HOW DO PHILIPPINE LISTED FIRMS MAKE INVESTMENT DECISIONS?

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Abstract

How do Philippine listed firms evaluate investment opportunities? Available survey evidence indicates that most of the firms sampled responded that they employ modern quantitative techniques that are based on maximizing shareholders' wealth. This paper set out to verify if this claim could find support in the statistical data examined in this study.

Tobin's q, defined as the ratio of the market value of a firm to the replacement cost of its total assets, was used to test the hypothesis that firms do employ the criterion of shareholders' wealth maximization when they evaluate investment proposals. The idea is that values of q greater than one, on the margin, should stimulate more investments and values less than one should correspondingly discourage investments until q equals unity.

Instead, the study found statistical evidence that consistent revenue growth stimulates greater investments presumably due to the increased business confidence that revenue growth generates. On the other hand, limitations on access to funds, either through the equity market or the loans market, dampen investments. The significant negative influence of high fixed assets to total assets ratio also indicates that the irreversibility of physical investments once made and the setup and adjustment costs related to high fixed capital expenditures may put some restraint on investments.

Finally, there appears to be no empirical basis to the often-cited claim that the strength of the local stock market is a solid barometer of investor confidence. High measures of marginal q do not seem to translate into actual investments of capital in the aggregate economy.

I. Introduction

Tobin's q (Tobin, 1969) suggests an approach to evaluate the rational basis, in the economic sense, of investment decision-making by private firms. Tobin's q is defined as the ratio of the market value of a firm (MV) to the replacement cost of its total assets (RC). The idea is that values of q greater than one, on the margin, should stimulate more investments and values less than one should discourage investments until q equals unity. Correspondingly, only new projects that adds to the net market value of the firm after covering investment cost should be implemented. Thus, rational investment decision-making in this paper is equated with shareholders' wealth maximizing behavior. This provides a theoretical foundation for quantitative approaches to investment appraisal such as the IRR (internal rate of return) and NPV (net present value) techniques.

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This investigation uses the q concept to study the rationality of investment decision-making by selected Philippine firms listed in the stock exchange. The firms are those identified in the study of Echanis and Kester (1997-98) which aimed to determine disparity between theory and practice in use of quantitative techniques in the evaluation of capital expenditures by publicly-listed firms. About 73% or 30 firms of the 41 that responded indicated that they subjected all capital investment proposals to quantitative evaluation techniques. The firms (except for one not named in the study) are listed in Exhibit 1 together with their industry classification and stock exchange code. The techniques most commonly cited were the IRR and NPV techniques. As hurdle rate, the rate used ranged from the cost of specific capital used for the project (29.3%), T-bill rate plus a premium (24.4%) and weighted average cost of capital (12.2%). This study looks at time series of published financial data of these companies to determine if their financial results support the implicit claims of rationality in selecting investment projects.

As a corollary issue, we look at the question whether Tobin's q has any predictive power as far as aggregate private investment is concerned. Much has been said of the strength of the local stock market as an indicator of investor confidence. Is there any basis to this and do high marginal q's translate into actual investments of physical capital into the aggregate economy?

As far as I know, there has not been any investigation of this concept in the Philippines. In the U.S. and other countries, empirical investigations (for example, as cited by Tobin (1998, p.152-153)) are aggregative studies on the relationship of q to aggregate investment in the economy. On the other hand, this paper focuses only on investment decision-making practices in individual representative Philippine firms.

II. Tobin's q Theory of Investment

More formally, q is defined as

$$q = \frac{MV}{RC}, \qquad (1)$$

where, as defined previously, MV is market value of the firm and RC is replacement cost of assets.

In chapters on valuation of a going concern in most textbooks in corporate finance, for example, Brealey and Myers (1996), MV can be expressed in terms of free cash flows of the firm as follows:

$$MV = \sum_{t=1}^{\infty} \frac{FCF_t}{(1+r_k)^t}, \qquad (2)$$

where FCF_t is the firm's free cash flows from operations available for debt servicing and dividend payouts and r_k is the return required by investors usually interpreted as the firm's average cost of capital. If the stock market is efficient, MV = MC + TD , the current market price of the stock multiplied by total shares outstanding (MC) plus the value of the firm's total debt (TD).

Note that

$$MV = \sum_{t=1}^{m} \frac{FCF_t}{(1+r_k)^t} + \frac{MV_m}{(1+r_k)^m}, \qquad (3)$$

where MV_m is the market value at end of some period m. This expression is particularly relevant in the Philippine setting

where returns from current dividends are not very significant relative to expected capital gains.

RC is the replacement cost of the individual assets that make up the firm. If MV is greater than RC (q is greater than one), the firm still has to exhaust all desirable investment opportunities to maximize shareholders' wealth. A related concept, the marginal efficiency of capital R (which is what financial practitioners call the IRR or internal rate of return) is defined to be the discount factor that equates the firm's asset replacement cost to its market value. Thus, under certain conditions, an alternate expression for q is

$$q = \frac{R}{r_k}. \qquad (4)$$

III. Investment Appraisal Application

A direct application of the concepts discussed in the preceding section can be found in chapters in capital budgeting in corporate finance textbooks in terms of decision rules on whether to accept or reject an investment proposal in accordance with the principle of rationality. There are two most commonly recommended approaches: the IRR method and the net present value or NPV method. The NPV approach implements the concept underlying (2) and (3) above while the IRR method is closest to equation (4) above. It finds the value R that equates the sum of the discounted future income or cash flows (CF) over the life of the investment to the initial investment I_0. Formally, R is found from

$$I_0 = \sum_{t=1}^{n} \frac{CF_t}{(1+R)^t}. \qquad (5)$$

If R is greater than a pre-selected hurdle rate r, which may be the average cost of capital r_k mentioned above, the investment proposal is acceptable. Otherwise, it is not. Thus, this is functionally equivalent to using the marginal q concept as we can restate the decision rule as accept investment proposal if the ratio R/r is greater than one, otherwise, not. All investment proposals passing this hurdle will be accepted such that theoretically average q will tend to unity.

The NPV approach computes the net present value (NPV) of the future income or cash flows (CF) over the life of the investment, i.e.,

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}. \qquad (6)$$

The NPV is then compared to the initial investment I_0. If it is greater, accept the investment proposal, otherwise, don't. Sometimes this approach is extended to computing an NPV index = NPV/ I_0. Again, if the index is greater than one, the investment proposal is acceptable. Otherwise, it is not.

Note the similarity between the ratio IRR/r and the NPV index. While both are functionally equivalent to q, they do not normally yield the same number. Nevertheless, under both approaches, average q tends to unity as long as all investment proposals passing the hurdle are implemented. In actual application, the IRR approach is preferred by financial analysts because, unlike in the NPV approach, one is not compelled to exactly specify r. The financial analyst normally just evaluates the IRR obtained whether it is "high enough" as compared to an unspecified benchmark.

IV. Analyzing the Financial Data

The market capitalization data used in the analysis came from the published monthly reports of the Philippine Stock Exchange from 1994 and before that from the Makati Stock Exchange. Financial data came from the annual compilations made by Philippine Business Profiles & Perspectives, Inc. and Business World. Of the 41 listed companies covered by the study of Echanis and Kester, we are only able to gather financial data covering six years or more from 35 companies. Thus, these data points are the only ones covered by this investigation.

The main hypothesis to be tested is whether Tobin's q has any effect on the firm's investment decision. In other words, do firms act to maximize shareholders' wealth in making investment, i.e., expansion or divestment decisions? Or, in statistical terms, the null hypothesis is that measures of Tobin's q exhibit no explanatory power on firms' investment decision-making, i.e., they do not make the implied calculations and follow the rule that it pays to invest whenever the percentage yield or internal rate of return exceeds the interest rate or cost of capital.

On the basis of the last two paragraphs in the previous section, it is reasonable to postulate a direct relationship between a firm's investment outlays and the value of marginal q. Higher values of marginal q, fully anticipated by the market, should lead to higher investments by firms. Similar to Hayashi's (1982) aggregate formulation, the following is postulated at the firm level:

$$I_i/TA_{t-1} = a_0 + b_0 q_i, \qquad (7)$$

where I_i is the ith firm's average annual investment outlay TA_{t-1} is previous year's total assets, and q_i its marginal q. I_i/TA_{t-1} can also be interpreted as the ith firm's rate of investment. As a starting point, average q as in (1) above is computed as the ratio of MV, the firm's estimated market value, to RC, the estimated replacement cost of its total assets. The market value of the firm is computed as the total market capitalization of its shares of stock plus debt. Replacement cost is computed on the book value of total assets after adjusting for inflation for the fixed assets component and subsequent increases from the base year when the earliest data are available using NEDA's GDP (Gross Domestic Product) deflator for fixed investment.

In looking at market capitalization, a separate but related issue emerges. This involves the efficiency of the stock market, i.e., whether the market price truly reflects the capitalized expected earnings stream of earnings (dividend plus capital gains) of listed firms. Whether we can isolate the issue of investment decision-making from the issue of market efficiency in the analysis of our data is a major concern. If we assume that the Philippine stock market is efficient, then relating investment decisions by firms as measured by the changes in their total asset values to the computed values of q should be enough to evaluate the hypothesis in question. However, some studies (see for example, Cayanan and Sazon (1995)) indicate that the local stock market may not be efficient, at least in the short term.

One other study that we will cite is that of Kester et. al. (1998) mainly because the sample covered for the Philippines is the same as that in the Echanis and Kester study that we are using. The study covers the results of an October 1995 survey of Chief Executive Officers (CEOs) and Chief Financial Officers (CFOs) of publicly listed companies in the Asia–Pacific Region

(Australia, U.S. Hong Kong, Indonesia, Philippines, Malaysia, and Singapore). Of 205 listed companies as of October 1995, 185 were surveyed and only 41 or 22.2% of them responded. To the question "Approximately what percent of the time would you estimate that your firm's outstanding securities are priced fairly by the market?," only 17.9% of the Philippine firms (lower than the U.S.'s 47.2 % and Australia's 43.1% but slightly higher than other Asian countries) answered that their firm's securities were priced fairly by the market "more than 80 percent of the time," 51.3% answered "between 50 and 80% of the time" and 30.8% answered "less than 50% of the time." In addition, maximizing the prices of publicly traded securities was only ranked 5th in order of importance (ensuring long-term survival of firm and maintaining financial flexibility were ranked 1st and 2nd, respectively) as a financial planning principle among these Philippine firms. These results are qualitative indications that the Philippine stock market may not be efficient.

There are also indications that factors other than intrinsic values determine market valuation. For instance, the influx of short-term foreign capital during the period starting in 1992 and peaking in 1994 and the Asian financial crisis which broke in mid-1997 seem to have definite effects on individual firm values that are not justified on so-called rational grounds. [1]

We will approach the market efficiency issue in two ways. First, by using end-of-year data and averaging and regressing through a number of years, we expect the effects of short-term market inefficiencies to be smoothened out. In addition, individual stock prices are also adjusted to take into consideration the effects of market volatility due to short-term foreign capital flows on market values. In the analysis of the data, two sets of market values are used – one with the adjustments just mentioned and another without. This is done to give us an isolated picture on just what the effects are of computed values of q on investments.

V. Investment Rate vs. Average q

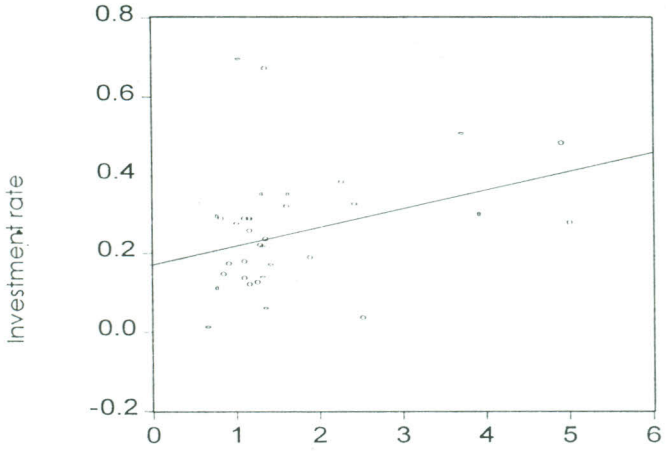
One of the main problems in this study is the construction of measures of marginal q for individual companies from available data. Hayashi (1982) showed that under certain conditions, the average q and marginal q are equivalent. These conditions are that the firm is a price-taker and that its production function and installation function are linearly homogeneous. Hence, if this equivalence is found to be plausible, we can use average q in (7) above.

To test statistically the hypothesis that average q is equal to marginal q is equivalent to testing that average q is invariant to scale of operations. Regressing average q against total replacement cost, we found significance (at 90% confidence level or more) in 11 of the 35 firms studied. In the other cases, the hypothesis that there is no relationship between average q and scale of operations cannot be rejected. However, in 23 firms, the relationship, i.e., the sign of the slope parameter, is negative meaning that average q goes down as scale of operations increases. This is indicative of decreasing returns to scale which, if valid, does not support one of the conditions of Hayashi's finding. Furthermore, the facts that the industries to which the sample firms belong consist only of a few players and that the firms themselves are large do not render plausible an assumption that these firms are price-takers.

Nevertheless, we tested the relationship in (7) using average q as surrogate for marginal

q, first using the unadjusted market values of individual firms. The results, summarized in Figure 1 below (figures in parenthesis are the t-statistics), showed a positive relationship that is statistically significant. Although R-square is only 0.101913, the p-value for the slope parameter is 0.0616.

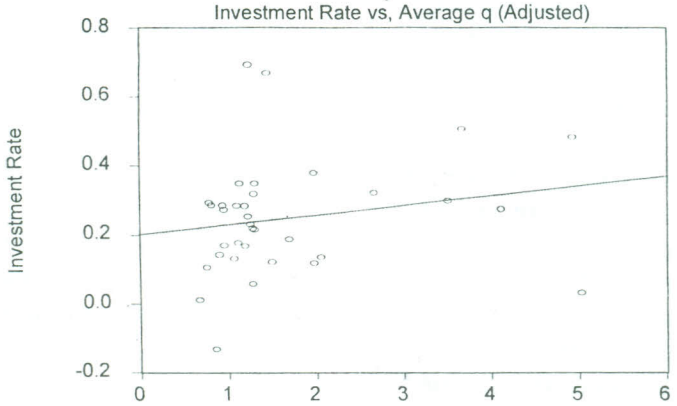
Figure 1
Investment Rate vs. Average q (Unadjusted)



Average q (Unadjusted)
Model: 0.169498 + 0,04699*q
((3.436937) (1.935145)

Using the adjusted market values as the dependent variable shows a similar but weaker result. This is summarized in Figure 2 below (figures in parenthesis are the t-statistics). R-square is lower at 0.036155 while the p-value for the slope parameter is 0.2739.

Figure 2
Investment Rate vs, Average q (Adjusted)



Average q (Adjusted)
Model: 0.202939 + 0.027342*q
(4.045713) (1.112591)

VI. Investment Rate vs. Marginal q

Given the reservations in the approach used above, more direct approaches are indicated to estimate marginal q[2]. For each firm, we estimate average change per year in market value as the sum of the average change in market capitalization (MC_t) and total liabilities (TL_t) from time series data as follows:

$$MC_t = a_1 + b_1 t \quad (8)$$

$$TL_t = a_2 + b_2 t\,, \quad (9)$$

where b_1 and b_2 are the fitted changes in MC and RC per year, respectively, and t is the time index. The sum $b_1 + b_2$ is now our estimate of the average change per year of total market value MV. Then, we estimate the average change in total replacement cost as follows:

$$RC_t = a_3 + b_3 t\,, \quad (10)$$

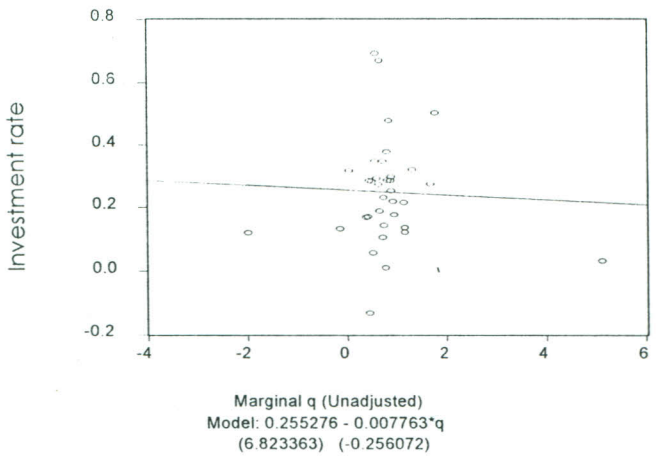
The ratio $(b_1 + b_2)/ b_3$ is now our estimate of marginal q. Now, we can represent I_t/TA_t as dTA_t/TA_t or $d(\ln TA_t)$. Hence, we can fit the following equation:

$$TA_t = a_4 * \exp\{b_4 t\}, \quad (11)$$

where b_4 represents our estimate of I/TA for a particular firm. We now have all the estimates for the hypothesized relationship in (7).

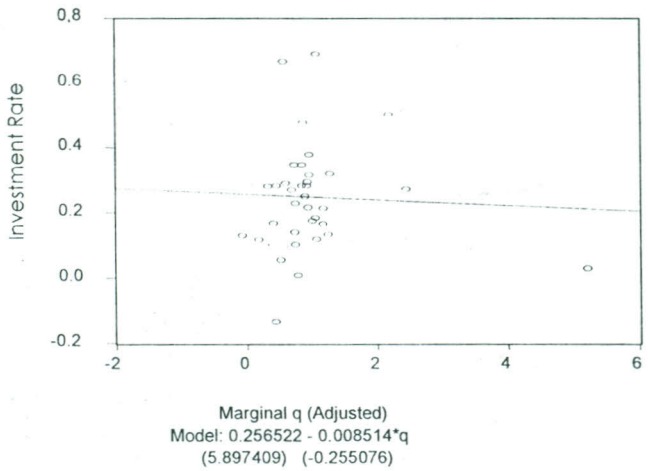
We now test the relationship in (7) first using the unadjusted market values of individual firms. The results, summarized in Figure 3 below (figures in parenthesis are the t-statistics), showed a negative relationship that is not statistically significant. R-square is only 0.001983 and the p-value for the slope parameter is 0.7995. In other words, we can accept the null hypothesis of no relationship between investment rates of firms with its computed marginal q's with reasonable confidence.

Figure 3
Investment Rate vs. Marginal q (Unadjusted)



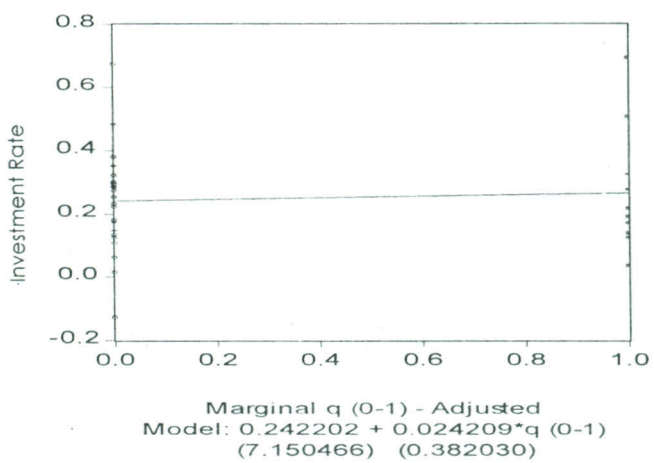
Using the adjusted market values as the dependent variable shows almost identical results. This is summarized in Figure 4 below (figures in parenthesis are the t-statistics). R-square is 0.001968 while the p-value for the slope parameter is 0.8002.

Figure 4
Investment Rate vs. Marginal q (Adjusted)



The bunching of data in Figures 3 and 4 above, however, presents a curiosity. It may be possible that the value of marginal q itself is not the appropriate variable to consider but whether it is below or above the threshold value of one. To examine this, we use the corresponding dummy variable representation and regress investment rate against this. The results are shown in Figure 5 below. A positive but small relationship is indicated this time although still not statistically significant. R-square is 0.004403 and p value of the relationship coefficient is 0.7049. This additional information does not seem to negate the findings discussed above.

Figure 5
Investment Rate vs. Marginal q 0-1 Variable



To summarize the results of the statistical analysis, the assertion that the representative listed firms use and apply quantitative decision-making rules based on the principle of shareholders' wealth maximization in selecting investment projects and this is appropriately reflected in market valuation is not supported by the data. However, we cannot rule out other factors that could result in such a finding, such as inherent (not just short-term) market inefficiencies not removed by the adjustment procedure used on the data, financial market imperfections such as lack of access to debt and capital sources, questions relating to the appropriate hurdle rates to be used, and inherent limitations in the reported financial data used.

VII. Other Determinants of Investment

The poor performance of estimates of q to explain investments leads us to look at other possible determinants of investment. We postulate an expanded model:

$$I/TA = a_0 + b_1q + b_2de + b_3at + b_4fa + b_5cf + b_6gr\,, \quad (12)$$

where

de – represents the firm's average debt-equity ratio. One would expect a high debt-equity ratio to put a restraint on investments as it puts a limit on borrowing capacity to finance investments particularly if existing owners/shareholders are unable or do not want to issue new shares as this may dilute their control over the corporation. The reverse may also be true, that increased investments may result in higher debt-equity ratio.

at – denotes asset turnover or ratio of gross revenue to total assets of the firm.

fa – denotes the proportion of the firm's total assets represented by fixed assets. This reflects the fixed capital intensity of the firm's operations. Setup costs related to high fixed capital expenditures may put some restraint on additional investments.

cf – denotes cash generated from operations by the firm computed as net income plus depreciation. This reflects the ability of the firm to finance investments from internal sources.[3]

gr – represents the average growth rate in revenues analogous to the acceleration principle in macroeconomics. Consistent increases in revenues are supposed to generate confidence and expectations of growth and additional investments.

The resulting regression equation is:[4]

$$I/TA = \underset{(1.650176)}{0.203646} + \underset{(0.159432)}{0.004740q} - \underset{(-0.933184)}{0.015020de} - \underset{(-0.601800)}{0.036288at} - \underset{(-1.018344)}{0.104140fa} + \underset{(0.168339)}{0.103019cf} + \underset{(3.502839)}{0.495158gr}\,.$$

One variable dominates in statistical significance – the revenue growth rate although it is not clear whether high revenue growth induces higher investments or the other way around. Results of Granger causality tests are inconclusive.[5] Three others show some significance - the debt-equity ratio, fixed assets to total assets ratio and asset turnover although all three add only marginal explanatory value. The others – marginal q and cash flow are not statistically significant.

So far, we have assumed that the behavior of companies with respect to investments is homogeneous. We now drop this assumption and introduce into (12) the following dummy variables denoting whether the company is a holding, finance (including banking), property, utility, or manufacturing company:

if – equals 1 if the company is a bank or financial company; 0 otherwise
ih – equals 1 if the company is a holding company; 0 otherwise
im – equals 1 if the company is a manufacturing company; 0 otherwise
ip – equals 1 if the company is a property company; 0 otherwise
iu – equals 1 if the company is a utility company; 0 otherwise.

The default is that the company is none of the above, for example, a construction or mining company. The resulting equation is:[6]

$$I/TA = 0.099121 + 0.007692q - 0.015736de - 0.035779at - 0.081262fa + 0.528382cf + 0.488880gr + 0.085061if - 0.079112ih + 0.003962im + 0.130688ip + 0.096269iu.$$
$$(0.696007)\ (0.250663)\ (-0.718796)\ (-0.524733)\ (-0.765977)\ (0.840573)\ (3.448790)\ (0.727246)\ (0.881193)\ (0.050300)\ (1.395120)\ (1.100218)$$

The coefficients for dummy variables are all not statistically significant (at 90% confidence level) indicating that, all other things equal, the investment behavior of a company in one particular industry is not distinguishable from that of companies in other industries. As far as the other selected determinants, however, the results are comparable to those of the previous model although the fit has improved significantly based, for example, on both R-square and adjusted R-square.

The statistical significance of revenue growth was noted earlier including the fact that it is not clear whether high revenue growth induces higher investments or the other way around. The Hausmann specification test could be used to test for simultaneity of the revenue growth variable and the investment rate variable. The test accepted the null hypothesis of no simultaneity of the two variables strengthens the support for a conjecture that revenue growth is a good predictor of firm investments. Thus, while this statement must be taken with some caution,[7] there is statistical basis for positing that consistent increases in revenues generate greater business confidence and expectations of high returns and therefore stimulate additional investments.

VIII. Investment Constraints

The previous results support the hypothesis that investments are made by firms because of expectations of future high returns. However, the signals were not from measures of marginal q being greater than one but rather through growing revenues (the accelerator principle). We factored in the notion of stock market inefficiency and attempted to correct for its influence in our analysis. This form of inefficiency, however, covers informational asymmetries among market players and are only of short-term influence. This section considers financial market inefficiencies which can have long-term effects including those pertaining to access to funds by firms (see for example, Romer, p. 381-384).

We reformulated the regression equation to include as regressors the debt-equity ratio (de), fixed assets to total assets ratio (fa), total assets in million pesos (ta), and return on stockholders' equity (re). The resulting equation is:

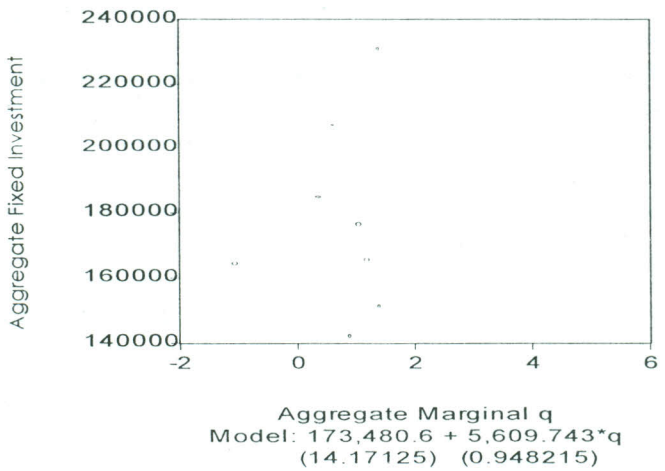
$$I/TA = 0.385582 + 0.028656de - 0.0262068fa - 0.000399ta + 0.158083re$$
$$(5.070211)\ (-1.924972)\ \ (-2.454354)\ \ (-0.401241)\ \ (0.479485)$$

The coefficients for the debt-equity ratio and fixed assets to total assets ratio are both negative and highly significant with p values of 0.0638 and 0.0201, respectively. The finding on the debt-equity ratio is particularly instructive especially in an environment where access to the equity market is limited and long-term financing is limited to those provided by existing owners and banks. This shows that highly leveraged firms, because of constraints on additional borrowings imposed by high debt-equity ratios, are limited in pursuing further investments regardless of their desirability. The finding on the fixed assets to total assets ratio may indicate that the irreversibility of physical investments once made and the setup and adjustment costs related to high fixed capital expenditures put some restraint on additional investments. The coefficients for total assets and return on shareholders' equity are not highly significant. These variables were included to test the effects of firm size and availability of internally generated finance on investment rate.

IX. Aggregate Private Investment and Marginal q

We also see whether we can extend the results to the aggregate economy. Looking at the five firms as representative of listed private firms (selected mainly for having marginal q continuous time series data from 1990), we investigated whether Tobin's q has any predictive power on aggregate private investments. The aggregate marginal q was computed for the five firms, which together accounted for 43.3% of the named firms in Exhibit 1. Then aggregate fixed investment reported by NEDA was regressed against this marginal q. The results, summarized in Figure 6 below (figures in parenthesis are the t-statistics), showed a positive relationship that is not statistically significant. R-square is only 0.113824 while the p-value for the slope parameter is 0.3746. Thus, there seems to be no empirical evidence to support the belief that local stock market performance is a reliable lead indicator of investor confidence.

Figure 6
Aggregate Fixed Investment vs, Aggregate q



X. Conclusion

The econometric evidence resulting from the study is mixed. If we accept the equivalence between average q and marginal q, there seems to be some support, although somewhat weak, to the hypothesis that there is a relationship between investment and marginal q in the sampled listed firms. However, under a second approach, which makes no such assumption, the evidence points to another direction. In other words, the assertion that the representative listed firms use and apply decision-making rules based on the principle of shareholders' wealth maximization in selecting investment projects and this is appropriately recognized by the market is not supported by the data. Of course, we cannot entirely rule out other factors that could result in such a finding such as inherent (not just short-term) market inefficiencies not removed by the adjustment procedure used on the data, financial market imperfections, questions relating to the appropriate hurdle rates to be used, or inherent limitations in the reported financial data used. Further study is indicated.

As a result of the aforementioned finding, we looked at other factors that may provide better explanatory power on firm investments. These include the individual firm's debt-equity ratio, a measure of asset turnover, fixed assets as a proportion of total assets as a measure of fixed capital intensity, internal cash flow generation, revenue growth rate, and the industry the company belongs to. Of these, revenue growth rate exhibits the highest positive relationship while high debt-equity ratio and fixed to total assets ratio show negative influences on investments. Thus, there is evidence, although not conclusive, that consistent revenue growth generates additional investments through the accelerator principle. On the other hand, limitations on access to funds, either through the equity market or the loans market, dampen investments. The significant negative influence of high fixed assets to total assets ratio also indicates that the irreversibility of physical investments once made and the setup and adjustment costs related to high fixed capital expenditures may put some restraint on additional investments.

Finally, although conventional wisdom always points to the strength of the local stock market as an indicator of investor confidence, there appears to be no empirical basis to this. High measures of marginal q do not seem to translate into actual investments of capital in the aggregate economy.

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Exhibit 1
List of Sampled Publicly Listed Companies

Code	Company	Industry
DHC	Acesite Philippines	Hotel
APO	Anglo-Philippine Holdings Corp.	Holding Co.
AAA	Asia Amalgamated Holdings Corp.	Holding Co.
AC	Ayala Corporation	Holding Co.
BCI	Bacnotan Consolidated Industries	Holding Co.
BC	Benguet Corporation	Mining
CAT	Central Azucarera de Tarlac	Manufacturing
CAC	Central Azucarera dela Carlota	Manufacturing
DUC	Davao Union Cement	Mfg and Quarrying
PWR	East Asia Power Corporation	Holding Co.
ECP	Easycall Communications	Services
EEI	EEI Corporation	Construction
ELI	Empire East Land, Inc.	Property
FEB	Far East Bank & Trust Co.	Banking
FPH	First Philippine Holdings Corp.	Holding Co.
GLO	Globe Telecommunications	Telecommunications
GUO	Guoco Holdings Phils., Inc.	Holding Co.
ICT	International Container Terminal Services	Container Handling Services
ION	Ionics Circuit, Inc.	Manufacturing
JFC	Jollibee Foods Corporation	Restaurant
LC	Lepanto Consolidated	Mining
MBC	Manila Broadcasting Co.	Services-Radio Broadcasting
MER	Meralco	Electric Distribution
MBT	Metrobank & Trust Co.	Banking
MFC	Monterey Farms Corp.	Livestock & Meat Processing
PDCP	PDCP Development Bank	Finance
PET	Petrofields Exploration & Dev. Corp.	Mining
RLT	Philippine Realty & Holdings Corp.	Property
TEL	PLDT	Telecommunications
PECB	PNOC Exploration	Oil Exploration
PMT	Primetown Property Group	Property
PPC	Pryce Properties Corporation	Mfg, Hotel & Property
REG	Republic Glass	Holding Co.
SMC	San Miguel Corp. Group	Manufacturing
SWM	Saniwares	Manufacturing
SAZ	Saztech/SPI Technologies	Manufacturing
UBP	Union Bank of the Philippines	Finance
VITA	Vitarich Corporation	Manufacturing
VUL	Vulcan Industrial and Mining Corp.	Holding Co.
WPI	Waterfront Philippines	Holding Co.

ENDNOTES

[1] The results of regressing total market capitalization with the overall market index which we use as surrogate for the effect of short-term foreign capital flows indicates some relationship. The coefficient of correlation R is 0.538 and the t-statistic is 1.277 with p-value of 0.271 (i.e., the null hypothesis of no relationship will be rejected at confidence level higher than 72.9%).

[2] We were able to construct measures of annual marginal q's as ratios of changes in market values to total replacement costs and regressed changes in total assets against them. However, we found no significant statistical relationship in any of the firms. Tests of Granger causality at lag of one period also did not show positive statistical results. Lags of more than one were not possible because the time series were short.

[3] The computed rate of return on shareholders' equity was also considered as another explanatory variable. However, this was found highly correlated with cf with R-square of 0.592872, t-statistics of 6.932214 and p-value of zero. The variable cf was included instead because it showed higher t-statistics when investment rate was regressed against both variables.

[4] The figures in parenthesis are the t-statistics. R-square is 0.464788 and adjusted R-square is 0.350100. The F-statistic is very significant with p-value of 0.004778.

[5] Granger causality tests on individual firm's time series data with one period lag show significance for three firms (revenue growth Granger-caused investment), another three firms (investment Granger-caused revenue growth) and another three firms (both Granger-caused each other). The rest show either no significance or fail the test.

[6] The figures in parenthesis are the t-statistics. R-square is 0.6253222 and adjusted R-square is 0.446128. The F-statistic is very significant with p-value of 0.005533.

[7] The Hausmann test (see Pindyck and Rubinfeld, p. 353-354) requires instrumental variables that are correlated with revenue growth. Many variables were tested, such as total assets, return on stockholders' equity and other financial variables, with no success. Finally, the dummy variables representing industry affiliation were tested. Regressing revenue growth against the dummy variables resulted in a moderately significant F-statistic of 1.487233 and p-value of 0.224457. The regression in equation (12) was then rerun with an additional variable representing the residual from a regression of the revenue growth variable with the other variables plus the industry dummy variables. The new regression produced coefficient parameters not significantly different from the original regression, which indicates that the coefficients obtained in the original regression are consistent.