemblance to private enterprises. The government subscribes to what has been termed the "managerial view" in the ongoing debate on public versus private ownership, which argues that competition rather than ownership per se is the key to efficiency.¹ GLCs are run on a commercial basis, with a focus on bottom-line performance. They have not been used for social or employment-generation purposes. They compete with private firms and multinational companies and, in some cases, with each other. Many of them have been partially privatized and are listed on the local stock exchange.

Yet, while GLCs have undoubtedly been a major element in Singapore's economic development, there recently has been an active debate concerning their future role in the economy.² Criticism of GLCs falls into two broad categories. The first contends that GLCs tend to do better than private sector firms because their institutional relationship with the government gives them special advantages in terms of access to funds, tenders, and opportunities; consequently, they have closed large areas of the economy to the private sector and stifled entrepreneurship. The second contends that GLCs tend to do worse than private sector firms because their managers are mainly civil servants who lack business acumen, and their investments may be politically, rather than commercially, motivated.

The purpose of this paper is to investigate the differences between GLCs and private sector firms empirically. To our knowledge, this has not been attempted so far; the discussion has been mostly anecdotal. Using data on publicly listed GLCs and a control sample of non-GLCs, we consider two questions: (1) Do GLCs benefit from special financial advantages? and (2) Do the financial markets value GLCs and non-GLCs differently, and if so, why? We examine the first claim by comparing the investment behavior of GLCs and non-GLCs—if GLCs do indeed receive preferential financing, they would tend to be less liquidity-constrained than non-GLCs. Next, we run Tobin's q regressions to find out if government ownership/affiliation makes a difference to the market valuation of a company.

I. Background

To jump-start industrialization in the late 1960s, the Singapore government created GLCs and statutory boards to spearhead development in various sectors of the economy.³ The stated rationale for this strategy was to compensate for the lack of

¹The alternative view, termed the "political view" or "ownership view," maintains that government-owned enterprises are intrinsically inefficient because governments pursue objectives in addition to, and in conflict with, profit maximization, and this political interference can distort the objectives and constraints faced by managers of such enterprises. See Shleifer (1998) for an example of this view, and Bardhan and Roemer (1992) for an example of the managerial view.

²This debate was sparked by the release of a report by a government-appointed committee on the role of the government in business (Singapore, Economic Review Committee, 2002); the committee's final recommendations are summarized in Singapore, Ministry of Trade and Industry (2003). An earlier debate—reflecting many of the same arguments—occurred in the late 1980s, when several public enterprises were fully or partially privatized.

³Statutory boards are legislated under individual acts of Parliament that define their functions, scope, and powers; they are formed under various ministries and are accountable to them through Parliament. GLCs are incorporated under the Companies Act and do not come under the direct purview of Parliament. Both GLCs and statutory boards can form their own subsidiaries and associated companies.

private sector funds or expertise. Pioneer GLCs included the Keppel, Sembawang, and Jurong Shipyards, which spurred the development of Singapore as a major shipbuilding and ship repair center; the Development Bank of Singapore, which was set up to provide development financing; and Neptune Orient Lines, which was formed to leverage on the island's strategic location. Some GLCs were set up for strategic reasons, notably Chartered Industries and Allied Ordnance in the defense industry. Many of these early companies were joint ventures with foreign investors. For example, the Singapore Refining Company, which provided the catalyst for the growth of the oil refining industry, was a joint venture with Caltex and British Petroleum, while the Petrochemical Corporation of Singapore, which launched Singapore's entry into the petrochemicals industry, was a joint venture with Shell and a Japanese consortium.

In 1974, the government (through the Ministry of Finance) established a limited holding company, Temasek Holdings, to manage its investments in GLCs. At that time, 36 companies were transferred to Temasek's control.⁴ Since then, rapid economic growth has afforded GLCs the scope and opportunities to expand and diversify their operations. The 1980s and 1990s also saw the corporatization of a number of statutory boards into GLCs.⁵ Today, the total number of GLCs is estimated to be in the hundreds. Temasek Holdings directly holds 22 first-tier GLCs, all of which have subsidiaries or associate companies, which in turn often have third-tier subsidiaries, and so on. The companies are involved in a wide range of sectors, including finance, telecommunications, transport and logistics, property, infrastructure and engineering, and utilities.

Temasek Holdings and its subsidiaries are registered companies under the Companies Act, subject to all the same requirements as private businesses. Many of its companies are listed on the Singapore Exchange. According to Temasek, the major listed companies account for more than 20 percent of the total market capitalization.⁶

In addition to GLCs held directly or indirectly by Temasek Holdings, there are also a number of enterprises that are fully or majority owned by statutory boards. Such enterprises may also be classified as GLCs, to the extent that their shares are owned ultimately by the government. An example is the Comfort Group, a publicly listed land transportation services conglomerate owned primarily by the Singapore Labor Foundation (a statutory board).

According to the government, GLCs operate fully as for-profit commercial entities, on the same basis as private sector companies: They are expected to pro-

⁴Two other holding companies were set up around the same time: MND Holdings (owned by the Ministry of National Development) and Sheng-Li Holdings (owned by the Ministry of Defense). MND Holdings was subsequently taken over by the Ministry of Finance and the bulk of its GLCs transferred to Temasek. Sheng-Li Holdings (now Singapore Technologies) is responsible for defense-related GLCs.

⁵For example, the Telecommunications Authority of Singapore was converted to Singapore Telecommunications in 1992, the Public Utilities Board's electricity sector functions were spun off to create Singapore Power in 1995, and the Port Authority of Singapore was converted into PSA Corporation in 1997.

⁶The listed first-tier companies are DBS Bank, Keppel Corporation, Neptune Orient Lines, SembCorp Industries, Singapore Airlines, SMRT Corporation, and Singapore Telecommunications. See <http://www.temasekholdings.com.sg/>.

vide commercial returns, commensurate with risks taken; they are subject to the same regulations and market forces as private entrepreneurs; and they do not receive any subsidies or preferential treatment from the government. In an early survey of public enterprises in Singapore, Lee (1976, p. 57) concludes that “[g]overnment control is in fact very loose” and that the government “normally does not interfere with the management of the companies directly.” Lee (1976, p. 58) further notes that GLCs appear to receive few, if any, special privileges by virtue of their government ownership:

Tax holidays and tax concessions are applied generally to all companies as long as they fulfill the conditions of pioneer status and export orientation. Most of the public enterprises obtain credit from the Development Bank of Singapore, but the interest rate is usually not lower than that of other banks. . . . A few government companies may secure orders of goods and services from government departments. A few said they might squeeze a lower price from suppliers of input of materials because they were government-owned. . . . To the question, “whether they can obtain prior information regarding the government’s future policy measures,” practically all of them replied negatively.

The main advantage of government ownership appears to be the positive signal it sends to the markets. The following statement by a GLC manager, cited in Low (1991, p. 65), sums it up: “Being linked to Government is of course useful. It gives the company credibility and nobody will think you are a fly-by-night operation. But the company has to justify itself and earn its keep by marketing right products at the right time as no favours are given or expected.”

Indeed, many GLCs have consistently posted a strong financial performance. But the rapid growth of GLCs—both in size and in number—has led to concerns that they are encroaching into too many industries, effectively crowding out the private sector and hindering the development of a critical mass of thriving local enterprises. Among small- and medium-sized private enterprises in particular, GLCs are still perceived to have unfair advantages in terms of access to funds, tenders, and opportunities. Other critics argue that GLCs are less efficient than private sector firms, due to their institutional relationship with the government, the market structure in which they operate, or the management systems applied within them. For example, GLC managers are usually appointed from the ranks of senior civil servants and military officers; and, while they are generally of a high quality and promoted on the basis of their performance—the Singaporean civil service being “an extreme example of a meritocracy” (Krause, 1987, p. 119)—they have also been criticized for being too risk-averse and lacking sufficient entrepreneurial drive.⁷ There have also been charges that certain GLC investments have been politically rather than commercially motivated. And being linked to the government may sometimes be a hindrance rather than an advantage; in recent years, some

⁷In recent years, some of the large GLCs saw management shake-ups, with new senior executives brought in from the private sector and some from abroad. A number of these foreign executives subsequently left before completing their contracts. The government has put this down to coincidence, maintaining that it does not play a direct role in recruitment decisions made by the GLCs’ boards.

countries have been reluctant to allow Singaporean GLCs to invest in sectors considered nationally strategic.⁸

II. Data and Descriptive Statistics

There is very little publicly available information on GLCs in Singapore. Temasek Holdings lists its major companies on its website, but not all of its (numerous) subsidiaries and associated companies. In fact, the definition of a GLC has itself been the source of some controversy. Singapore's Department of Statistics defines GLCs as companies in which the government's effective ownership of voting shares is 20 percent or more.⁹ However, as argued in United States, State Department (2001), this definition excludes many second- or third-tier GLC subsidiaries. For example, if Temasek owns 50 percent of a first-tier GLC, and that GLC owns 30 percent of a subsidiary, the effective government ownership of the subsidiary is calculated to be only 15 percent; as a result, the subsidiary is not considered to be a GLC. It can be argued that companies in which the government's formal shareholding is less than 20 percent should still be considered government-linked, even if they are not effectively government-owned. For example, if the other shareholders individually own a miniscule fraction of the company, a mere 5 percent government ownership can entail *de facto* control of the company. Thus, the government may be the largest shareholder (and therefore have a controlling stake) with an ownership fraction of less than 20 percent if the other shareholders are atomistic.

For the purposes of this paper, we classify a firm as a GLC if one of its *substantial shareholders* is Temasek Holdings or a statutory board. (Under the Companies Act, an individual is considered to have substantial shareholding in a company if he or she has an interest in 5 percent or more of the voting shares of that company.) Firm data, including information on shareholders, were obtained from the *Corporate Handbook*, supplemented, where necessary, by information from the Singapore Exchange's website. A list of GLCs and the control group of private enterprises is presented in Table 1. We focus on only three sectors—manufacturing; transport, storage, and communications (TSC); and multi-industry—as these are areas in which GLCs have a significant presence.¹⁰ We were able to obtain adequate data for the period 1994–98 for a sample of 17 GLCs and 92 private enterprises in these three sectors.

Table 2 presents summary statistics for the sample. The figures presented for each group (GLC and non-GLC) are means, medians, and standard deviations, calculated for all firms and all years. Note that the average GLC is almost 10 times as large as the average non-GLC in terms of capital stock (fixed assets). Aside from this, the two groups of firms have a roughly similar set of characteristics. During the sample period, GLCs reported slightly lower average cash flow and gross sales (proportional

⁸In 1999–2000, Singapore Telecommunications was defeated in takeover attempts in Hong Kong SAR and Malaysia largely for this reason.

⁹See Singapore, Department of Statistics (2001). The list of GLCs according to this definition was not published.

¹⁰GLCs are also strongly represented in the financial and property sector, but the characteristics of firms in these sectors do not lend themselves well to our empirical framework.

Table 1. Sample Companies

GLCs	Sector	Private Enterprises	Sector
Comfort Group	TSC	Ace Dynamics	Manufacturing
CWT Distribution	TSC	Acer Computer International	Manufacturing
DelGro Corp.	TSC	Acma	Multi-industry
Intraco	Multi-industry	Alliance Technology & Devt	Multi-industry
Jurong Shipyard	Manufacturing	Amtek Engineering	Manufacturing
Keppel Corp.	Multi-industry	Armstrong Industrial Corp.	Manufacturing
Keppel Hitachi Zosen	Manufacturing	Asia Pacific Breweries	Manufacturing
Keppel Marine Industries	Manufacturing	Avimo Group	Manufacturing
NatSteel	Multi-industry	Aztech Systems	Manufacturing
Neptune Orient Lines	TSC	Berger International	Manufacturing
SembCorp Logistics	TSC	British American Tobacco Co.(S)	Manufacturing
Singapore Airlines	TSC	Broadway Industrial Group	Manufacturing
Singapore Petroleum Co.	Manufacturing	Burwill Holdings	Manufacturing
Singapore Press Holdings	Manufacturing	CAM International Holdings	Manufacturing
Singapore Telecoms	TSC	CarnaudMetalbox Asia	Manufacturing
SNP Corp.	Manufacturing	Cerebos Pacific	Manufacturing
Times Publishing	Manufacturing	Chuan Hup Holdings	TSC
		Clipsal Industries (Holdings)	Manufacturing
		Compact Metal Industries	Manufacturing
		Cosco Investments (S)	TSC
		Creative Technology	Manufacturing
		Datapulse Technology	Manufacturing
		Eastern Publishing	Manufacturing
		Elec & Eltek International Co.	Manufacturing
		Eltech Electronics	Manufacturing
		Falmax	Manufacturing
		First Engineering	Manufacturing
		Fraser & Neave	Manufacturing
		Freight Links Express Holdings	TSC
		Fu Yu Manufacturing	Manufacturing
		GB Holdings	Manufacturing
		General Magnetics	Manufacturing
		Giken Sakata (S)	Manufacturing
		GP Batteries International	Manufacturing
		GPE Industries	Manufacturing
		Haw Par Corp.	Multi-industry
		Haw Par Healthcare	Manufacturing
		HBM Print	Manufacturing
		Heshe Holdings	Manufacturing
		Ho Wah Genting International	Manufacturing
		Hotel Properties	Multi-industry
		Hwa Hong Corp.	Multi-industry
		Hwa Tat Lee Holdings	Manufacturing
		IMC Holdings	TSC
		Inter-Roller Engineering	Manufacturing
		IPC Corp.	Manufacturing
		Jaya Holdings	TSC
		Jurong Cement	Manufacturing

(continued)

Table 1. (*concluded*)

GLCs	Sector	Private Enterprises	Sector
		Liang Huat Aluminium	Manufacturing
		Lion Asiapac	Manufacturing
		Metalock (S)	Manufacturing
		MHE Holdings	Manufacturing
		National Kap	Manufacturing
		Network Foods International	Manufacturing
		Nippecraft	Manufacturing
		Omni Mold	Manufacturing
		Osprey Maritime	TSC
		Pacific Can Investment Holdings	Manufacturing
		Pacific Carriers	TSC
		Pan Pacific Public Co.	Manufacturing
		PCI	Manufacturing
		Pentex-Schweizer Circuits	Manufacturing
		Pokka Corp. (S)	Manufacturing
		Powermatic Data Systems	Manufacturing
		Prima	Multi-industry
		QAF	Manufacturing
		Rothmans Industries Holdings	Manufacturing
		Rotol Singapore	Manufacturing
		San Teh	Manufacturing
		Seksun Precision Engineering	Manufacturing
		Sime Singapore	Multi-industry
		Singamas Container Holdings	Manufacturing
		Singatronics	Multi-industry
		SM Summit Holdings	Manufacturing
		Sunright	Manufacturing
		Super Coffeemix Manufacturing	Manufacturing
		Superior Metal Printing	Manufacturing
		Teckwah Industrial Corp.	Manufacturing
		The Straits Trading Co.	Multi-industry
		TIBS Holdings	TSC
		Tong Meng Industries	Manufacturing
		Total Access Communication Public Co.	TSC
		Tri-M Technologies (S)	Manufacturing
		Tuan Sing Holdings	Multi-industry
		United Engineers	Multi-industry
		United Industrial Corp.	Multi-industry
		United Pulp & Paper Co.	Manufacturing
		Venture Manufacturing (S)	Manufacturing
		Wassall Asia Pacific	Manufacturing
		WBL Corp.	Multi-industry
		Wepco	Manufacturing
		Yeo Hiap Seng	Manufacturing

Note: TSC is transport, storage, and communications.

Table 2. Summary Statistics

Statistic	GLCs	Non-GLCs
Number of firms	17	92
Investment*		
<i>Mean</i>	0.14	0.14
<i>Median</i>	0.10	0.04
<i>Standard deviation</i>	0.22	0.39
Cash flow*		
<i>Mean</i>	0.31	0.44
<i>Median</i>	0.23	0.20
<i>Standard deviation</i>	0.38	1.16
Gross sales*		
<i>Mean</i>	2.58	4.15
<i>Median</i>	1.44	2.24
<i>Standard deviation</i>	3.98	7.42
Liquid assets*		
<i>Mean</i>	0.87	0.87
<i>Median</i>	0.45	0.28
<i>Standard deviation</i>	1.01	1.78
q		
<i>Mean</i>	1.83	1.65
<i>Median</i>	1.44	1.44
<i>Standard deviation</i>	1.21	0.85
ROA		
<i>Mean</i>	6.06	3.91
<i>Median</i>	5.43	4.35
<i>Standard deviation</i>	7.69	10.62
Debt-equity ratio		
<i>Mean</i>	0.91	0.97
<i>Median</i>	0.61	0.71
<i>Standard deviation</i>	0.94	1.71
Total assets (S\$ million)		
<i>Mean</i>	3,558	922
<i>Median</i>	844	141
<i>Standard deviation</i>	5,815	5,281
Fixed assets (S\$ million)		
<i>Mean</i>	1,407	149
<i>Median</i>	301	46
<i>Standard deviation</i>	2,621	367

*Proportional to fixed assets.

to capital stock) compared with non-GLCs; average investment and liquid assets (also proportional to capital stock) were almost identical for the two groups. The medians of these variables are always smaller than the means, indicating that their distributions are skewed by some large values. This is true for both GLCs and non-GLCs.

Table 2 also presents the value of q , a proxy for Tobin's q (the market value of the firm relative to its replacement cost). Here, q is approximated by the market value of common equity stock plus the book value of debt and preferred stock,

divided by the book value of total assets. During the sample period, the average Tobin's q for GLCs exceeded the average q for non-GLCs by about 10 percent, although the median q values were comparable for the two groups. We investigate differences in Tobin's q further in Section IV.

Finally, Table 2 shows the profitability of the two sets of companies, as measured by the return on total assets (ROA), which is the ratio of pretax net profits plus interest payments to total assets (both equity and nonequity capital). By this indicator, GLCs appear to be more profitable on average than non-GLCs. However, the standard deviations are so large that the difference between the two means is not statistically significant at standard levels.¹¹ This can be verified by looking at the medians, which are much more comparable between the two groups. Furthermore, this accounting ratio has well-known weaknesses—for example, it reflects only past profitability, is not adjusted for risk, and tends to be subject to manipulation. We discuss this further in Section IV.

III. Are GLCs Less Liquidity-Constrained?

A recurring charge against GLCs is that they enjoy financial privileges and do not compete on an equal footing with private enterprises. Krause (1987, p. 119), for example, asserts that GLCs have a “natural advantage . . . in marshalling financial resources,” because “the government saves more than it invests, and thus always has easy access to finance.” Charges of cheap funding for GLCs were also made more recently by two members of Parliament during a parliamentary debate last year.¹²

There are different ways in which GLCs could potentially receive cheap funding—government loan guarantees, concessional interest rates, and generous repayment periods are some examples that come to mind. However, it is virtually impossible to obtain data on the terms of borrowing for each firm and each project. Hence, a direct test of preferential credit access is not feasible, and we have to resort to an indirect test.

One useful way to test—indirectly—if GLCs have indeed received financial advantages is to compare their investment behavior with that of their private sector counterparts. According to the imperfect capital markets literature, problems of asymmetric information between borrowers and lenders (such as adverse selection and moral hazard) make external financing more costly than internal financing for many firms. If lenders have imperfect information about the quality or riskiness of the borrowers' investment projects, adverse selection will lead to the so-called “lemons” premium, a wedge between the cost of external financing and internally generated funds. In the presence of incentive problems and costly monitoring of managers, external lenders will require a higher return to compensate them for these monitoring costs and the potential moral hazard associated with managers' (i.e., borrowers') control over the allocation of investment funds. To the extent that a firm's managers themselves supply the funds for investment projects, the shadow cost of these funds need not carry such a premium reflecting adverse selection or

¹¹The t -statistic for the difference in means is 0.99 for the ROA.

¹²See Singapore, Ministry of Information (2002).

moral hazard.¹³ Firms that find it too expensive to raise capital externally would thus tend to rely more on internal funds to finance their investment spending, so their investment spending would tend to be strongly correlated with their liquidity—all else constant, more liquid firms would be able to afford to invest more.

If GLCs have preferential access to financing (whether it be through lower interest rates or government guarantees), this means they find it cheaper to raise external funds compared with their private sector counterparts. If this is the case, liquidity should be irrelevant (or at least less important) as a determinant of GLCs' investment spending. The test, therefore, involves comparing the differences in the effects of various determinants of investment spending by GLCs and private sector companies: If GLCs have better access to credit, then their investment spending should be less sensitive to a liquidity measure like cash flow than would be the case for their private-sector counterparts.

The idea for this test is not new. Previous empirical studies have determined—under a variety of settings—that firms that would appear to face the greatest problems raising capital externally tend to cut investment most in response to cash flow shortfalls. For example, Fazzari, Hubbard, and Petersen (1988) use data from American manufacturing firms, identifying firms that retain a smaller fraction of their earnings as being less liquidity-constrained; Hoshi, Kashyap, and Scharfstein (1991) use data from Japanese manufacturing firms, identifying firms linked to a *keiretsu* as being less liquidity-constrained; and Ramírez (1995) uses data from American companies in the 1910s, identifying firms affiliated with J. P. Morgan as being less liquidity-constrained.¹⁴ More recently and closer to our subject, Harrison and McMillan (2001) use data from Côte d'Ivoire to test if foreign firms and state enterprises are less credit-constrained than domestic private firms.

The regression specification for these tests is essentially a reduced-form investment equation, with gross investment regressed on the standard explanatory variables, q and gross sales, as well as on liquidity measures such as cash flow. Our specification is based on that used in Hoshi, Kashyap, and Scharfstein (1991), and takes the following form:

$$\begin{aligned} \frac{I_t}{K_{t-1}} = & \beta_0 + \beta_1 q_{t-1} + \beta_2 \left(\frac{SALES_{t-1}}{K_{t-1}} \right) + \beta_3 \left(\frac{CASH_t}{K_{t-1}} \right) + \beta_4 \left(\frac{LIQ_{t-1}}{K_{t-1}} \right) \\ & + \gamma_1 (GLC \times q_{t-1}) + \gamma_2 \left(GLC \times \frac{SALES_{t-1}}{K_{t-1}} \right) \\ & + \gamma_3 \left(GLC \times \frac{CASH_t}{K_{t-1}} \right) + \gamma_4 \left(GLC \times \frac{LIQ_{t-1}}{K_{t-1}} \right) + \varepsilon_t. \end{aligned} \quad (1)$$

¹³See Hubbard (1998) for a review of this literature and a graphical analysis illustrating the link between internal funds and capital investment in models of informational asymmetries.

¹⁴Kaplan and Zingales (1997) dispute the claim that capital market imperfections are correlated with investment–cash flow sensitivities. However, their results are subject to criticism on both conceptual and empirical grounds. For example, their conclusions are based on a very small sample of firms, which they then subdivide into five categories according to clearly endogenous variables such as the degree of liquidity. See Fazzari, Hubbard, and Petersen (2000) for a critical reply. See also Hennessy and Levy (2002) for a more recent overview of this issue.

The dependent variable is investment during period t (I_t) as a proportion of capital stock at the beginning of period t (K_{t-1}). The independent variables are average Tobin's q at the beginning of period t (q_{t-1}); lagged gross sales ($SALES_{t-1}$) relative to capital stock; cash flow during period t ($CASH_t$) relative to capital stock; the stock of liquid assets at the beginning of period t (LIQ_{t-1}) relative to capital stock; and the same four variables interacted with a dummy (GLC), which takes the value of 1 for GLCs and 0 otherwise.¹⁵

The motivation for this regression is set out in Hoshi, Kashyap, and Scharfstein (1991) and also discussed in detail in Hubbard (1998); we briefly review the general idea behind it below.

Neoclassical investment theory predicts that a firm's investment spending should depend positively on its investment opportunities, that is, the expected present value of future profits from additional capital investment. This expectation is captured by the value of marginal q , the shadow value to the firm of an additional unit of physical capital. As a proxy for marginal q , which is unobservable, we use average Tobin's q at the beginning of each period, q_{t-1} .¹⁶ The empirical investment literature finds that investment spending is also positively correlated with lagged output via the accelerator effect. We use lagged gross sales, $SALES_{t-1}$, to proxy for lagged output as an explanatory variable to capture this effect. In the absence of friction, these two variables should be sufficient for explaining investment spending behavior. The imperfect capital markets theory extends these conventional models of investment to incorporate a role for financing constraints in determining investment. As explained above, models of asymmetric information and incentive problems in capital markets imply that information costs and the internal resources of a firm influence the shadow cost of external funds for fixed investment, holding constant underlying investment opportunities. Simply put, the theory predicts that, all else being equal, investment should be significantly correlated with the change in net worth (internal funds) for firms that are likely to face information-related capital market imperfections. The standard proxy for liquidity is cash flow ($CASH_t$), that is, income after tax plus (accounting) depreciation less dividend payments.¹⁷ Following Hoshi, Kashyap, and Scharfstein (1991), we also include a stock measure of liquidity, that is, the firm's stock of cash and short-term assets such as marketable securities at the beginning of the period (LIQ_{t-1})—these are assets that can be readily converted to cash to finance investment spending.

One potential concern with the regression specification is that cash flow could be correlated with other determinants of investment, such as expected

¹⁵An alternative approach would be to estimate the investment regressions separately for GLCs and non-GLCs. However, we prefer the specification in equation (1) because we are interested in the difference in investment behavior between GLCs and non-GLCs, rather than the determinants of investment spending for each group of firms per se.

¹⁶As noted in Hubbard (1998), this is allowable under certain assumptions, including perfect competition in the factor and product markets, homogeneity of fixed capital, linear homogeneity of production technologies and adjustment costs, and independence of financing and investment decisions.

¹⁷As discussed in Hubbard (1998), cash flow is an imperfect proxy for the change in net worth. For example, the determination of a firm's cash flow may reflect accounting decisions (timing and financial) that muddy its correlation with the change in net worth. However, in many cases, it is the best available proxy.

future profitability or sales. If this is the case, a link between cash flow and investment for a given firm over time could be reflecting the link between expected profitability and investment, and a cross-sectional link between cash flow and investment at a point in time could be reflecting the fact that firms with high cash flow have successful investments or low costs and face incentives to expand production. However, the inclusion of Tobin's q and gross sales as regressors should control for these factors, as the component of shifts in net worth accounted for by changes in current and expected future profitability should be captured in gross sales and q .

Of course, the average (Tobin's) q that we use may be a poor proxy for marginal q , the theoretical construct that is a measure of investment opportunities, so another potential problem with the regression is the (mis)measurement of q . However, the point of our regression is to compare the cash flow and liquid assets coefficients for the two sets of firms. This difference should be unbiased as long as the mismeasurement is the same for both sets of firms.

A third source of concern could be selection bias—selection bias would be a problem if there is endogeneity between GLCs and liquidity constraints, that is, if the government somehow chose only less-liquidity-constrained firms to be GLCs. But as noted earlier, many GLCs were created in the late 1960s and early 1970s as part of the government's strategy to spearhead development in various sectors of the economy; the GLCs in our sample were mostly incorporated during that early period. It would be difficult to argue that the government could perfectly predict the performance of these GLCs at the time of their creation. Our sample of GLCs does not contain any instance of the government cherry-picking private sector firms and converting them into GLCs. As the GLCs in our sample are historically determined, then, for the purposes of statistical inference during the sample period, we treat being a GLC as an exogenous event.

Equation (1) is estimated using ordinary least squares (OLS) with fixed effects. (Firm and year dummies were included in each regression.) The regression results, shown in Table 3, column 1, indicate that the liquidity variables—cash flow and the stock of liquid assets—are indeed important explanatory variables. The other explanatory variables also have the right signs and are statistically significant.

As our focus is on the difference between GLCs and non-GLCs, we are interested in the coefficients on the interaction terms involving the liquidity variables. If GLCs are less liquidity-constrained than non-GLCs in their investment decisions, then the coefficient on $GLC \times (CASH_t / K_{t-1})$ and $GLC \times (LIQ_{t-1} / K_{t-1})$ should be negative and significant. Table 3, column 1 shows that the GLC cash flow coefficient is smaller than the non-GLC cash flow coefficient—as evidenced by the negative coefficient on the interaction term, $GLC \times (CASH_t / K_{t-1})$ —but the difference between the two cash flow coefficients is not significant. The GLC liquid assets coefficient is larger than the non-GLC cash flow coefficient—as evidenced by the positive coefficient on the interaction term, $GLC \times (LIQ_{t-1} / K_{t-1})$ —but again, the difference between the two coefficients is not significant. Hence, our tests show no statistical difference between the GLC and non-GLC liquidity coefficients. This indicates that the GLCs in our

Table 3. Regression Results: Liquidity

Dependent Variable: I_t / K_{t-1}	(1) Full Sample	(2) Multi-industry (excluding small non-GLCs)	(3) TSC (excluding small non-GLCs)	(4) Manufacturing (excluding small non-GLCs)
$CASH_t / K_{t-1}$	0.142* (0.051)	0.195 (0.274)	-0.279 (0.178)	0.115 (0.100)
LIQ_{t-1} / K_{t-1}	0.082* (0.022)	0.222* (0.087)	0.254 (0.295)	0.093 (0.059)
$SALES_{t-1} / K_{t-1}$	0.018* (0.007)	-0.020 (0.050)	0.257 (0.168)	0.097* (0.019)
q_{t-1}	0.124* (0.037)	-0.064 (0.277)	1.228* (0.375)	0.111* (0.046)
$GLC \times (CASH_t / K_{t-1})$	-0.143 (0.319)	-0.029 (1.047)	-0.185 (1.426)	-0.021 (0.431)
$GLC \times (LIQ_{t-1} / K_{t-1})$	0.125 (0.116)	0.022 (0.186)	-0.104 (0.568)	0.001 (0.244)
$GLC \times (SALES_{t-1} / K_{t-1})$	-0.034 (0.032)	-0.012 (0.074)	0.237 (0.467)	-0.011 (0.298)
$GLC \times q_{t-1}$	-0.082 (0.096)	0.129 (0.758)	-1.083* (0.405)	-0.121 (0.309)
Number of observations	421	51	61	135
Degrees of freedom	304	30	37	92
R ² (within)	0.1833	0.3513	0.4263	0.3948
R ² (between)	0.0196	0.0002	0.0020	0.0287
R ² (overall)	0.0312	0.1002	0.0237	0.0801

Notes: Firm and year dummies are included. Standard errors are presented in parentheses. An asterisk (*) indicates significance at the 5 percent level (two-tailed test).

sample are no more or less liquidity-constrained in their investment decisions than their private sector counterparts. Our results are therefore consistent with the government's claim that GLCs do not enjoy cheap funding because of their link to the government.

The fact that we fail to find significant coefficients on the two interaction terms of interest may be due to the disparity in sample sizes (17 GLCs versus 92 non-GLCs) or, more specifically, to the relatively small number of GLCs in our sample. Unfortunately, these 109 firms represent the limit of the data provided in the (comprehensive) *Corporate Handbook*. Breaking up or otherwise manipulating the samples does not change our results. To illustrate, columns 2, 3, and 4 in Table 3 present the results of the same regression run separately by sector and excluding the smallest non-GLCs with average fixed assets below S\$50,000. The

estimated coefficients on $GLC \times (CASH_t / K_{t-1})$ and $GLC \times (LIQ_{t-1} / K_{t-1})$ are not significantly different from zero in each case.

Our findings are, of course, based only on the sample period 1994–98. However, while relatively short, this period is actually an important one as it includes the years just after the onset of the Asian crisis. One can conjecture that if GLCs are eligible for special treatment, they will be more likely to need such favors when times are bad (e.g., during the Asian crisis) than when times are good. The fact that we find no difference in liquidity constraints between GLCs and non-GLCs during this period is thus a strong rejection of the hypothesis that GLCs have easier access to credit.¹⁸ A second, more important, caveat is that our findings obviously relate only to GLCs that have been partially privatized and are publicly listed; unlisted GLCs or wholly owned government companies may well behave differently.

IV. Does the Market Value GLCs and Non-GLCs Differently?

If GLCs do not seem to be benefiting from special financial privileges, does being part of Singapore Inc. make any difference at all? Having found no evidence of preferential credit access for GLCs, we turn our attention in this section to a different question, namely, how does the market perceive GLCs compared with non-GLCs?

As mentioned earlier, some GLCs claim that their only advantage is that being linked to the government sends a positive signal to the markets (much like bearing a “Good Housekeeping stamp of approval”). In this section, we investigate whether the market’s valuation of a firm is correlated with its government link. We have no prior beliefs about whether the government link would translate into a higher q , lower q , or no effect on q . If GLCs differ from non-GLCs because the government link enhances performance, for example, then one would expect GLCs to be valued more than comparable non-GLCs. On the other hand, if the capital markets perceive GLC managers to be corrupt and inefficient, then one would expect the government link to translate into a lower q .

Following the approach of Lang and Stulz (1994), we focus on Tobin’s q rather than on stock market or accounting measures of performance in order to avoid some of the problems associated with those comparisons. The numerator of q —the firm’s market value—reflects the firm’s expected future profits, while the accounting rate of return measures only past profits. Furthermore, the firm’s market value also incorporates the variance of expected profits, so q includes an automatic adjustment for risk; by contrast, comparisons of stock returns have to account for differences in risk. Of course, the underlying assumptions behind the use of Tobin’s q are that financial markets are efficient and that a firm’s market value is an unbiased estimate of the present value of its cash flows.

¹⁸A possible extension would involve lengthening the time frame of the analysis so as to compare results during the pre-Asian crisis period with the post-Asian crisis period. The drawback here is that the gain in length of the data set would be offset by a loss in breadth, as several companies (including some GLCs) do not have a very long history of being listed on the stock exchange.

Table 4. Regression Results: Tobin's q

Dependent variable: $\ln q_t$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>GLC</i>	0.085 (0.103)	0.226* (0.090)	0.224* (0.089)	0.215* (0.110)	0.217* (0.110)	0.199* (0.095)	0.238* (0.101)
<i>(Earnings / Price)</i>			0.873* (0.090)	0.868* (0.089)	0.832* (0.089)	0.524* (0.218)	0.535* (0.218)
\ln (<i>Total Assets</i>)				0.006 (0.030)	0.006 (0.030)	-0.015 (0.025)	-0.021 (0.027)
<i>(Debt / Equity)</i>					-0.013 (0.017)	-0.002 (0.014)	-0.000 (0.015)
<i>ROA</i>						0.014* (0.004)	0.014* (0.005)
<i>Beta</i>							0.045 (0.060)
Industry dummies	No	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	530	530	530	530	530	529	464
Adjusted R^2	0.1659	0.2789	0.3815	0.3804	0.3811	0.4529	0.4550

Notes: Robust standard errors are presented in parentheses. An asterisk (*) indicates significance at the 5 percent level; a double asterisk (**) indicates significance at the 10 percent level (two-tailed test). See text for explanation of column numbers.

Industry dummies: (1) machinery and equipment, (2) electronic products, (3) metal products, (4) rubber and plastic, (5) food and beverage, (6) chemical products, (7) electrical, (8) printing and publishing, (9) transport equipment, (10) petroleum products, (11) other manufacturing, (12) transport, (13) storage, (14) post and telecommunication.

Table 4 reports semilog OLS regressions of q on the GLC dummy and several control variables. Theory does not dictate a specific functional form for a q equation, although Hirsch and Seaks (1993) provide evidence that the semilog form is superior. The semilog specification also has the advantage of dampening the influence of extreme or mismeasured values of q .¹⁹

The first column of Table 4 shows that, controlling only for year effects, $\ln(q)$ for GLCs is higher than that for non-GLCs by 0.085 on average. This is more or less in line with our earlier observation, based on a comparison of means in Table 2. However, the difference is not statistically significant.

Column 2 refines the analysis by including 14 industry dummies into the regression (the base category being “multi-industry”). We find that industry effects increase the magnitude of the GLC premium from 8.5 percent to about 22.5 percent, and the coefficient on the GLC dummy is now significant at the 5 percent level. This suggests that GLCs tend to be in low q industries but tend to have high

¹⁹We also estimated the regressions using a between-effects model (regression on group means without the year dummies), and found the results qualitatively unchanged.

q 's relative to their industry cohort.²⁰ How do we explain this difference in the market valuation of GLCs compared to non-GLCs?

One possible explanation is that GLCs are more likely to operate in protected markets and have a certain degree of monopoly power. If GLC stocks were selling for higher prices on the Singapore Exchange because these companies were exploiting monopoly power, we would expect GLCs to have a high earnings-price ratio—earnings in the present would be high, but market value (price) would not rise in proportion because investors would look forward to the long-run erosion of monopoly power in the face of new entry—and that inclusion of the earnings-price ratio would reduce the GLC coefficient. However, this does not appear to be the case: the third column shows that the GLC coefficient is not affected by the inclusion in the regression of the companies' earnings-price ratios.

Could the GLC premium be reflecting a size effect and economies of scale? As noted earlier, GLCs tend to be big companies: the average GLC in our sample is about 10 times larger than the average non-GLC, in terms of total assets. Larger firms may be better able to exploit scale and scope economies. If this is the case, larger firms would have a cost advantage over smaller ones and may therefore be more profitable. Column 4 considers the effect of size (measured by the log of total assets) on q .²¹ If the GLC premium is due to their larger size, the inclusion of this variable should eliminate (or at least substantially reduce) the impact of the GLC dummy.²² We find that the GLC dummy does decrease by about 4 percent (from 0.224 to 0.215), but remains statistically significant.

A third possibility is that GLCs may have lower debt-equity ratios than non-GLCs. If GLCs are less leveraged than their private sector counterparts, their probability of insolvency and failure would also tend to be lower, and this may explain their higher q . Column 5 adds the debt-equity ratio to the list of regressors in order to control for the risk of bankruptcy. The results indicate this variable carries little explanatory power. More important, the coefficient on the GLC dummy is not materially affected by its inclusion—it remains large and statistically significant.

Or perhaps GLCs are more profitable than non-GLCs. This could be the case if they are better run or if they receive special discounts on inputs, for example. Column 6 shows the effect of adding the ROA to the regression. The estimated GLC coefficient declines in size by about 8 percent (from 0.217 to 0.199), but remains statistically significant. This suggests that part of Singapore Inc.'s added value comes from making the GLCs more profitable. However, the fact that more

²⁰That GLCs seem to be in low q industries actually may not be too surprising, given the fact that they were established mostly in areas where the private sector was—at least initially—unwilling to go. In our sample, GLCs are mostly found in industries such as transport, storage, petroleum products, and transport equipment manufacturing, and generally are absent from manufacturing industries involving electrical and electronic products, machinery and equipment, metal products, chemical products, etc.

²¹We use the log of assets as our measure of size in order to control for possible nonlinearities (for example, the effect of size on q may diminish as size increases).

²²One may also posit, a priori, a negative correlation between size and q . Young, typically small, and promising firms tend to have an expected high future growth profile, so q may tend to be higher for smaller firms. In any case, the important point is that the GLC dummy remains relatively large and significant after accounting for size.

than 90 percent of the premium survives the inclusion of this variable suggests that investors are also valuing the capitalized worth of future higher earnings from being affiliated with the government.

Finally, we consider the possibility that GLCs' stock returns may have a lower covariance with the market return. If this is the case, it would imply that market movements have little influence on GLCs' returns, thereby making them more attractive as investments in a portfolio that minimizes risk exposure. Column 7 shows the effect of adding each firm's beta to the regression. Beta is the covariance between the firm's return and the market return, divided by the market variance, that is, it is the "normalized" covariance of returns.²³ If investors' appetites for GLC stocks are driven by this consideration, the inclusion of beta should reduce the size of the GLC premium. The regressions results indicate, however, that this is not the case; instead, the inclusion of beta increases the premium to 24 percent.

In summary, comparing the Tobin's q of GLCs and non-GLCs, we find evidence that the capital markets value GLCs more highly than non-GLCs. This positive and significant relation between the government link and q is robust to the inclusion of other variables—such as industry effects, size and monopoly power, profitability, and bankruptcy risk—that might affect firm value and thereby q . Taking these variables into consideration still leaves us with a GLC premium of more than 20 percent.

Thus, performance measures aside, the capital markets seem to reward substantially the very fact that a company is linked to the government. This positive market perception is hard to pin down. It could simply reflect a form of brand recognition (much like how consumers are willing to pay more for goods bearing a well-known label than for similar or even identical goods without such a label). Or investors may believe—rightly or wrongly—that GLCs are backed by the government, which will not let them fail in times of trouble. (Krause, 1987, notes that a few small GLCs were permitted to fail in the 1970s and a few others were closed down in the 1980s, but the total capitalization of these failures was relatively small.)

V. Conclusion

Singapore's GLCs are an unusual breed of state enterprises. Primarily established to catalyze the industrialization process, they have expanded into all areas of the economy, including those served by private enterprises. The government claims that GLCs are run on commercial rather than ideological grounds, with no state interference or favors: They are expected to be efficient and profitable; they are not supposed to receive special privileges or concealed subsidies; they are free to

²³Beta is obtained from the *Corporate Handbook*, where it is computed using the natural log of weekly returns of the stock against the weekly returns of the All-Singapore Equities Index as the market index for the 105-week period from August 29, 1997, to August 27, 1999. The beta of the market is 1. The returns of stocks with beta coefficients greater than 1 would, on average, respond to a larger extent than the market portfolio to factors that affect that capital market as a whole. Conversely, those with beta coefficients less than 1 would respond to a lesser extent.

recruit staff in the open market, both at home and abroad, on competitive terms; and they should be allowed to fail if they lose money. Yet time and again, charges of favoritism for GLCs at the expense of private enterprises surface.

Do GLCs receive special financing privileges or not? This paper finds no basis for the argument that GLCs have easier access to credit. Our regression results indicate that GLCs are no more or less liquidity-constrained in their investment decisions than their private sector counterparts. This suggests that GLCs are competing on a level playing field as far as access to financing is concerned.

However, we do find that being a GLC is rewarded in financial markets with a premium of more than 20 percent. This is after accounting for the fact that GLCs tend to be large (so that they may be able to exercise monopoly power or exploit economies of scale and scope), profitable, and less likely to go bankrupt. This GLC premium has to reflect the market's perception of the benefits—whether real or illusory—of being linked to the government.

While our results are interesting, they do not imply that the government should keep creating new GLCs or expanding existing ones. If the GLC premium is largely due to the market's perception of the benefits of being linked to the government, further proliferation of GLCs—which will tend to stretch the resources of the government—will only dilute these perceived benefits and, thereby, the premium.

REFERENCES

- Bardhan, Pranab, and John E. Roemer, 1992, "Market Socialism: A Case for Rejuvenation," *Journal of Economic Perspectives* (U.S.), Vol. 6 (Summer), pp. 101–16.
- Corporate Handbook Singapore 2000* (Singapore: CEIC Holdings Ltd.).
- Fazzari, Steven, R. Glenn Hubbard, and B. Petersen, 1988, "Financing Constraints and Corporate Investment," *Brookings Papers on Economic Activity: 1* (Washington: Brookings Institution), pp. 141–95.
- , 2000, "Investment–Cash Flow Sensitivities Are Useful: A Comment on Kaplan and Zingales," *Quarterly Journal of Economics*, Vol. 115 (May), pp. 695–705.
- Harrison, Ann E., and Margaret McMillan, 2001, "Does Direct Foreign Investment Affect Domestic Firms' Credit Constraints?" NBER Working Paper No. 8438 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Hennessy, Christopher A., and Amnon Levy, 2002, "A Unified Model of Distorted Investment: Theory and Evidence" (unpublished; Berkeley: University of California at Berkeley, Haas School of Business).
- Hirsch, Barry T., and Terry G. Seaks, 1993, "Functional Form in Regression Models of Tobin's q ," *Review of Economics and Statistics* (U.S.), Vol. 75 (May), pp. 381–85.
- Hoshi, Takeo, Anil Kashyap, and David Scharfstein, 1991, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups," *Quarterly Journal of Economics*, Vol. 106 (February), pp. 33–60.
- Hubbard, R. Glenn, 1998, "Capital-Market Imperfections and Investment," *Journal of Economic Literature* (U.S.), Vol. 36 (March), pp. 193–225.
- Kaplan, Steven N., and Luigi Zingales, 1997, "Do Investment–Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" *Quarterly Journal of Economics*, Vol. 112 (February), pp. 169–215.

- Krause, Lawrence B., 1987, "The Government as an Entrepreneur," in *The Singapore Economy Reconsidered*, ed. by Koh Ai Tee, Krause, and Lee (Tsao) Yuan (Singapore: Institute of Southeast Asian Studies).
- Lang, Larry H. P., and Rene M. Stulz, 1994, "Tobin's q , Corporate Diversification, and Firm Performance," *Journal of Political Economy*, Vol. 102 (December), pp. 1248–80.
- Lee, Sheng Yi, 1976, "Public Enterprise and Economic Development in Singapore," *Malayan Economic Review*, Vol. 21 (October), pp. 49–73.
- Low, Linda, 1991, *The Political Economy of Privatisation in Singapore: Analysis, Interpretation, and Evaluation* (Singapore and New York: McGraw-Hill).
- Ramírez, Carlos D., 1995, "Did J. P. Morgan's Men Add Liquidity? Corporate Investment, Cash Flow, and Financial Structure at the Turn of the Century," *Journal of Finance*, Vol. 50 (June), pp. 661–78.
- Shleifer, Andrei, 1998, "State versus Private Ownership," *Journal of Economic Perspectives*, Vol. 12 (Autumn), pp. 133–50.
- Singapore, Department of Statistics, 2001, "Contribution of Government-Linked Companies to Gross Domestic Product," *Occasional Paper on Economic Statistics* (March).
- Singapore, Economic Review Committee, 2002, *Recommendations on Government in Business* (May 30). Available via the Internet: http://www.mti.gov.sg/public/PDF/CMT/ERC_EISC_MainReport.pdf?sid=113&cid=1120.
- Singapore, Ministry of Information, 2002, "Motion on Temasek Charter and EISC's Recommendations on Government in Business—Speaking Points for DPM's Round-up Speech," Singapore Government Press Release, August 28. Available via the Internet: http://www.mti.gov.sg/public/frm_cmn_printpage.asp?SID=120&CID=1243&DID=&Page=.
- Singapore, Ministry of Trade and Industry, 2003, "New Challenges, Fresh Goals—Towards a Dynamic Global City," *Report of the Economic Review Committee*, February 4. Available via the Internet: http://www.mti.gov.sg/public/PDF/CMT/ERC_Comm_Cover_v2.pdf?sid=150&cid=1480.
- United States, State Department, Embassy Singapore, 2001, "Government-Linked Corporations Face the Future," *Economic Report*, March. Available via the Internet: <http://www.usembassysingapore.org.sg/ep/2001/GLC2000.html>.