THE IMPACT OF CASH FLOW ON CORPORATE INVESTMENT IN TRINIDAD AND TOBAGO

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Abstract

This paper examines the effect of cash flow on corporate investment in Trinidad and Tobago. The objective is to see whether corporate investment is sensitive to internally generated cash flow. The analysis covers the investment and financial activities of 18 listed companies over the period 1986 to 2000. Our results show a strong positive relationship between investment and internally generated funds (cashflow), suggesting that the financial and real decisions of listed firms are not independent. We find similar results when we segment the sample based on size, industry and dividend payout ratios. Although we find strongly positive cashflow-investment sensitivities, these are initial findings, which we interpret very cautiously as evidence of possible financial constraints.

JEL Classification: G31, Corporate investment policy

Key words: Investment-internal funds, Financial constraints, Investment-cashflow

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INTRODUCTION

The role of finance in economic development has been debated over the years. These discussions were joined by Adam Smith (1776) and later Joseph Schumpeter (1912). An early view was that the availability of finance was crucial to economic growth. Support for this view was provided by Tinbergen (1939, pp. 49) in one of the earliest studies on investment. Tinbergen (1939) found "that the fluctuations in investment activity are in the main determined by the fluctuations in profits ...some months later". In a later study Meyer and Kuh (1957, pp. 192) support this view noting that "the investment decision is subject to a multiplicity of influences..." but that there was a "clear tendency for liquidity and financial considerations to dominate the investment decision in the short run".[1]

Firms that rely heavily on internal sources of funds to finance their new investments may find that investment is highly correlated with profits and this can exacerbate business cycles. However, in countries with well functioning capital markets, firms' investment spending need not be tied to internally generated funds. In principle, firms may access funds externally, either in the form of debt or new equity. One advantage to using debt is that the interest cost provides a tax shield. Firms may also issue new shares. However, in practice, firms may have difficulty borrowing, and in underdeveloped stock markets, may incur high transaction costs and pay a significant "lemon's" premium for new shares.[2]

Whether firms can secure the funds they need to undertake their profitable investment projects is an important consideration for economic growth and development. For Trinidad and Tobago, two surveys on this issue were undertaken in recent years. The first study was done by Farrell et al (1986) and was later updated by Clarke et al (1992), using a larger and more representative sample of firms.

In their study, Farrell et al investigated, among other things, the constraints to growth that firms faced. The results reported in Table 1 shows that of the sixty-nine sample firms, availability of finance was ranked third, after market size and management talent, as one of the most important factors that constrain firms' investment and growth. They also find that, on average, firms finance 51 percent of their investments from internally-generated resources, a ratio which is only slightly lower than that of more developed countries like the US and the UK (see Table 2). When sample firms were segmented by size, small and large firms placed heavier reliance on internal funds than medium-sized firms do.

With respect to external sources of funds, results showed a strong preference for bank finance. Table 3 shows that financing comprising of overdraft facilities and bank loans accounted for 60 percent of total external funds. Other borrowing accounted for 33.7

[1] Quoted in Chirinko and Schaller (1995).
[2] The Akerlof (1970) lemons problem always operate against the most efficient firms.

percent while reliance on the stock market through the issue of new shares was minimal with new share issues accounting for 2.9 percent of total external funds.

Internal funds as a source of investment financing has been growing in importance over the years. In the survey, 26 percent of the respondents in 1982 said that over 80 percent of their fixed assets were financed from internal resources. In the later survey (1990-92),[3] 38 percent of firms said that over 80 percent of their investment was financed internally. These surveys have been extremely insightful in shedding light on corporate financing decisions and constraints on investment and growth.

This paper extends the work of these two surveys. It does so by examining the issues among listed companies in Trinidad and Tobago over the period 1986 to 2000. Before we examine the data and results, we discuss next the literature associated with this work.

LITERATURE REVIEW

The work of Modigliani and Miller (1958) provides the mainstream position on the investment-finance nexus. They show that in perfect capital markets, there will be no cost differential between internal and external sources of finance. Internal and external finance will be perfect substitutes. Firms will therefore be indifferent between internal and external funds for their investments. Consequently, investment decisions will depend only on the expected future profitability of the project. Many have argued, however, that in the real world, capital markets are imperfect. There are market frictions, taxes and information asymmetry, which have lead to agency problems among other things. And because of these problems, internal and external finance may not be perfect substitutes.

In imperfect market some firms may face difficulty accessing external funds. With respect to debt financing, Jensen and Meckling (1976) argue that agency problems—an example of which is conflict between owners and creditors—could arise in the presence of asymmetric information and that these problems could lead to an increase in the marginal cost of debt finance to the firm. The Akerlof (1970) lemon's argument—when investors are unable to discern differences in borrower quality—has also been used to show that in the presence of asymmetric information, good companies may have to pay a premium to raise new capital on the stock market. Transaction costs (underwriting discounts, registration fees, taxes, selling and other administration expenses) associated with new share issues also make new share issues more expensive than internal finance.

Myers and Majluf (1984) modeled a different result of asymmetric information. They argue that when the premium on external financing is high, the firm might refuse even those projects, which yield positive net present values (NPV). Firms that cannot convince existing shareholders to buy and hold the new issue of shares may undertake the positive NPV projects only if debt securities can be issued. Firms in this situation with sufficient retained earnings may undertake all positive NPV projects. Retained earnings therefore help avoid the under pricing associated with new share issues and pricey debt. Myers

[3] Clarke et al (1992).

(1984) refers to this as the pecking order of financing where firms prefer retained earnings, than less risky debt and as a last resort, equity.

Against these theoretical arguments on capital markets, several empirical studies have attempted to test the relationship between financial factors and firms' investment behaviour. The Q model (the ratio of a firm's assets relative to the cost of producing those assets) is one approach that is commonly used. Neo-classicals have used structural investment models (see Jorgenson and Siebert, 1968) and sales accelerator models, which hold that the rate of investment is proportional to the change in the economy's output have been used to measure investment-cashflow sensitivity.

A substantial body of empirical research has been done in this area. Many researchers have tried to do so by classifying firms according to some segmenting variables, which attempt to distinguish firms, which are constrained from those which are not. The idea is to classify firms based on some exogenous variable, some of which include maturity, concentration of ownership, membership of an industrial group, manufacturing/non-manufacturing and credit rating (Kadapakkam et al, 1997).

Fazarri, Hubbard and Petersen (1988), (FHP), is one of the earliest and best-known studies on the subject of investment and cash flow constraints. FHP used data on a wide cross-section of manufacturing firms and classified these firms based on dividend payout. They argue that firms with average low payout ratios are more likely to be financially constrained than those with average high payout. While they found that cashflow was positively correlated with the investment spending of all firms, they also found that the sensitivity of cashflow to investment was much greater for firms with low dividend payout ratios. They interpret this high cashflow-investment sensitivity as evidence of financial constraint.

Gilchrist and Himmelberg (1995) and Chirinko and Schaller (1995) provide support for the cashflow-investnment sensitivity. Chirinko and Schaller (1995) found that information asymmetry and transaction costs were possible sources of financing constraints for their analysis of over 200 Canadian firms. They considered their results as strong evidence that firms in a weaker information position had higher liquidity-investment sensitivities.

However, the link between cashflow and investment and in particular, the interpretation of these findings as financing constraints has generated widespread debate. Kaplan and Zingales (KZ) 1995 are perhaps the best known critique of the cashflow-investment sensitivity and cashflow constraint arguments. In their study which analyzed the same firms identified in FHP's 1988 work, they found that only a small percentage of these firms had difficulty financing their investment whether from internal or external sources. They criticized FHP's work for not having sufficiently addressed the question of whether higher cashflow-investment sensitivity was related to financing constraints.

In an attempt to answer the question of whether high cash flow-investment sensitivity signified financing difficulties, KZ used previously unexplored data sources to assess which firms faced financing constrains. They relied to some extent on qualitative data

such as annual reports, management's discussion of liquidity conditions and future investment plans, as well as other public news to complement quantitative data collected. This was done for each firm each year in an attempt to gauge whether the firm could be correctly classified as financially constrained by the availability of internal and/or external funds. They found that in only 15 percent of firm-years was there genuine indication that firms had difficulty in accessing investment funds. More surprisingly, those firms classified as less financially constrained according to KZ's classification exhibited far greater investment-cash flow sensitivity than those categorized as financially constrained. KZ explained these surprising results by appealing to agency cost arguments suggesting that managers perhaps choose to rely primarily on internal cash flow for investment despite the availability of additional low cost external finance.

These findings suggest a less than one-to-one relationship between investment-cash flow sensitivity and financial constraints. This prompted them to ask what then is the source of firms' investment-cash flow sensitivity, why do financially constrained firms demonstrate lower sensitivities, while companies facing no identifiable constraints exhibit higher sensitivities. Possible reasons they suggested for these apparent anomalies are: a) financially constrained firms are in fact financially distressed, so that any excess cash is directed to servicing loans rather than for investment purposes. b) Seemingly financially unconstrained firms are in reality financially constrained. c) Firms that are unconstrained engage in precautionary savings to compensate for future shortages of cash. d) The cost of modifying capital expenditure due to cash flow shocks is high.

Kaplan and Zingales conclude that their research points to several telling implications: a) greater cash flow-investment sensitivity does not provide ample evidence of financing constraints. b) If high sensitivity among unconstrained firms is due to managers choosing to rely mainly on internal funds despite the availability of low cost external financing this may be symptomatic of agency problems caused by overly risk-averse managers. If however, their decisions are based on justifiable caution, then their policies are in fact sound and not irrational. Whatever the reason for firms' investment decisions, their results suggest that policies designed to make credit more readily available in recessionary times, for example, may not lead to increased investment as anticipated.

Since their work was published, other studies have found evidence that corroborate the findings of KZ. Kaddapakam, Kumar and Riddick (1997) examined the degree to which cash flow availability influences firm investment in six OECD countries. Much of their empirical work attempt to ascertain the extent to which the reliance on internal funds was influenced by firm size based on the view that smaller firms have less access to external capital markets and as a result may be more dependent on internal funds. Larger firms are thought to have better access to external finance as they face lower transaction costs, are less susceptible to the effects of information asymmetries, are less affected by agency problems because of monitoring by large institutional shareholders, who can in some respects constrain managerial actions.

Their results indicated that generally all firms regardless of size were affected by the availability of internal financing. After segmenting the sample according to size they found that, contrary to a priori expectations, the highest cash flow-investment sensitivity

was exhibited among the large firm group and the smallest sensitivity among the small firm group. Like KZ, they explained these findings by sighting managerial agency factors as well as the likelihood that larger firms may have enjoyed greater flexibility with respect to their investment timing decisions and that they were better able to adjust capital expenditure readily in response to cash flow shocks. They also concluded that the degree of sensitivity between cash flow and investment cannot be interpreted as an accurate measure of firm financing constraint or ease of access to capital markets.

Schnure's (2000) findings also support those of KZ in his critique of research done by Lamont (1997). Lamont found high cash flow-investment sensitivity among 26 large oil-dependent firms when oil revenues fell around 1986 and interpreted this sensitivity as evidence of financial constraints and capital market imperfections. After careful examination of both quantitative and qualitative firm data, Schnure (2000) concluded that many of these large firms were by no means cash or investment constrained. Assuming that his measurements and interpretation of firms' liquidity conditions were correct and that these firms with high liquidity were also demonstrating high cash flow-investment sensitivity, this led him to agree with KZ on two grounds. Firstly, when conducting this kind of investigative work, the measurement of cash flow and liquidity conditions is important. Secondly, caution should be exercised in interpreting high investment-cash flow sensitivities as evidence of financing constraints.

There has also been some debate between FHP and KZ. In subsequent work FHP (1996) criticised KZ on KZ's determination of financial constraint, on the grounds that it is complex and judgmental. For instance, FHP argue that statements by managers, which KZ used in their analysis, might not always reflect economic reality. Nevertheless, FHP argue that the overall results of the study done by KZ support their initial findings that a firm's investment decisions may in fact be affected by financial constraints.

The present study extends this line of work for listed companies in Trinidad and Tobago. It does so by employing a standard econometric model to examine the effect of cash flow on corporate investment, with a view to identifying the extent to which, if any, financial factors constrain firms' investment. The next section of this paper presents a discussion of the data and methodology, this is followed by the results of the study and then by some concluding remarks and discussion.

DATA AND METHODOLOGY

Data description

The data for this analysis came from the Trinidad and Tobago Stock Exchange (TTSE) company dataset. At the end of 2000, twenty eight (28) companies were listed on the TTSE. Eighteen (18) of the non-financial TTSE companies were included in the study. Since the analysis focuses on firms making physical investment and generating sales in the product market, the six (6) listed financial companies were excluded. Three (3) are regional companies, which are cross-listed on the TTSE were also excluded since their centre of economic activity is outside of Trinidad and Tobago. Finally, one (1) company was omitted as it has only two years of published data available.

Table 5 gives a list of sample companies and data availability. Twelve (12) of the companies included in the study are manufacturing firms; the other six (6) are non-manufacturing firms. Sample companies have data ranging from five (5) years to fifteen (15) years between 1986 and 2000. The sample is unbalanced, with a total panel of two hundred and forty three (243) firm years of data.

Descriptive statistics for the full sample and variables used in the regressions are given in Table 6. The smallest company in any year had capital stock of TT$1.8 million and the largest TT$1.7 billion, with a median of TT$48.9 million. The median firm had an investment to capital stock ratio of 9 percent, cash flow to capital of 10 percent and a Q ratio of 0.75. Over the period 1986 to 2000, the median firm also paid out 46 percent of its earnings as dividends.[4] However, as indicated by the large standard deviation for each variable, our sample includes a broad range of firms with regard to size, investment behavior, and financial health.

Table 7 gives means and standard deviations for firms segmented by size, dividend policy and industry classification. Given the small size of the sample, we divide the sample into tertiles to maintain sufficient observations in each category. With respect to size, the smallest firms (those in the first tertile) have average capital stock of $23.8 million. Firms in the second tertile are, on average, twice as large as these, while those in the third tertile are twenty times as large as the smallest firms are. While firms in the second tertile have the lowest internally generated cash flow (10%), investors clearly believe that they had valuable investment opportunities as evidenced by their Q (1.54) ratio, the highest of the three categories. Even so, their investment rates did not exceed that of the overall sample, and these firms paid out the highest rate of dividends (72%) of all sample firms.

Segmenting the sample by dividend payout ratios, we find that firms with high dividend payout ratios have the highest Q and cash stock. However, among the three categories, these firms also have the lowest rates of investment and internal cash flow generated. While the average manufacturing and non-manufacturing firms have similar payout ratios, the similarities appear to end there. The average manufacturing firm has cash resources (cash stock and cash flow) that are at least twice as large of that of the non-manufacturing firms. And with Q and sales growth rates that are more than twice as large as their counterparts, manufacturing firms achieved investment rates that are twice as large. Manufacturing firms appear to have outperformed non-manufacturing firms.

Model

To examine the possible financial constraints on firms' investment spending, we employ a variant of the Q-model of investment. The Q theory of investment was introduced by Keynes (1936) and developed by Brainard and Tobin (1968), Tobin (1969). In this theory, a forward looking firm faced with costs in adjusting its capital stock will have its investment expenditures determined by Marginal Q, the ratio of the discounted future revenues from an additional unit of capital to its purchase price. In the absence of taxes

[4] In any year in which dividend payment exceeded net earnings or in cases were dividends were paid but current profits were negative, the dividend payout ratio was taken as 100 percent.

and capital market imperfections, a value-maximizing firm will invest as long as the shadow price of an additional unit of capital, marginal Q, exceeds unity.

Since Marginal Q is unobservable, empirical studies employ Tobin's average Q, defined as the market value of the firm to the replacement cost of its existing capital stock. Tobin's average Q therefore incorporates information about future conditions and how these are likely to affect firms' investment. In effect, average Q incorporates the capital market's evaluation of the firm's investment opportunities. The basic Q model is:[5]

$$I_{it}/K_{it} = \mu_i + \mu_1 Q_{i,t-1} + \mu_{it}$$

Where μ_i is the normal value of investment scaled by capital stock (I_{it}/K_{it}) for the ith firm and μ_{it} is the error term.

Using the Q model and assuming perfect capital markets, there is no reason to expect fluctuations in internal finance (cash flow) to have a significant impact on investment, unless firms must pay a premium to access external funds for their projects. To examine whether our sample firms face these financing constraints, we follow other studies and use the following Q model, which is augmented by internal finance, cash stock and sales.

$$I_{it}/K_{i,t-1} = \beta_1 Q_{i,t-1} + \beta_2 CF_{it}/K_{i,t-1} + \beta_3 CS_{it}/K_{i,t-1} + \beta_4 S_{i,t-1}/K_{i,t-2} + \varepsilon_{it}$$

The dependent variable is investment to capital stock (I_{it}/K_{it-1}), I_{it} is investment in plant, equipment, and long-term investments. We focus on spending on fixed assets and long term assets as these reflect management's deliberate decision to use corporate resources. In contrast, changes in current assets occur in the normal course of business. Capital stock K_{it-1} is the beginning-of-period capital stock, defined as the net book value of plant, equipment, and long-term investments.

Tobin's Q ($Q_{i,t-1}$), is calculated as the ratio of firm market value to firm book value at the beginning of the period. Market value is the sum of market value of outstanding common equity, book value of long-term debt and preferred stock at the beginning of the year. Firm book value is the book value of common equity plus the book value of long-term debt and preferred stock. Cashflow to capital (CF_{it}/K_{it-1}) is cash flow generated during the year, measured as the sum of net income plus depreciation, amortized intangibles and deferred taxes, less dividends divided by beginning-of-period capital stock. Cash stock to capital stock (CS_{it}/K_{it-1}) is the sum of cash and marketable securities at the beginning of the year divided by beginning-of-year capital stock. Sales to capital stock (S_{it-1}/K_{it-2}) is the value of net sales to beginning of period capital, each variable being lagged one period.

We estimate the above model, using the "within estimators" approach, which requires suppression of the intercept term. Fixed time effects capture aggregate business-cycle influences and other unobserved time-invariant links between a firm's investment and explanatory variables. For example, problems of high values of Tobin's average Q, stemming from monopoly rents not captured by our simple model are likely to be

[5] See Fumio, Hayashi and Summers .....

eliminated by using fixed-effects methods.[6] We run several variations of this model, dropping one or more of the explanatory variables at times, and including an explanatory variable with a lagged term. Given the relatively small size of the sample, we try where possible to run a parsimonious model. For this reason, we include only one lagged term.

RESULTS

Tables 8 to 13 present OLS estimates for the full sample and for the sample segmented by dividend payout, industry and a measure of firm size. Regressions were run for the full sample period 1986 to 2000 and for shorter time periods within this sample period to gauge whether the importance of cash flow changes over time.

Full sample results

Panel A of Table 8 reports estimates for the most basic model. These regressions regress investment on internally generated cash flow and Q after controlling for firm time invariant effects. Our results show a strong positive relationship between investment and internally generated funds. The coefficients on the cash flow variable range from 0.511, in the five-year period 1986 to 1990, to 1.169, in the five-year period 1996 to 2000. All coefficients are statistically significant at the 10 percent level or better. These results suggest that investment is affected by the availability of internal finance.

As is typically found the coefficient on Tobin's Q is positive and close to zero, but unlike most studies, the coefficients are not statistically significant in our study. For example, in their model, which regresses investment on Q and cash flow, Kaplan and Zingales (1995) report statistically significant Q ranging from 0.021 to 0.039 over various time periods between 1970 and 1984. In the present study, the Q coefficient range from 0.08 to 0.239 and only the coefficient in time period 1986 to 2000 is statistically significant.

Since Q is based on asset prices which are determined in markets where investors are supposed to take a forward-looking stance and prices should reflect expected profitability of the company, it should help to capture the profitability of new investment spending and hence should be highly correlated with investment spending decisions. The low explanatory power of Q in our results appear to indicate that earnings expectations captured by Q do not convey much useful information about firms' investment spending.

Panel B of Table 8 reports estimates for the model, which includes cash flow, lagged one period. The results are similar to those of Panel A of the table. Although the size of the coefficient reduces in absolute terms, the cash flow coefficients remain positive and statistically significant in five of the six regressions, and the lagged term is also positive in five of the six regressions and statistically significant in two. These results suggest that the firm's cashflow and profitability from past years also have significant impact on investment spending in the current period. Although the adjusted R^2 improves slightly

[6] Lindenberg E.B. and Ross, S.A. (1981), "Tobin's Q ratio and industrial organisation", Journal of Business, Vol. 54, pp. 1-32; Salinger, M.A. (1984), "Tobin's Q, unionization and the concentration-profits relationship", Rand Journal of Economics, Vol. 15, pp. 159-70.

with the inclusion of the lagged cash flow term, the Q coefficient while remaining positive lacks significant explanatory power.

Table 9 provides additional results for the full sample. Here we replace lagged cash flow with lagged Q (Panel A) and cash stock (Panel B). Even so, the results remain broadly similar to those reported above. The cash flow coefficients remain strongly positive in all regressions. However, in Panel A, while the Q remains positive, the lagged Q is consistently negative although not statistically significant. In Panel B, the cash stock coefficients are positive in most regression, but are not significant.

Table 10 reports results from the model which includes sales to test whether cash flow effects still has significant explanatory power when account is taken of output levels. The justification for including sales is that the firm's investment spending may be related to the level of or change in output or sales. The model includes cash flow, Q and sales, lagged one period. Although in several cases cash flow looses significance when sales are included, it remains strongly positively correlated with investment in two cases.

Results from Table 10 can be interpreted in several ways. One might argue that with Q in a model with sales, cash flow should *not* have significant explanatory power. In this model, Q is expected to serve as a signal of the profitability of investment not captured by sales. But it is also known that internal cash flow is highly correlated with current and therefore future output levels. However, with sales explicitly included in the model, cash flow (internally generated funds) should not have significant explanatory power. Therefore if one argues that Q captures the effects of future profitability on the demand for investment, this lends credibility to the argument that any positive significant coefficients on the cash flow variable is likely to indicate an additional supply of low cost investment funds for firms that must pay a premium to access external financing. A strong positive coefficient on cashflow in this model could indicate financing constraints.

Results for firms segmented by dividend payout

Our next results are those from the sample segmented by dividend policy. As discussed above, FHP and a number of other studies argue that firms that pay low dividends on average over a period of time are more likely to be financially constrained than those that pay high dividends. Given the small size of the sample, we divide firms into three tertiles to retain as many observations within each group. Firms in the first third have dividend payout ratios that average 0 to 35 percent, firms in the second third averages 36 to 55 percent and those in the third tertile average 56 to 92 percent.

Using the model with cash flow and Q as explanatory terms, these results are reported in Table 7. They show that while the cash flow terms are positive and significant in many cases, the effect of cash flow on investment is greatest for firms with the lowest and highest dividend payout ratios. Over the entire sample period, 1986 to 2000, the coefficient on cash flow for firms with the lowest payout ratio (1.162) is larger than that of firms with the highest payout ratio (0.910). This is also the case for the period 1991 to 2000. However, for the 1986 to 1995 period, the cash flow coefficients are strongly positive and largest for the highest payout firms and declines with dividend payout in the

next two groups. Although it is not clear how to interpret the largest cash flow coefficient for the highest dividend payout firms, as we found for the entire period, FHP and others provide supporting evidence that cash flow coefficients are largest for low payout firms.

Results for firms segmented by size

We follow Kadapakkam et al (1998) and segment the sample based on firm size. The rationale here is that the cost of external funds that small firms face is likely to be higher than that for large firms. Typically, smaller firms are followed by fewer analysts than larger firms are. Hence there is likely to be greater and more costly information asymmetry between insiders and outsiders of small firms. Furthermore, small firms are likely to incur higher transaction costs per dollar of new shares than large firms do. Both factors are likely to lead to small firms having greater difficult accessing capital market, becoming more cash constrained and exhibiting a higher degree of cash flow-investment sensitivity than large firms.

To identify firms, which are likely to suffer more because of size, we use the average over 1986 to 2000 beginning-of-period capital stock as a measure of size to place firms in three groups. We regress investment on cash flow and Q separately for each group. Table 12 reports results that are consistent with our a priori expectations. The coefficients on the cash flow variable for the smallest firms in the sample is consistently positive and highly statistically significant over the full sample period and all other sub-periods, except the earliest five-year period, 1986 to 1990.

In contrast, the sign on the cash flow coefficient for the largest firms is inconsistent but not statistically different from zero. Interestingly, coefficients on the cash flow variable for firms in the middle group is positive and strongly correlated with investment in two time periods, 1986 to 1990 and 1991 to 1995. Indeed, during these periods, the cash flow coefficients for medium-sized firms are 4.0 and 7.8 times as large as those for the smallest firms.

In summary cash flow effect is sensitive to investment for small and medium sized firms, but not large firms. While we make a distinction between small and medium-sized firms, this distinction does not appear to hold in the market. One reason for this is that there is not much difference in size of firms in these groups. As Table 7 shows, small firms have an average capital stock (size) of $24 million, medium sized firms $53 million, and large firms $490 million. What this shows is that large firms are much bigger than medium size firms, but medium-sized firms are not much larger than small firms in our sample,[7] which probably explains the sensitivity of cash flow for small and medium-sized firms.

Results for firms based on industry classification

We also segment our sample based on whether firms are manufacturing or non-manufacturing. Poterba (1988) argues that because of the highly specialized nature of manufacturing firms' fixed assets, these firms are likely to encounter greater liquidity

[7] Of course, one way to see whether this argument holds is to re-run the regressions on two groups of firms, those that are large in one group and the small and medium sized firms combined in another group.

constraints than non-manufacturing firms in providing acceptable and marketable collateral in support of their debts. However, one can also argue that non-manufacturing firms may also have high levels of intangible assets, which could not be used as collateral for debt financing, and may be liquidity constrained just as much or even more. Notwithstanding these arguments, we divide our samples into manufacturing and non-manufacturing firms to see whether cash flow investment sensitivity is different for firms in these two different industry classes.

The results for manufacturing and non-manufacturing firms from the Q model augmented by the cash flow variable are reported in Table 13. These results show that the cashflow coefficients for non-manufacturing firms are 2 times to 14 times as large as those for their manufacturing counterparts over the entire sample period and various sub-periods. The greater cashflow-investment sensitivity for non-manufacturing firms appears to support the argument that these firms might have assets that do not support external financing. However, the results may also be reflecting the impact of cash flow on size. As Table 3 shows, non-manufacturing firms are also twice as large, on average, as manufacturing firms. And as we find above, cash flow is strongly correlated with investment for firms in the smallest and largest categories.

CONCLUSION

This study examined the effect of cash flow on corporate investment. We employ the Q model of investment with an unbalanced panel dataset of 18 companies over 1986 to 2000. We ran several augmented versions of the Q model. These regressions regress investment on Q, internally generated cash flow, cash stock and sales, after controlling for firm time invariant effects.

The results for our full sample show a strong positive relationship between investment and internally generated funds (cashflow), suggesting that the financial and real decisions of Trinidad and Tobago listed firms are not independent. When we segment the sample based on a measure of firm size, we find that the effect of cashflow on investment is strongly positive, but only for small and medium sized firms. When the sample is segmented by dividend payout ratios, the effect of cash flow on investment is positive and strongly correlated with investment for firms with the lowest payout and highest dividend payout ratios. When we segment the sample based on industrial classification, the cashflow coefficients on manufacturing and non-manufacturing firms are positive and highly correlated, but the coefficients for non-manufacturing are more than 2 times that of their manufacturing counterparts.

Despite the sizable positive and statistically significant cash-flow coefficients, in light of the work of KZ, we can interpret these findings as evidence of possible financial constraints. Furthermore, as KZ also showed, the size of our cashflow coefficients in the various regressions need not have a monotonic relation with the severity of financial constraints. It is also quite possible that liquidity term in our regressions serves as a proxy for omitted variables or some other specification problems. What these preliminary results do however is provide a basis for more investigation into whether firms identified

as financial constrained are indeed so, and what might be some of the associated factors that affect firms ability to efficiently raise investment finance in the local capital market.

REFERENCES

Akerlof, G.A. (1970), "The market for "lemons": Quality and the market mechanism", Quarterly Journal of Economics, 84, 488-500.

Bond, Stephen, et. al. "Financial Factors and Investment in Belgium, France, Germany and the UK: A Comparison Using Company Panel Data". Working Paper No. 5900. National Bureau of Economic Research. January 1997.

Brainard, William C., and James Tobin. "Pitfalls in Financial Model Building," American Economic Review 58 (May 1969), 99-122.

Chirinko, R.S. and H. Schaller. "Why Does Liquidity Matter in Investment Equations?" Journal of Money, Credit and Banking, Vol. 27, No. 2 (May 1995).

Clarke, C., D. Stoddard and V. Shield. "Corporate Financing Revisited", Insights into an Emerging Financial Structure: The Experience of Trinidad and Tobago. Ramesh Ramsran(ed.) 1995.

Cummins, Jason G., et. al. "Investment Behaviour, Observable Expectations and Internal Funds". Finance and Economics Discussion Series, Federal Reserve Board, 1997-27.

Fazzari, Steven, R. Glenn Hubbard and Bruce C. Petersen. "Financing Constraints and Corporate Investment: Response to Kaplan and Zingales". Working Paper No. 5462, National Bureau of Economic Research. July 2000.

_____. "Financing Constraints and Corporate Investment", Brookings Papers on Economic Activity, 141-195, 1988.

Fumio, Hayashi. "Tobin's Marginal q and Average q: A Neoclassical Interpretation," Econometrica, Vol. 50 (January 1982), pp. 213-24.

Gilchrist, Simon and Charles Himmelberg. "Investment, Fundamentals and Finance". Working Paper No. 6652, National Bureau of Economic Research. July 1998.

Graham, J.R. and C.R. Harvey. "The Theory and Practice of Corporate Finance: Evidence from the Field", Journal of Financial Economics, Volume 60, No. 2-3 (May/June 2001) 187-243.

Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: Managerial behaviour, agency costs and ownership structure", Journal of Financial Economics, 3, 305-60.

Jorgenson, D.W. and C.D. Siebert. "A Comparison of Alternative Theories of Corporate Investment Behaviour", American Economic Review, Vol. 58 (September 1968) 681-712.

Kadapakkam, P., P.C. Kumar and L.A. Riddick." The Impact of Cash Flows and Firm Size on Investment: the International Evidence", Journal of Banking and Finance, Vol. 22 (1998), 293-320.

Kaplan, Steven and Luigi Zingales. "Do Financing constraints Explain Why Investment in Correlated with Cash Flow?" Working Paper No. 5267, National Bureau of Economic Research. September 1995.

_____. "Investment-Cash Flow Sensitivities Are Not Valid Measures of Financing Constraints". Working Paper No. 7659, National Bureau of Economic Research. April 2000.

Keynes, J.M., (1936) The General Theory of Employment, Interest and Money, New York: Harcourt Brace.

Lamont, Owen. "Cash Flow and Investment: Evidence from Internal Capital Markets". Working Paper No. 5499, National Bureau of Economic Research. March 1996.

Modigliani, F., and M. Miller. "The Cost of Capital, Corporate Finance and the Theory of Investments", American Economic Review 48 (June 1958) 261-297.

Meyer, J. R. and E. Kuh (1957), The Investment Decision, Cambridge, Mass: Harvard University Press.

Myers, S.C. and N.S. Majluf. "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have", Journal of Financial Economics, Volume 13, No. 2 (June 1984) 187-221.

Opler, T., et al. "The Determinants and Implications of Corporate Cash Holdings". Working Paper No. 6234, National Bureau of Economic Research. October 1997.

Poterba, James M. "Financing Constraints and Corporate Investment: Comment," Brookings Papers on Economic Activity (1988:1), 200-4.

Schnure, Calvin. "Internal Capital Markets and Investment: Do the Cash Flow Constrints Really Bind?" Finance and Economic Discussion Series, Federal Reserve Board 1997-39.

Smith, A. (1776), "An Inquiry into the Nature and Causes of the Wealth of Nations", London: W. Strahan and T. Cadell.

Stein, J.C. "Agency Information and Corporate Investment". Working Paper No. 8342, National Bureau of Economic Research. June 2001.

Terrence, F., A. Najjar and H. Marcelle. "Corporate Financing and Use of Bank Credit in Trinidad and Tobago", Social and Economic Studies, Volume 35, No. 4, (1996).

Tinbergen, Jan. "A Method and Its Application to Investment Activity." In Statistical Testing of Business Cycle Theories, Vol. 1 Geneva: League of Nations, 1939.

Tobin, J. (1984), "On the efficiency of the financial system", Lloyds Bank Review, No. 153, July, 1-15.

Table 1
Significance Attributed by Firms to Various Constraints on Their Operations

Type of Constraint	Level of Significance (Percentage Distribution) Very Important	Important	Of Minimal Importance	Non Response		TOTAL
Market Size	73.9	17.4	2.9	5.8	-	100
Availability of Finance	53.6	29.0	4.3	5.8	7.3	100
Availability of Management	42.0	45.0	7.2	4.3	1.5	100
Availability of Technical Staff	42.0	43.6	5.8	4.3	4.3	100
Cost of Finance	31.9	47.8	8.7	5.8	5.8	100

Source: Corporate Financing and Bank Credit

Table 2
Relative Importance of Internal and External Sources of Funds in Selected Countries

Country	Period	Internal Funds/ Total Funds
United Kingdom	1970's	60
Germany	1970's	60
U.S.A.	1981	66
Japan	1967-1971	38
Guyana	1971	44
Trinidad & Tobago	1981/82	51(Mean)
Trinidad & Tobago	1981/82	32 (Median)

Sources: Corporate Financing and Bank Credit

Table 3
Sources of Fund*

	Sources	% Distribution	
(i)	Cash & Bank balances	49.8	
(ii)	Trade Credit	17.8	
(iii)	Bank Loans	10.2	
(iv)	Other Loans	5.7	
(v)	Issue of Shares	2.9	
(vi)	Other Sources**	13.6	
Memo:	External Funds Ratio		49.0 (Mean)
			68.0 (Median)

* 47 firms supplied data for 1982, 14 for 1981 and 2 for 1980

** Includes Decreases in trade debtors, decreases in inventories and other working capital changes as well as decreases in financial investments and sales of fixed assets.

Source: Corporate Financing and Bank Credit

Table 4
Internal Financing of Investment in Fixed Asets- 1975-1980, 1981 and 1982

Percentage Distribution	1975-1980	1981	1982
Non-Response	27.5	10.0	11.6
Not Applicable	1.4	5.8	7.2
Nil	31.9	42.0	31.9
1-29	8.7	8.7	11.6
30-49	2.9	5.8	2.9
50-79	7.2	7.2	8.6
80-100	20.2	20.3	26.0
TOTAL	100.0	100.0	100.0

Source: Corporate Financing and Bank Credit

Table 5: Sample companies data availability, 1986 – 2000.

Company	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Years of data available
Non-Manufacturing																
Agostini	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
ANSA McAL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
Furness	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
LJ Williams	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
Neal & Massy	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
Valpark	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
Manufacturing																
Angostura Holdings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
Berger	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
CCN	N/A	N/A	N/A	N/A	N/A	1	1	1	1	1	1	1	1	1	1	**10**
Flavourite	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
Lever Brothers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
MoraVen Holdings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1	1	1	1	**5**
National Flour Mills	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1	1	1	1	1	**6**
Point Lisas	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
ReadyMix	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
Trinidad Cement	N/A	N/A	N/A	1	1	1	1	1	1	1	1	1	1	1	1	**12**
Trinidad Publishing	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
West India Tobacco	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**15**
	14	**14**	**14**	**15**	**15**	**16**	**16**	**16**	**16**	**17**	**18**	**18**	**18**	**18**	**18**	**243**

Table 6: Descriptive statistics of the full sample, 1986 - 2000

	Mean	Std. Dev.	Median	Minimum	Maximum
Capital stock	182,459	302,306	48,957	1,805	1,759,382
Investment to capital stock	0.18	0.40	10	-0.65	3.64
Cash stock to capital	0.13	0.18	0.08	0.00	1.17
Cash flow to capital	0.14	0.18	0.10	-0.23	1.83
Sales growth	10.52	25.80	7.24	-61.18	209.94
Sales to capital	2.46	3.16	1.48	0.08	26.11
Dividend payout*	0.49	0.33	0.46	0.00	1.00
Tobin Q	1.11	0.96	0.75	0.03	4.51

* Maximum dividend payout in any year was constrained to +100%.

Table 7: Mean and standard deviation (in brackets) for firms by size, dividend payout and industry

Firms size is based on the average value of capital stock over sample period. Firms in the first tertile are the smallest firms or have the lowest dividend payout ratios. Those in the third tertile are the largest firms or have the highest dividend payout ratio.

	Firm size 1st Tertile	Firm size 2nd Tertile	Firm size 3rd Tertile	Dividend payout 1st Tertile	Dividend payout 2nd Tertile	Dividend payout 3rd Tertile	Manufacturing firms	Non-Manufacturing firms
Capital stock	23,813	52,994	489,996	146,815	224,104	172,640	100,087	290,719
	[16,697]	[19,586]	[380,764]	[251,627]	[379,610]	[248,656]	[196,644]	[375,341]
Investment to capital stock	0.18	0.17	0.18	0.22	0.21	0.11	0.23	0.11
	[0.42]	[0.46]	[0.30]	[0.61]	[0.28]	[0.18]	[0.49]	[0.20]
Cash stock to capital	0.11	0.12	0.16	0.12	0.13	0.16	0.18	0.08
	[0.20]	[0.17]	[0.16]	[0.21]	[0.17]	[0.17]	[0.22]	[0.08]
Cash flow to capital	0.19	0.10	0.12	0.15	0.15	0.12	0.19	0.08
	[0.26]	[0.09]	[0.09]	[0.28]	[0.11]	[0.09]	[0.22]	[0.07]
Sales growth	8.26	10.52	13.13	14.76	11.12	5.87	13.16	7.06
	[21.11]	[31.05]	[25.25]	[37.33]	[18.35]	[17.23]	[27.82]	[22.55]
Sales to capital	3.37	2.49	1.39	2.59	1.97	2.86	3.25	1.43
	[4.56]	[2.03]	[1.10]	[5.10]	[1.24]	[1.87]	[3.89]	[1.17]
Dividend payout*	0.33	0.72	0.45	0.21	0.49	0.76	0.49	0.48
	[0.27]	[0.34]	[0.26]	[0.23]	[0.22]	[0.29]	[0.32]	[0.34]
Tobin Q	0.82	1.54	1.03	0.79	1.08	1.43	1.45	0.65
	[0.65]	[1.31]	[0.70]	[0.74]	[0.64]	[1.28]	[1.10]	[0.40]

* Maximum dividend payout in any year was constrained to +100%.

Table 8: Effects of Cashflow and Q on investment, 1986 – 2000.

Dependent variable is investment to capital stock (I_{it}/K_{it-1}), where I_{it} is investment in plant, equipment, and long-term investments, and K_{it-1} is the beginning-of-period capital stock. Independent variables are defined as follows: Tobin Q ($Q_{i,t-1}$) is the ratio of firm market value to firm book value. Market value is the sum of market value of outstanding common equity and book value of long-term debt and preferred stock at the beginning of the year. Firm book value is the book value of common equity plus the book value of long-term debt and preferred stock. Cashflow to capital (CF_{it}/K_{it-1}) is cash flow generated during the year, measured as the sum of net income plus depreciation, amortized intangibles and deferred taxes, less dividends divide by beginning of period capital stock.

Panel A	**1986-2000**	**1991-2000**	**1986-1995**	**1986-1990**	**1991-1995**	**1996-2000**
CF_{it}/K_{it-1}	1.072 **	1.090 **	1.015 *	0.511 ***	0.797 *	1.169 ***
	[0.481]	[0.534]	[0.288]	[0.275]	[0.307]	[0.619]
Q_{it-1}	0.080	0.081	0.084	0.054	0.043	0.239 ***
	[0.074]	[0.086]	[0.057]	[0.071]	[0.117]	[0.142]
Adjusted R-squared	0.27	0.23	0.20	0.08	0.17	0.22
No of observations	241	170	151	71	80	90
Panel B	**1987-2000**	**1991-2000**	**1987-1995**	**1987-1990**	**1991-1995**	**1996-2000**
CF_{it}/K_{it-1}	0.952 **	0.962 ***	0.981 *	0.490	1.023 *	1.121 ***
	[0.464]	[0.503]	[0.242]	[0.351]	[0.339]	[0.637]
CF_{it-1}/K_{t-2}	0.266	0.286	0.976 *	-0.483	1.153 *	0.129
	[0.298]	[0.340]	[0.333]	[0.520]	[0.412]	[0.502]
Q_{it-1}	0.063	0.065	0.016	0.061	0.034	0.222
	[0.083]	[0.093]	[0.073]	[0.109]	[0.110]	[0.170]
Adjusted R-squared	0.28	0.24	0.27	0.06	0.25	0.21
No of observations	225	168	136	57	79	89

* Indicate significance at 0.01, ** Indicate significance at 0.05, *** Indicate significance at 0.10

Table 9: Effects of cash flow, cash stock and Q on investment, 1987 – 2000.

Dependent variable is investment to capital stock (I_{it}/K_{it-1}), as described in Table 8. Independent variables are cash stock to capital stock (CS_{it}/K_{it-1}) which is the sum of cash and marketable securities at the beginning of the year divide by beginning of year capital stock. The other independent variables are as defined in Table 2.

Panel A	**1987-2000**	**1991-2000**	**1987-1995**	**1987-1990**	**1991-1995**	**1996-2000**
CF_{it}/K_{it-1}	1.069 **	1.051 ***	1.077 *	0.499	0.803 *	1.130 ***
	[0.500]	[0.553]	[0.314]	[0.357]	[0.314]	[0.673]
Q_{it-1}	0.112	0.117	0.103	0.058	0.049	0.235
	[0.136]	[0.152]	[0.069]	[0.103]	[0.115]	[0.203]
Q_{it-2}	-0.052	-0.057	-0.078	-0.101	-0.194 ***	-0.002
	[0.127]	[0.142]	[0.058]	[0.084]	[0.113]	[0.155]
Adjusted R-squared	0.28	0.24	0.20	0.06	0.19	0.21
Observations	223	167	134	56	78	89
Panel B	**1986-2000**	**1991-2000**	**1986-1995**	**1986-1990**	**1991-1995**	**1996-2000**
CF_{it}/K_{it-1}	1.028 **	1.020 **	1.000 *	0.510 ***	0.849 *	1.050 ***
	[0.464]	[0.511]	[0.295]	[0.276]	[0.330]	[0.589]
Q_{it-1}	0.077	0.077	0.084	0.054	0.044	0.240 ***
	[0.073]	[0.084]	[0.057]	[0.072]	[0.116]	[0.141]
CS_{it}/K_{it-1}	0.157	0.219	0.044	0.041	-0.123	0.376
	[0.211]	[0.275]	[0.140]	[0.274]	[0.176]	[0.510]
Adjusted R-squared	0.27	0.23	0.20	0.06	0.15	0.22
Observations	241	170	151	71	80	90

* Indicate significance at 0.01, ** Indicate significance at 0.05, *** Indicate significance at 0.10

Table 10: Effects of cash flow, Q and sales on investment, 1987 – 2000.

Dependent variable is investment to capital stock (I_{it}/K_{it-1}), and independent variables are lagged sales to capital stock (S_{it-1}/Kit_{-2}), Q and cash flow. All other variables are as defined in Table 8.

	1987-2000	1991-2000	1987-1995	1987-1990	1991-1995	1996-2000
CF_{it}/K_{it-1}	0.769	0.738	0.940 *	0.177	0.801 **	0.803
	[0.479]	[0.497]	[0.292]	[0.479]	[0.320]	[0.676]
Q_{it-1}	0.074	0.070	0.071	0.000	0.053	0.220 ***
	[0.074]	[0.082]	[0.068]	[0.112]	[0.116]	[0.131]
S_{it-1}/K_{it-2}	0.032	0.042	0.026	0.066	0.043	0.049
	[0.022]	[0.029]	[0.021]	[0.077]	[0.042]	[0.037]
Adjusted R-squared	0.28	0.25	0.21	0.07	0.17	0.23
Observations	225	168	136	57	79	89

* Indicate significance at 0.01, ** Indicate significance at 0.05, *** Indicate significance at 0.10

Table 11: Effects of cash flow and Q on investment for firms classified by dividend payout

Dependent variable is investment to capital stock (I_{it}/K_{it-1}). All variables are as defined in Table 8.

	1986-2000	1991-2000	1986-1995	1986-1990	1991-1995	1996-2000
Panel A: Sample firms with dividend payout ratios in the **first tertile** (average dividend payout 0-55 percent)						
CF_{it}/K_{it-1}	1.162 **	1.236 **	0.715 **	-0.209	0.438 ***	1.514 *
	[0.508]	[0.539]	[0.300]	[0.330]	[0.227]	[0.496]
Q_{it-1}	0.209	0.235	0.200	0.301	-0.310	0.603 ***
	[0.169]	[0.212]	[0.122]	[0.200]	[0.365]	[0.337]
Adjusted R-squared	0.36	0.30	0.17	-0.10	0.12	0.41
Observations	77	55	47	22	25	30
Panel B: Sample firms with dividend payout ratios in the **second tertile** (average dividend payout 35-55 percent)						
CF_{it}/K_{it-1}	0.128	-0.226	1.004 *	0.808 ***	0.786	-0.562
	[0.522]	[0.679]	[0.385]	[0.456]	[0.513]	[1.005]
Q_{it-1}	0.112	0.123	0.200	0.105	0.349	0.137
	[0.085]	[0.084]	[0.161]	[0.303]	[0.255]	[0.093]
Adjusted R-squared	0.09	0.09	0.25	-0.10	0.41	-0.09
Observations	84	59	54	25	29	30
Panel C: Sample firms with dividend payout ratios in the **third tertile** (average dividend payout 55-92 percent)						
CF_{it}/K_{it-1}	0.910 ***	0.850	2.913 *	1.328 ***	3.409 **	0.481
	[0.528]	[0.602]	[1.106]	[0.770]	[1.435]	[0.588]
Q_{it-1}	-0.018	-0.025	-0.017	0.001	-0.027	0.027
	[0.054]	[0.063]	[0.051]	[0.076]	[0.099]	[0.081]
Adjusted R-squared	0.07	0.02	0.33	-0.04	0.30	-0.15
Observations	80	56	50	24	26	30

* Indicate significance at 0.01, ** Indicate significance at 0.05, *** Indicate significance at 0.10

Table 12: Effects of cash flow and Q on investment for firms classified by size

Dependent variable is investment to capital stock (I_{it}/K_{it-1}). All variables are as defined in Table 8.

	1986-2000	1991-2000	1986-1995	1986-1990	1991-1995	1996-2000
Panel A: Sample firms with capital stock in the **first tertile** (average capital stock TT$4.3 million to TT$44.5 million)						
CF_{it}/K_{it-1}	1.363 *	1.451 *	0.669 *	0.211	0.522 ***	1.847 *
	[0.481]	[0.529]	[0.254]	[0.323]	[0.265]	[0.510]
Q_{it-1}	-0.006	-0.022	0.347 *	0.336	0.145	0.173
	[0.072]	[0.085]	[0.120]	[0.257]	[0.330]	[0.111]
Adjusted R-squared	0.55	0.52	0.31	0.12	0.23	0.68
Observations	90	60	60	30	30	30
Panel B: Sample firms with capital stock in the **second tertile** (average capital stock TT$46.3 million to TT$63.9 million)						
CF_{it}/K_{it-1}	-0.372	-0.592	2.705 **	1.648 ***	3.017 **	-1.527
	[1.003]	[1.130]	[1.148]	[0.873]	[1.374]	[1.249]
Q_{it-1}	0.248	0.286	-0.016	-0.007	0.028	0.682 ***
	[0.184]	[0.212]	[0.047]	[0.077]	[0.087]	[0.364]
Adjusted R-squared	0.20	0.17	0.33	0.00	0.25	0.28
Observations	74	54	44	20	24	30
Panel C: Sample firms with capital stock in the **third tertile** (average capital stock TT$169.2 million to TT$938.2 million)						
CF_{it}/K_{it-1}	-0.179	-0.289	1.210	0.579	1.086	-0.636
	[0.650]	[0.689]	[0.834]	[0.929]	[0.982]	[0.840]
Q_{it-1}	0.117	0.109	0.106	0.089	-0.013	0.159
	[0.087]	[0.094]	[0.146]	[0.226]	[0.285]	[0.102]
Adjusted R-squared	0.06	0.03	0.09	-0.12	0.05	-0.09
Observations	77	56	47	21	26	30

* Indicate significance at 0.01, ** Indicate significance at 0.05, *** Indicate significance at 0.10

Table 13: Effects of cash flow and Q on investment for firms classified by industry

Dependent variable is investment to capital stock (I_{it}/K_{it-1}). All variables are as defined in Table 8.

	1986-2000	1991-2000	1986-1995	1986-1990	1991-1995	1996-2000
			Panel A: Manufacturing Firms			
CF_{it}/K_{it-1}	1.031 **	1.047 ***	0.865 *	0.260	0.640 **	1.109 ***
	[0.511]	[0.567]	[0.257]	[0.254]	[0.265]	[0.659]
Q_{it-1}	0.098	0.098	0.081	0.049	0.005	0.271 ***
	[0.084]	[0.096]	[0.059]	[0.073]	[0.131]	[0.159]
Adjusted R-squared	0.27	0.21	0.21	0.09	0.15	0.20
Observations	137	100	82	37	45	55
			Panel B: Non-Manufacturing Firms			
CF_{it}/K_{it-1}	2.076 *	2.158 **	3.166 **	3.806 **	3.550 ***	2.514 *
	[0.746]	[0.881]	[1.388]	[1.871]	[2.083]	[0.942]
Q_{it-1}	-0.095	-0.110	0.136	0.149	0.312	-0.052
	[0.095]	[0.104]	[0.156]	[0.212]	[0.271]	[0.073]
Adjusted R-squared	0.22	0.21	0.26	0.17	0.23	0.28
Observations	104	70	69	34	35	35

* Indicate significance at 0.01, ** Indicate significance at 0.05, *** Indicate significance at 0.10