Schmalenbach Business Review ◆ Vol. 52 ◆ April 2000 ◆ pp. 103 – 136

Ivo Welch/David Wessels*

The Cross-Sectional Determinants of Corporate Capital Expenditures: A Multinational Comparison**

Abstract

This study predicts cross-sectional investment (asset-normalized capital expenditures) innovations within the United States, Canada, Great Britain, (mainland) Europe, and Japan. We find that lagged stock returns are the most important cross-sectional predictors of investment increases – except in mainland Europe. American firms tend to react more than Japanese firms but less than Canadian and British firms. However, the differences between Japanese firms and U.S. firms are small. In contrast, European firms appear to conduct their investment policy without much regard for their own lagged stock performance.

1 Introduction

The question of whether stock markets help in the allocation of funds to their most productive uses is an important one. Proponents of free capital markets argue that an efficient stock market can send entrepreneurs important investment signals. Even if managers are unaware of the stock market's role in directing private investments to their socially optimal use, capital markets still directly increase or decrease the cost of funds, inducing managers to allocate investment to their best use. Furthermore, proponents argue that the discipline imposed by external equity markets can control some of the principal-agent conflicts or even signaling conflicts. Opponents of free markets argue that inefficient markets, driven by "animal spirits", are or should be irrelevant for managers' investment decisions (and thus only serve to enrich some participants at the expense of others). Some even argue that stock markets confuse managerial investment decision-making. Unfortunately, it is impossible to establish with ex-post data whether investment decisions were either ex-ante optimal, confused, or the product of either principal agent or signaling problems. Yet, it is possible to investigate the

* *Ivo Welch*, University of California, Los Angeles and Yale University, e-mail: ivo.welch@yale.edu. *David Wessels*, University of California, Los Angeles and Emory University, e-mail: David.Wessels.2000@anderson.ucla.edu.

** We especially thank *Andrew Alford* for providing us with a better method to compute stock returns and a better understanding of international accounting differences, and Juan Siu for independent verification of the basic results in the paper. We thank *Mike Darby, Siew Hong Teoh, Sheridan Titman* and *the editor* (*Wolfgang Bühler*) for helpful comments. We gratefully acknowledge support from UCLA's Center for International Business and Economic Research (CIBER), the John M. Olin Foundation, and the UCLA Academic Senate.

more limited question if stock markets have historically played a role influencing (or at least in predicting) investment decisions at all[1].

With the increasing globalization of trade and the public recognition that there are social benefits of investment ignored by private corporations, this debate over what induces companies to invest has become ever more important. U.S. managers have alleged in the popular press that, unlike Japanese and European managers, their constant attention to stock market values and dividends prevent them from making sound investment decisions.

For example, the U.S. Congress proposed *The Long Term Investment Promotion Act of 1991*[2], stating that "There is an urgent need to extend the time horizons of industry in the United States and there is too much pressure to maximize short-term profits and shareholder value, often at the expense of long-term competitive viability… managers tend to emphasize short-term profits even when it raises possible conflict with longer term investment." Further,

> A preoccupation with short-term business horizons … seems ill-suited to a world characterized by rapid technological change, global competition based on quality and a constant need for bringing innovation into the marketplace … In contrast to the short-term preoccupation in the United States, in Japan and Germany firms report their financial results on an annual rather than quarterly basis and this factor contributes to significantly longer time horizons.

The underlying premise that stock returns have too much influence on U.S. investment also surfaces in Michael Porter's Report on behalf of *The Council on Competitiveness* (cosponsored by the Harvard Business School), arguing that market pressures have reduced long-term investment. The report states that

> In both Japan and Germany, share prices and pressure from non-permanent owners/agents have virtually no influence on management … The U.S. system is less supportive of investment overall because of its sensitivity to current returns for many established companies …

Adding to the allegation of the adverse pressures of stock markets on U.S. managers against investments are allegations that the tax codes in Europe and Japan are better in encouraging investment than the U.S. tax codes (e.g., *Jacobs* [1992]). Of course, in Germany, managers allege that their higher overall tax burdens stifle their investment relative to their international competition.

Yet, aside from some anecdotes in the popular press, there is no systematic evidence if corporate investment in the U.S. indeed responds any differently to stock returns, increased income taxes, internal cash-flow, or future demand. The purpose of this paper is to fill this gap, to provide a first rigorous attempt for a comparative description of the basic empirical regularities at work in various

1 To approach the question of whether stock markets play a positive role requires a decomposition of stock returns into "useful fundamental components" and "useless noise". Unfortunately, such a decomposition lies beyond the understanding of modern finance today.

2 102d Congress, Bill HR2910.

OECD regions. The paper examines the *cross-sectional* determinants (i.e. the heterogeneity) of investment changes in the United States, Japan, the United Kingdom, Canada, and Europe[3] in a new, comprehensive, and directly comparable data base of financial statements and stock prices: Compustat's *Global Vantage* (GV) tapes.

Our sample consists of about 300–550 U.S. firms with about 4,700 U.S. firm-years (median assets: US-$2 billion), 130–250 Canadian firms with 2,000 Canadian firm-years (US-$200 million), 200–700 British firms with 4,500 British firm-years (US-$280 million), 150–450 European firms with 3,100 firm years (US-$1 billion), and 100–600 Japanese firms with 4,000 firm-years (US-$2 billion). To enter our data set, U.S. and Japanese firms had to have at least $500 million in assets when they first appear on GV; Canadian, British, and mainland European firms had to have at least $25 million in assets. (Fewer than ten other firms [mostly Canadian] were dropped because their assets fell below $10 million and Compustat's data was very unreliable for these observations.) Our results should be interpreted to be specific to these relative large firms.

The main focus of this study is to examine the *cross-sectional* forecastability of capital expenditures (as a fraction of assets) with their own lagged capital expenditures and other lagged variables *within countries*. (In other words, the future heterogeneity of capital expenditures is explained.) Of primary interest to us is the role of the firms' own stock returns in predicting their capital expenditures innovations (i.e., holding constant their own past capital expenditures). Other lagged predictors include net income, dividends, inventory changes, cash and short-term investment changes, income taxes, and a host of sales, size, year, and industry controls.

We find that the best variable with good cross-sectional explanatory power *in all regions except mainland Europe* for predicting capital expenditure innovations – and regardless of specification – tends to be the firm's own lagged stock return. The U.S. firms' response to lagged stock returns is similar (depending on the measure) to the response among Canadian, British, and Japanese firms. We find mild evidence that large American firms' investments are more responsive to stock market returns than Japanese firms' investments, but this difference is far less than folklore suggests – and there is clearly much less difference between the United States on one hand and Canada and Great Britain on the other.

We also examine some other variables, sometimes hypothesized to measure the degree to which firms are liquidity constrained in imperfect markets. Internal sources of capital, income and changes in cash and short-term investments, play important roles in Europe, the United States[4], and especially in Japan. Japanese firms increasing their cash and short-term investments, i.e. weaving themselves more into their Keiretsus, are more likely to invest. Other variables tend to be either insignificant or sensitive to the model estimation. Perhaps closest to importance in predicting capital expenditure innovations within Europe are firms' own

3 This should be more properly called "mainland Europe", but is often abbreviated in this manuscript. Europe covers only France, Germany, Italy, the Netherlands, Sweden, and Switzerland.

4 For evidence in a larger data set with more firms and without exclusion of firms involved in corporate control activity, refer to *Beatty, Riffe,* and *Welch* (1997).

income taxes. European firms incurring *higher* income taxes are empirically more likely to increase their investment[5].

However, some words of caution are in order. Although the data base used in this paper allows much better international comparisons than were possible in the past, all international comparisons are inevitably problematic for at least five reasons:

Reporting Incentives For example, Japanese firms present only one financial statement for both tax and valuation purposes, while U.S. firms present a different financial picture to investors and the I.R.S. As a result, Japanese firms are likely to report less income than U.S. firms.

Institutional Arrangements and Reporting Incentives For example, Japanese firms are tied closely to their Keiretsu. To investors, the company's own operating performance may not be as important as the performance of their Keiretsu. Thus, Japanese accountants might smooth their income towards that of their own Keiretsu. In contrast, because U.S. companies' performance is evaluated relatively more to their lagged performance, U.S. accountants are more likely to smooth the time-series of reported data.

Data Reporting Requirements For example, only about 30% of all Japanese firms directly report capital expenditures. The decomposition of current and deferred components of income taxes are reported in about 75% of all firm-years in the United States and Japan, but only in about 30% and 10% of all firm-years in Europe (after 1987) and Canada, respectively. Retained earnings are commonly available in the United States, Japan, the United Kingdom, and Canada, but only in 15–20% of all firm-years in Europe.

Accounting Policies For example, unlike firms in other countries, the income statements of German firms show losses (profits) carried forward from the last period, this year's profits or losses, and retained earnings, explicitly. Further, depreciation to lower market values is partly necessary (short-term accounts), partly possible (long-term assets). Market values are explicitly forbidden if they are above the historical price at which the asset was bought.

Economic Meanings For example, cash and short-term investments include cross-holdings of equity in other companies in all countries. Yet, the meaning of cash holdings as a predictor of investment is probably different in Japan's system, where the average cross-holdings of firms make up an astonishing 20% of assets[6].

5 European tax codes may offer more generous investment tax breaks than those of other countries, but this neither explains the absolute positive coefficient (just a *higher* coefficient), nor are we qualified to analyze the international tax codes in the necessary detail to offer a more definiteanalysis. *Beatty, Riffe,* and *Welch* (1997) find evidence that the U.S. *Tax Reform Act of 1986* significantly distorted short-term investment decisions.

6 We thank *Yasushi Hamao* for mentioning that Japanese managers often used cash to speculate in the stock market. This practice was referred to as "fi-tech".

Industry Composition For example, about three-quarter of Japan's sample firms are in the manufacturing sector, while only one-third of Canada's sample are in the manufacturing sector. Moreover, the United States and Japan have more large publicly listed firms than other countries in our data; our filter to limit the minimum acceptable size has the effect of reducing the number of U.S. and Japanese firms in the data base, to allow us to cover the most important firms in all countries (which makes the U.S. and Japan sample more comparable to other regions). At the same time, this increases the average U.S. and Japanese firm sizes (which makes the U.S. sample less comparable to other regions).

By restricting ourselves to OECD countries and very basic accounting items, and by running regressions to forecast investment innovations *only within countries* (with the exception of mainland Europe), we hope to reduce the influence of these factors.

The remainder of this paper proceeds as follows: The next section discusses related work, suggests some hypotheses about the causes of investments, and sketches the methodology used in this paper. Section 3 describes the definition and univariate properties of the variables used in this study. Section 4 predicts investment *cross-sectionally* with lagged variables. And Section 5 summarizes the paper's main findings.

2 Hypotheses about the Determinants of Investment

2.1 Related Literature

The interest in the cross-sectional determinants of U.S. capital expenditures is rather recent but extensive, and summarized in *Hubbard* (1995)[7]. Because our paper runs similar regressions, two papers are particularly noteworthy. *Fazzari, Hubbard,* and *Peterson* (1988) predict investment with market returns, dividends and cash flow. In a sample of 400 firms from 1970–1984, they find that investment levels are correlated with both contemporaneous and lagged Tobin's Q (which proxies for stock values) and, to a lesser extent, contemporaneous and lagged internal cash flow. They conclude that firms with low dividend payout ratios are most likely to base investment decisions on available cash flow[8]. *Morck, Shleifer,* and *Vishny* (1990) examine changes in capital expenditures in a sample of approximately 27,000 firm-years. Assuming that managers have perfect foresight of future "fundamental variables" (but not abnormal stock price performance) when making investment decisions, they predict investment with contemporaneous "fundamental" (internal) variables and lagged stock returns and measure the importance of stock returns by the percentage loss in R^2 when abnormal stock returns are omitted. In other words, *Morck*, *Shleifer*, and *Vishny* handicap the possible impact of stock returns in two ways: first, they measure abnormal stock

7 Most empirical literature following *Tobin's* (1969) investment paper focused on the *intertemporal* determinants of aggregate investment. A description thereof is omitted due to space constraints.

8 *Barro* (1990) examines both stock returns and the highly correlated Tobin's *Q*. He finds that stock returns dominate Tobin's *Q* in explaining investment. Although it is by no means clear that future work should use stock returns instead of *Q*, the choice of stock returns is thus defensible.

returns earlier than fundamental variables; second, they ask whether lagged stock returns have incremental power (R^2) that explain changes in investment after controlling for two contemporaneous fundamentals, sales and cash-flow. They find that 70% of the power (R^2) of lagged stock returns in their regressions disappears once they control for contemporaneous fundamental variables. *Hubbard* (1995) also summarizes some international evidence. As far as evidence on investment heterogeneity in Japan is concerned, *Hoshi, Kashyap* and *Scharfstein* (1990a, 1990b) find that the investment policies of firms with weak bank ties are considerably more liquidity sensitive. They establish this pattern both in cross-section and in time series (changes in bank deregulation). To the best of our knowledge, there is no paper that comprehensively examines the determinants of investment in different countries.

2.2 Hypotheses Examined in this Paper

The variable to be forecast in this paper is investment, measured as capital expenditures (*capex*). Because capital expenditures is a flow variable, it is normalized by the average assets during the fiscal year (computed as the average assets from the prior and current years' financial statements).

The predictors can be broadly grouped into two categories: external equity market measures and internal performance measures.

External equity can serve two roles: first, equity price changes (stock *returns*, abbreviated returns) can signal information to the entrepreneur whether an industry has growth opportunities; second, higher equity prices lower the cost of equity financing. Thus, we would expect lagged positive returns to correlate with investment increases. In a world with perfect capital markets, Tobin's Q (which in first differences is mostly stock returns) has been theoretically shown to be the *only* important variable.

Other theories have added a variety of variables to adjust for capital market imperfections, such as constrained liquidity, free cash flow, and signaling effects. Dividends (*dividends*) are a method of reducing the equity in the company. On the one hand, if managers act in the interest of shareholders, they should pay out dividends when there are no first-rate investment opportunities. As a result, dividends and investments could be substitutes. On the other hand, if managers' actions are driven by excess free cash flow, managers would use excess cash not only to placate shareholders with dividend payout, but also to fund investment on their own behalf. As a result, dividends and investments could be complements.

There are two hypotheses that suggest that firms with more cash/earnings are more likely to invest. First, firms may infer from high earnings that they have unusually good investment opportunities and expand. Second, *Jensen*'s (1976) free cash flow hypothesis suggests that managers – interested in empire-building – are more likely to invest when they have cash on hand, which avoids managers' need to undergo the discipline of external capital markets to fund investment. Consequently, investment changes are predicted with both internal cash and short-term

investment changes[9] (*Δ cash*) and higher net income (*net-income*). It is our subjective view that lagged cash and short-term investment on hand may be a better indicator of free cash problems, while high net income may be a better indicator of positive opportunities.

The effect of income taxes (*taxes*) on investment can be complicated. High corporate income tax rates on a given taxable income stream increase the attractiveness of the tax shelter "investment", but reduce the attractiveness of resulting payoffs in the future[10]. Still, different countries may offer variations of the system by which capital expenditures influence the determination of taxable income (and not just the tax rates). On one hand, European managers commonly complain that their ability to invest is hindered by an unusually high tax burden in Europe, suggesting a negative correlation between lagged income taxes and investment. On the other hand, the U.S. press has alleged that European tax codes are extraordinarily effective in creating investment incentives, which suggests a positive correlation between income taxes and investments[11]. There may also be a residual "free-cash" effect which is not fully held constant by the aforementioned profit and cash variables, in that high income taxes may reflect both high profitability and high investment innovation.

Finally, firms should respond with investment decreases to unusual increases in their inventories (*Δ inventories*), caused presumably by unusually low real demand[12]. Therefore, the first difference in inventories in the regression is included. It has to be noted, though, that firms might increase both inventories and investment in response to anticipated higher demand[13].

Given the broad nature of these hypotheses, it is important to try to control for plain size changes or other firm-specific factors unrelated to these hypothesis. Therefore, this study includes a comprehensive set of control variables, ranging from lagged assets, assets squared, and changes in assets, to sales and changes in sales, to industry dummies and year dummies. No hypotheses are attributed to them.

Table 1 and *Appendix A* provide a comprehensive description of variables used in this paper, as well as the exact description of the definition using the Global

9 Because firms have to hold a certain amount of cash for normal operations, first differences in cash holdings are considered.

10 In a proportional tax-rate regime in which capital expenditures are immediately deductible, taxes act to reduce NPV by a proportional factor, which would not change the determination of the zero cutoff point.

11 *Beatty, Riffe,* and *Welch* (1997) document that taxes played an important role in the United States (only) when the investment tax credit and accelerated depreciation schedules were eliminated with the *Tax Reform Act of 1986*.

12 A better method would split up inventory changes into one factor due to current sales changes and one factor due to expected future sales changes (e.g., order backlog). The former should have a negative influence on capital expenditures, the latter a positive influence.

13 See also the preceding footnote. These hypotheses can be contrasted by examining firms suffering sales declines and inventory increases vs. firms increasing both sales and inventories. However, this exercise proves to be non-productive: inventories remain insignificant predictors of capital expenditures in the subset of firms having suffered either sales declines or sales increases.

Table 1: Variable Definitions

In regressions, extreme observations are winsorized at −50% and +200%, except for *Sz*, Sz^2 , and sales. "$_t$" denotes fiscal year end timing, "$_{t-0.5}$" denotes an average of the fiscal year end timing in year t and year t − 1. Individual numbers denote the item number on the Compustat *Global Vantage* tape. Monthly returns are computed by taking the current month's price, adding dividend per share, and dividing by the previous month's (split-adjusted) price. Monthly returns are then compounded for the twelve months ending with the firm's fiscal year end. Many companies have multiple listings. By examining public records, *Andrew Alford* was able to determine which issue was most representative. Whenever possible, this issue was used. When no representative issue was available, a simple average of all issues were used.

Real Investment		
Symbol	Name	Definition
capex	Capital Expenditures	$193_t/Sz_{t-0.5}$ $145_t/Sz_{t-0.5}$ $(76_t - 76_{t-1} + 1_t - 3_t - 14_t)/Sz_{t-0.5}$
Financial Signals		
Symbol	Name	Definition
returns	The Firm's Stock Return	(complicated formula)
dividends	Dividends - Common	$36_t/Sz_{t-0.5}$
net-income	Income before Extraordinary Items	$32_t/Sz_{t-0.5}$
Δcash	*Changes in* Cash and ST Instruments	$60_t/Sz_t - 60_{t-1}/Sz_{t-1}$
Δinventories	*Changes in* Inventories	$66_t/Sz_t - 66_{t-1}/Sz_{t-1}$
tax	Income Taxes	$23_t/Sz_{t-0.5}$
Panel C: Ceteris Paribus		
Symbol	Name	Definition
sales	Sales	$1_t/Sz_{t-0.5}$
Δ*sales*	Changes in Sales	$1_t/Sz_{t-0.5} - 1_{t-1}/Sz_{t-1.5}$
Δ*Sz*	Percentage Change in Assets (in US-$)	$(Sz_t - Sz_{t-1})/Sz_{t-1}$
Sz	Assets (in US-$)	Sz_t
Sz^2	Assets Squared (in US-$)	$Sz_t * Sz_t$
Industry	Dummies for service and manufacturing	
$Year_{Year}$	Individual Year Dummies	

Vantage data items. Flow variables are adjusted by the average assets during the year (at the fiscal year beginning and end), stock variables are adjusted by the fiscal year end assets, only[14].

14 Note that capital expenditures often had to be constructed from changes in property, plant and equipment, sales, operating expenses and net income. For firms where all three methods of capital expenditures produced data, the correlation among the three measures lies between 95% and 98%.

2.3 Statistical Methodology

The basic method used in this paper are *cross-sectional* Ordinary Least Squares Vector Auto Regressions with *White* (1980) heteroskedasticity adjustments. The advantages of Vector Auto Regressions over simple cross-sectional regressions (predicting either investment or investment changes) is evident: the contribution of third variables to each firm's innovation in investment is measured only after adjusting for the firm's own lagged investment, and without having to specify ex-ante the persistence (levels or differences) of investment.

If the relationship is stationary, then the model can be estimated not only in cross section, but also over time. That is, pooling all observations into one regression is legitimate[15]. Of course, the large number of cross-sectional observations (on the order of thousands of observations) swamps the number of time-series observations (at most 10). Consequently, even if the well-known time-series nonstationarity problem biases the coefficient on other variables downward in a pooled panel regression, this bias is likely to be small and similar across different countries.

An alternative to controlling for each firm's lagged capital expenditures is to estimate the model with firm-specific intercepts. In other words, each firm is assumed to have its own investment average and other variables must explain deviation from this firm-specific average. The regressions in Panel B of *Table 8* are estimated with firm-specific intercepts.

There are some important (and mutually related) caveats in examining the aforementioned theories with VAR regressions. First, the regressions in this model do not arise from a specific model; hence, this study should only be considered exploratory. Indeed, the theories examined are so broad that no satisfactory comprehensive model may ever be developed. Second, the examined theories are long-horizon, while the estimated regressions measure only immediate effects. For example, it might be possible for firms with high income taxes to delay investing if they believe that tax code changes can increase investment tax credits in later years. Or, managers with low cash flows could invest in projects in the expectation that high future cash-flows can pay for the project. Third, although each firm acts as its own control, the hypotheses are tested on completely different companies, each of which may follow a different theory. For example, it is obvious that firms can either invest or pay out funds. Yet some firms with positive prospects can increase both dividends and investments (leading to a positive correlation between dividends and investments), other firms may sacrifice investments to pay dividends (leading to a negative correlation). This study can only measure the dominant factors.

2.4 Alternative Methodologies

Chirinko (1993) provides a survey of fixed investment models, and their strengths and weaknesses. The two dominant formal models are the "Neoclassical Model"

15 Some further minor assumptions on the behavior of residuals are necessary.

and the "Tobin's *Q* Model" (which is closely related to this paper[16]). While the *Q* literature offers very important insights, it also has some drawbacks:

1. *Chirinko* (1993, p.1891f) details that estimations of *Q*-theory equations have generally performed very poorly, with poor in-sample and out-sample performance and some authors concluding that *Q* is not even marginally important, given other ad-hoc variables[17].

2. In an explicit formal form, no single *Q*-theory is rich enough to address the wide range of phenomena recognized in finance (from investor sentiment, to principal agent and free-cash-flow phenomena, to insider information, to liquidity restrictions, dynamic lags, etc.) that can influence investment.

3. Having to rely on accounting data, the *Q*-theory is tested with data far from those prescribed by the formal theory[18].

4. Structural estimation of one *Q* variant is often difficult to interpret in light of another variant.

Thus, this study instead investigates less formal, more intuitive questions[19], although the interpretation of the results within the *Q* literature is straightforward. *Fazzari*, *Hubbard* and *Peterson* (1988) and *Hubbard*'s (1995) survey article estimate a reduced form

$$(I/K) = \alpha + \beta q + \gamma (CF/K) + \epsilon ,$$

where *I/K* is investment normalized by capital stock, *q* is Tobin's *Q*, and *CF* is cash flow (measuring internal liquidity constraints, i.e. "violations" of classical efficient markets' investment theory). Our own specification is close to a differenced version

16 The most variable component of *Q* are stock returns. *Barro* (1990) finds that stock returns predict better than the theoretically prescribed *Q* itself.

17 Researchers following the *Q*-theory-test paradigm often end up writing one theory, but then test something entirely different. Their empirics resort to including ad-hoc measures, textually justified by such assumptions as delivery lags, multi-period adjustment costs, or other dynamic models. Indeed, the relative poor performance of *Q*-theory was only recognized when variables not suggested by *Q*-theory (such as capacity utilization) were included. *Chirinko* (p. 1892) argues that such (common) adjustments, though empirically predictive, are entirely inappropriate.

18 For example, *Q* theories require marginal *Q*, not average *Q*. Further, the book value of assets is a poor measure for the replacement cost, e.g. due to differences in economic and accounting depreciations. (Investor sentiment research has led some to even question the usefulness of market-value (the other component of *Q*).) By enforcing too much structure from a theoretical measure to a different observed measure through *Q*-theory, omitted variables may play a larger role. Similarly, strict measures of investment, as formally prescribed by theory, are unavailable empirically. For example, capital expenditures omit more risky and more intellectual components of investment.

19 The investments literature has only recently begun to estimate derived or non-structural models, shifting emphasis from formal theory alone to the intuitive insights from models (which is more common in the corporate finance literature). However, even here, there have been exceptions, most notably *Morck, Vishny, Shleifer* (1990). *Chirinko's* recent survey article (Journal of Economic Literature, 1993) further notes that *Sims* (1980) at one point argued for a relatively non-structural approach, as did *Bean* (1981), *Bosworth* (1975), and *Auerbach* and *Hassett* (1991). Similarly, the R&D literature, the more risky component of investment, does not attempt to fit formal models.

of this equation: we include lagged capital expenditures, lagged net income (cash flow), and stock returns (time-variation of *q* is primarily stock price variation; the other component of *q* derive from accounting measures which, to the extent that they move at all, are only a poor measure of the underlying concepts)[20]. Inclusion of other variables ("the kitchen sink") is similarly common in this literature to adjust for improper measurement of investment opportunities and incomplete theoretical specification. Indeed, cash flow in the equation *proxies* for the degree of liquidity constraint, which can also be proxied for, e.g., by dividends (negatively) or cash holdings[21].

Because a formal theory is not used, however, and because alternative theories/specifications could predict a reverse causation (contemporary investment decisions influencing measured *q*), an alternative criterion to judge the results' meaning must be used. In this paper, this criterion is "pure prediction." By concentrating on predicting future investment *innovations*, one can include lagged variables that are themselves driven by lagged investment. This also allows including more than just a few variables[22] to capture a complex reality with multiple, economically plausible hypotheses, allowing variables to either positively or negatively influence investment. (*Structural theories typically assume effects away; they do not prove that these other effects do not matter.*)

In the end, our paper is concerned, not with testing *q* models (which are almost universally rejected whenever tested elsewhere), but in the pragmatic and simple question of the influence of stock prices on investment. Our knowledge of stylized international differences is so limited that any formal theory test would easily be disputed. To the extent that our interest is in a very intuitive question, the simple regression approach is an appropriate method.

3 The Data

3.1 The Global Vantage Tape

In 1982, Compustat assembled a comprehensive list of all firms in the *Morgan Stanley Capital International Index and Prospective*, and the *Financial Times World Index* to track in its Global Vantage Tapes, further supplemented with companies that Compustat considered to be "firmly represented in their respective

20 If the *q* equation holds, the estimated equation (aside from variable timing issues) would see a unit coefficient on first-lagged capital expenditures, a positive coefficient on first-lagged stock return, and, in perfect markets, zero coefficients on all other variables. If firms were liquidity constrained ($\gamma > 0$), we would see a positive coefficient on net income (cash flow) and the same negative coefficient on lagged cash flow. These constraints can easily be rejected, especially if capital expenditures are not leading these other variables.

21 *Fazzari, Hubbard,* and *Peterson* (1998) argue that only liquidity constrained firms should have a positive γ coefficient. Unconditionally examining liquidity constraint provides a coefficient of an "average" liquidity constraint across firms in each country.

22 With enough observations, economically insignificant variables should not enter. The problem is more likely that there are omitted variables correlated with included variables.

local market indices."[23] Firms that disappeared after 1982 (e.g. through acquisition or bankruptcy) are kept on the tapes to eliminate survivorship bias. Compustat itself switched data providers during the early 1990s. Our current paper merges data from both providers.

3.2 Data Selection

Although the data set begins in 1982, investment requires computing the first difference in gross property, plant and equipment, reducing the sample by one year. Two further years are required to produce two lagged changes to predict investment in the following year. Thus, the first year for which investment is forecast is 1985 (with fiscal year ends that can extend up to May 1986)[24].

Table 2 describes the (rather severe) basic data restrictions. Because the Global Vantage tapes contain more U.S. firms than all other countries' firms combined and because there is a large number of Japanese firms among the remaining observations, we impose the additional initial filter that U.S. and Japanese firms must have at least $500 million in assets at the first year they appear in the data. For Canada, Great-Britain, and mainland Europe, firms must have at least $25 million in assets.

Table 2: Initial Data Filters

The number of original observations is determined by collecting all firm-year observations which have assets greater than zero. From this, observations which do not have stock returns are eliminated. Next, observations without the required accounting data are eliminated. At this point, observations which had either corporate control activity or accounting changes are eliminated. Corporate control and accounting problems are determined by the footnote in the GV sales variable. Next, observations without the necessary lagged data, both stock returns and accounting data, are removed. Observations from 1996 are removed, since they are few in number. Finally, firms which do not have a minimum level of sales (500 US$ million for US and Japan, 25 US$ million for Canada, Great Britain, and Europe) in their first recorded observations are eliminated. Additionally, any observations with less than 10 million US$ are eliminated as well.

	USA	Canada	GBR	Europe	Japan	Total
Original Observations	34,214	4,956	12,626	12,676	11,617	76,089
Missing stock returns	5,473	795	2,971	6,006	1,389	16,634
Missing financial data	121	29	187	211	174	722
Corporate control problems	4,715	777	1,383	814	113	7,802
Accounting changes	524	39	374	389	301	1,627
Missing lags	6,182	1,016	2,583	2,108	2,648	14,537
Years with few observations	203	9	61	1	0	274
Small firms	12,292	244	505	39	2,977	16,057
Remaining Firm-Year Observations	4,704	2,047	4,562	3,108	4,015	18,436

23 The countries for which COMPUSTAT supplemented its data set were Austria, France, Italy, New Zealand, Sweden, Canada, Hong Kong, Malaysia, South-Africa, Switzerland, Finland, Ireland, Netherlands, Spain and Germany.

24 We follow the COMPUSTAT convention defining companies to fall into the same data year only if their fiscal year ends in June–December.

Starting with 76,000 firm-years, about 17,000 firm-years are lost because firms have no actively traded and listed issues from which to compute returns. Missing lags and firm capitalization constraints are largely responsible for the remaining firm-year losses[25]. The data set used in our paper consists of 4,704 U.S. firm-years, 2,047 Canadian firm-years, 4,562 British firm-years, 3,108 European firm-years – where Europe is limited to France, Germany, Italy, the Netherlands, Sweden, and Switzerland – and 4,015 Japanese firm-years. As noted in the introduction, the reader has to be aware that the sample is a highly selected set of firm-years, and thus the results may or may not generalize to these countries' economies as a whole. Despite its shortcomings, this paper offers the best available multi-national comparison of investment policy to-date.

Table 3 shows that the population of firm-years in this sample has tended to increase over the years. The Japanese and mainland Europe data sample has the highest concentration of manufacturing firms (1-digit SIC codes of 2 and 3). About 60% of the European and Japanese sample, but only about 40–45% of the American, Canadian, and British sample were in the manufacturing sector.

Table 3: Number of Observations by Country and Year

SIC codes beginning with a "2" or a "3" (indicated as 2xxx and 3xxx) indicate that the company's primary business is in the manufacturing sector. For a detailed list of SIC codes please see *Appendix B*.

	USA	Canada	GBR	Europe	Japan	Total
1985	363	125	176	150	82	896
1986	343	124	172	179	160	978
1987	547	205	143	133	148	1,176
1988	518	211	354	334	481	1,898
1989	535	217	468	390	559	2,169
1990	546	255	557	376	575	2,309
1991	453	227	628	297	589	2,194
1992	457	226	674	401	594	2,352
1993	461	226	713	449	592	2,441
1994	481	231	677	399	235	2,023
SIC = 2xxx	1,041	421	889	836	1,035	4,222
SIC = 3xxx	1,090	372	1,016	1,133	1,430	5,041
Non-Manuf	2,573	1,254	2,657	1,139	1,550	9,173
Full Sample	4,704	2,047	4,562	3,108	4,015	18,436

25 Although the loss of firms undergoing corporate control activity is regrettable, it is unavoidable: Compustat does not provide reliable stock return information when firms exchange shares with other firms. For example, when a firm is taken over and each target shareholder receives x shares of the bidder, COMPUSTAT does not record this non-cash distribution in their returns and thus falsely quotes a large loss for the target.

3.3 Univariate Statistics on Asset Growth

Table 4 describes firm assets. Panel A shows that the median U.S. and Japanese firm in the sample had about $2.1 billion in assets (book value), the median European firm had about $1 billion, and the median Canadian firm and British firm had about $300 million in assets. *Jorion* and *Goetzmann* (1999, *Table V*) list the 1995 stock market capitalization of the U.S. as about $6 trillion, Canada as $310B, Great Britain as $1.4 trillion, Europe as $2.2 trillion and Japan as $3.6 trillion. Multiplying our own 1994 dollar asset averages by the number of firms indicates that our study covers about 20% of the U.S. and European stock markets, 15% of the British stock market, and 40% of the Canadian and Japanese stock market (the latter as of 1993; 1994 coverage was only about 30%). Panel B shows that British (and then European) firms experienced the fastest asset growth, while the much larger American and Japanese firms experienced the slowest growth rates. Panel C shows that Japanese firms' assets increased dramatically when quoted in U.S. dollars – 1985 to 1994 was a period in which the Yen showed a dramatic increase relative to the U.S. dollar.

3.4 Univariate Statistics on Stock Returns

Table 5 describes stock price performance. Japanese companies displayed superior performance before 1990, followed by the familiar poor Japanese stock market performance of the 1990's. Overall, European firms in the sample showed the best stock market performance (even if quoted in native currency), with the U.S. and Britain close behind. Finally, Canada was the laggard in our sample. Manufacturing firms in all regions seemed to have performed as well or slightly better than their non-manufacturing counterparts.

3.5 Univariate Statistics on Capital Expenditures

Table 6 describes the dependent variable: corporate investment, measured as capital expenditures normalized by the average of simultaneous and lagged firm assets. The median Japanese firm invested about 4% of its assets, the median British firm invested about 5% of its assets, and the median U.S., Canadian, and European firm invested about 6.5% of its assets. There was no strong trend in capital expenditures in the sample period for any region. In any case, the common allegation that major U.S. firms invested *less* than their Japanese counterparts is not apparent in this sample.

3.6 Univariate Statistics on Other Predictors of Investment – Internal Performance Measures

Table 7 provides overall summary statistics on net income, dividends, inventories, cash holdings, taxes, and sales. All flow variables were normalized by the average firm assets during the year; stock variables (i.e., inventories and cash) were normalized by concurrent assets. The main role of the asset normalization is that it

Table 4: Firm Assets

Panel A: Assets in Million Dollars (For a detailed list of SIC codes please see *Appendix B.*)

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
All	2073.0	5515.3	12565.0	304.2	1079.8	2136.5	278.5	1343.6	4050.4	1069.8	3705.9	7547.2	2096.1	5831.4	11978.8
1985	1734.0	4302.7	8923.6	284.6	881.6	1339.7	90.4	318.8	626.0	320.1	1461.7	3563.0	1884.8	4387.9	6137.7
1986	1580.6	4181.4	8750.4	257.9	817.8	1196.4	119.9	363.0	848.7	451.9	1735.5	4328.3	1959.0	4713.9	7232.0
1987	1838.4	4530.3	8802.2	296.8	971.2	1664.3	143.0	523.4	1040.7	600.1	2172.8	5464.9	2429.6	5926.8	9280.9
1988	2073.2	5042.4	10621.7	305.4	1076.3	1901.7	424.2	1538.2	3977.4	1077.7	3240.1	6170.9	1692.7	4431.0	8675.5
1989	2270.9	6131.5	15100.8	336.4	1305.0	2516.5	430.2	1625.9	4091.1	1062.7	3152.9	5846.5	1604.2	4589.7	9455.2
1990	2296.0	6381.0	15897.9	325.6	1388.7	3311.8	347.7	1574.5	4429.1	1292.3	4121.6	7615.0	1867.5	5214.5	10490.9
1991	2128.0	5838.3	12913.9	298.2	1192.9	2392.6	302.0	1434.9	4337.7	1797.8	5539.9	9753.8	1992.0	5502.7	10885.3
1992	2110.9	5837.8	12664.4	297.4	981.2	1897.3	264.6	1285.5	3964.7	1239.1	4441.2	8868.5	2326.0	6291.1	12438.6
1993	2241.5	6080.0	13292.2	301.1	941.3	1659.2	260.8	1352.9	4273.2	1029.1	3747.4	7702.3	2544.3	6978.8	14078.9
1994	2222.0	6191.1	14045.3	319.6	995.5	1715.3	289.1	1509.2	4590.6	1199.5	4332.1	8753.1	4133.4	11136.8	22093.0
SIC = 2xxx	2846.1	6132.6	10631.2	545.6	1482.0	2356.7	277.9	1764.1	5467.6	1030.3	3907.3	7282.5	1914.2	2972.0	3043.9
SIC = 3xxx	1843.4	6221.7	19334.5	311.2	1046.6	1752.1	191.4	795.9	1797.2	1107.2	3793.4	7630.0	1913.1	5785.8	11425.8
Non-Manuf	1952.0	4966.3	9167.4	260.6	954.6	2147.6	310.4	1412.4	4094.5	1047.1	3470.9	7654.9	2496.5	7782.8	15360.4

Table 4: Firm Assets (continued)

Panel B: Asset Changes in Native Currency (For a detailed list of SIC codes please see *Appendix B.*)

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
All	4.9%	7.7%	27.1%	5.3%	11.1%	52.0%	6.9%	9.8%	25.8%	5.9%	10.3%	35.0%	4.9%	7.1%	18.8%
1985	6.8%	7.6%	14.3%	6.4%	9.0%	17.6%	7.4%	9.3%	20.4%	3.6%	5.2%	10.4%	2.4%	3.3%	7.6%
1986	5.3%	6.5%	22.3%	2.9%	3.1%	19.8%	8.8%	12.0%	19.4%	4.4%	6.2%	14.7%	3.9%	4.9%	9.2%
1987	5.8%	10.4%	32.9%	8.4%	23.1%	123.8%	10.5%	15.1%	19.0%	7.2%	11.7%	35.9%	9.1%	11.0%	12.4%
1988	6.6%	12.2%	34.9%	7.9%	14.2%	31.2%	17.7%	25.2%	40.6%	10.8%	17.5%	35.4%	10.9%	13.7%	14.7%
1989	5.4%	8.6%	27.3%	7.8%	14.0%	38.0%	16.7%	20.0%	26.5%	9.8%	15.9%	31.0%	14.1%	17.1%	17.6%
1990	4.9%	5.8%	16.1%	3.4%	1.8%	22.5%	1.9%	4.3%	24.5%	6.7%	13.4%	37.8%	7.8%	9.4%	11.9%
1991	2.5%	3.6%	15.0%	1.4%	0.8%	25.9%	1.8%	3.8%	20.7%	5.5%	10.4%	35.1%	4.4%	4.3%	10.9%
1992	3.5%	4.3%	15.4%	2.2%	3.8%	27.4%	4.6%	4.8%	19.9%	3.6%	10.0%	57.3%	0.6%	2.6%	34.7%
1993	4.7%	8.7%	44.4%	6.5%	20.1%	58.8%	6.3%	9.4%	27.4%	1.6%	3.2%	20.4%	-1.3%	-0.3%	11.3%
1994	4.5%	8.1%	25.4%	8.4%	19.3%	43.5%	5.2%	8.5%	22.5%	3.7%	7.6%	29.0%	0.9%	1.7%	8.2%
SIC = 2xxx	6.0%	8.5%	24.3%	5.0%	9.9%	31.7%	6.9%	10.2%	21.5%	6.1%	10.0%	24.4%	4.0%	6.8%	27.9%
SIC = 3xxx	5.4%	7.8%	24.8%	4.7%	9.5%	35.2%	5.6%	7.6%	18.0%	5.0%	8.4%	29.3%	4.4%	6.6%	13.1%
Non-Manuf	4.5%	7.3%	29.1%	5.7%	12.0%	60.8%	7.5%	10.5%	29.4%	6.3%	12.4%	45.3%	6.2%	7.8%	15.3%

Table 4: Firm Assets (continued)

Panel C: Asset Changes in U. S. Dollars (For a detailed list of SIC codes please see *Appendix B.*)

For each firm, currencies were converted over its fiscal year period.

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
All	4.9%	7.7%	27.1%	5.1%	10.5%	53.5%	6.6%	9.0%	27.2%	8.2%	13.2%	39.1%	13.3%	14.6%	21.9%
1985	6.8%	7.6%	14.3%	1.0%	3.4%	16.6%	7.2%	7.8%	20.8%	-0.7%	0.8%	10.6%	12.0%	12.5%	8.5%
1986	5.3%	6.5%	22.3%	1.1%	1.3%	19.4%	23.9%	27.5%	23.5%	36.0%	39.3%	18.9%	43.8%	45.3%	12.8%
1987	5.8%	10.4%	32.9%	13.6%	29.5%	130.4%	23.0%	27.7%	20.9%	25.7%	30.8%	41.1%	26.1%	28.4%	14.4%
1988	6.6%	12.2%	34.9%	16.5%	23.3%	34.4%	16.2%	22.9%	40.0%	7.7%	11.6%	31.8%	11.2%	13.0%	16.2%
1989	5.4%	8.6%	27.3%	11.5%	17.9%	39.2%	7.7%	11.3%	24.0%	7.8%	13.2%	33.5%	-1.1%	1.2%	15.3%
1990	4.9%	5.8%	16.1%	4.5%	2.9%	22.7%	13.7%	17.0%	28.4%	23.2%	30.2%	45.6%	19.2%	20.4%	13.6%
1991	2.5%	3.6%	15.0%	1.3%	1.0%	25.9%	-1.5%	0.1%	19.9%	3.3%	7.9%	34.5%	9.8%	10.1%	11.5%
1992	3.5%	4.3%	15.4%	-6.9%	-5.2%	25.1%	-8.7%	-7.5%	19.8%	-3.1%	3.9%	60.6%	15.6%	17.1%	40.5%
1993	4.7%	8.7%	44.4%	1.8%	14.4%	54.9%	2.2%	3.6%	25.1%	-5.9%	-4.9%	19.4%	10.6%	11.7%	12.6%
1994	4.5%	8.1%	25.4%	3.3%	13.3%	41.0%	12.3%	15.6%	24.0%	15.4%	19.6%	32.3%	19.0%	19.7%	9.9%
SIC = 2xxx	6.0%	8.5%	24.3%	4.6%	9.5%	33.2%	6.5%	9.9%	24.1%	7.6%	12.5%	28.0%	13.0%	14.9%	33.2%
SIC = 3xxx	5.4%	7.8%	24.8%	2.9%	8.8%	33.7%	5.8%	6.9%	20.4%	7.2%	11.2%	32.3%	12.4%	14.0%	15.3%
Non-Manuf	4.5%	7.3%	29.1%	5.8%	11.4%	62.9%	6.9%	9.5%	30.2%	9.7%	15.9%	50.6%	14.5%	15.0%	16.9%

Table 5: Stock Price Performance

"All" denotes the median of all year returns. For each firm, currencies were converted over the same fiscal year period over which returns were computed.

Panel A: Stock Returns in Native Currency (For a detailed list of SIC codes please see *Appendix B.*)

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
All	11.0%	14.1%	50.8%	5.1%	10.2%	60.4%	10.5%	15.3%	46.4%	12.1%	19.6%	45.2%	-3.4%	3.6%	36.2%
1985	28.2%	28.0%	31.9%	20.9%	28.4%	37.6%	31.2%	37.0%	45.4%	37.1%	47.8%	46.9%	26.6%	37.3%	47.3%
1986	20.2%	19.3%	30.2%	4.5%	10.4%	48.6%	31.2%	44.2%	69.5%	21.1%	30.0%	44.0%	35.4%	35.3%	42.8%
1987	1.0%	5.4%	33.9%	2.2%	6.1%	31.0%	23.8%	30.8%	47.7%	-22.3%	-17.3%	27.4%	25.9%	34.0%	47.9%
1988	14.2%	16.0%	32.6%	9.1%	12.0%	33.4%	14.6%	16.4%	26.3%	43.6%	51.8%	56.3%	23.6%	34.8%	46.4%
1989	24.0%	24.0%	54.6%	11.6%	12.8%	34.6%	11.0%	11.1%	30.9%	31.3%	37.1%	38.3%	2.8%	9.7%	36.6%
1990	-7.5%	-9.4%	29.5%	-17.7%	-20.0%	34.1%	-9.8%	-10.9%	28.3%	-16.3%	-14.0%	27.7%	-13.7%	-13.2%	22.0%
1991	24.3%	29.8%	51.1%	5.0%	10.5%	92.9%	13.7%	15.6%	50.1%	6.1%	8.8%	28.6%	-26.8%	-24.0%	18.5%
1992	10.7%	12.5%	30.6%	1.1%	2.0%	47.2%	7.5%	7.8%	42.2%	-1.3%	-1.9%	28.8%	-6.1%	-4.5%	19.5%
1993	14.4%	25.0%	107.7%	30.8%	52.2%	105.5%	34.2%	43.6%	55.9%	40.7%	45.9%	45.5%	6.6%	9.9%	22.4%
1994	-3.9%	-0.7%	32.5%	-3.5%	0.2%	38.3%	-2.1%	0.0%	33.6%	1.5%	4.7%	28.4%	-12.6%	-11.6%	17.4%
SIC = 2xxx	12.3%	15.7%	33.4%	6.8%	12.5%	37.3%	13.7%	16.4%	37.0%	14.2%	19.1%	36.9%	-3.5%	1.6%	31.3%
SIC = 3xxx	9.6%	13.3%	39.4%	6.7%	12.8%	54.7%	10.9%	15.3%	47.5%	12.8%	20.0%	47.7%	-2.1%	4.9%	37.1%
Non-Manuf	11.2%	13.7%	60.0%	3.4%	8.7%	67.8%	9.3%	14.9%	48.8%	9.8%	19.7%	48.0%	-4.7%	3.8%	38.4%

Panel B: Stock Returns in U. S. Dollars (For a detailed list of SIC codes please see *Appendix B.*)

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
All	11.0%	14.1%	50.8%	4.3%	9.5%	59.4%	9.6%	13.9%	46.4%	15.0%	21.4%	44.5%	4.6%	11.3%	41.0%
1985	28.2%	28.0%	31.9%	14.5%	21.8%	35.6%	29.1%	35.9%	48.7%	31.8%	41.7%	45.6%	40.0%	50.0%	53.2%
1986	20.2%	19.3%	30.2%	2.7%	8.4%	47.6%	49.1%	64.2%	81.4%	57.9%	70.3%	56.4%	87.2%	87.4%	59.5%
1987	1.0%	5.4%	33.9%	7.6%	11.5%	32.4%	34.4%	44.7%	51.1%	-8.5%	-2.9%	32.9%	46.1%	55.0%	55.3%
1988	14.2%	16.0%	32.6%	18.1%	20.7%	36.2%	11.8%	14.0%	27.2%	35.0%	44.0%	52.7%	21.1%	33.0%	46.0%
1989	24.0%	24.0%	54.6%	15.8%	16.6%	35.7%	2.2%	2.9%	28.0%	28.9%	33.5%	38.0%	-10.9%	-4.9%	32.7%
1990	-7.5%	-9.4%	29.5%	-17.1%	-19.1%	34.6%	1.8%	-0.3%	31.0%	-4.5%	-1.4%	31.6%	-4.2%	-4.1%	25.0%
1991	24.3%	29.8%	51.1%	5.4%	10.7%	93.2%	10.2%	11.2%	47.5%	3.8%	6.4%	28.3%	-22.6%	-19.8%	19.7%
1992	10.7%	12.5%	30.6%	-7.9%	-6.7%	43.7%	-4.9%	-5.3%	37.0%	-6.9%	-7.8%	27.8%	7.9%	9.3%	23.9%
1993	14.4%	25.0%	107.7%	25.3%	45.6%	101.8%	28.2%	36.2%	54.1%	30.3%	34.7%	43.2%	19.3%	23.1%	25.3%
1994	-3.9%	-0.7%	32.5%	-8.7%	-4.8%	36.8%	4.5%	6.5%	35.4%	12.9%	16.2%	31.2%	2.9%	3.9%	19.2%
SIC = 2xxx	12.3%	15.7%	33.4%	6.5%	11.9%	37.2%	12.1%	15.6%	37.3%	15.8%	20.6%	36.9%	4.9%	10.4%	39.6%
SIC = 3xxx	9.6%	13.3%	39.4%	6.8%	11.9%	53.1%	10.1%	14.4%	50.3%	15.1%	21.6%	46.4%	6.6%	12.4%	40.4%
Non-Manuf	11.2%	13.7%	60.0%	2.5%	7.9%	66.7%	8.2%	13.2%	47.5%	13.7%	21.8%	47.5%	3.5%	11.0%	42.5%

Table 6: Investment – Capital Expenditures

Panel A: Investment Divided by Assets (Investment = Capital Expenditures) (For a detailed list of SIC codes please see *Appendix B.*)

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
All	6.5%	7.5%	5.2%	6.8%	8.6%	14.7%	4.8%	5.8%	10.4%	6.5%	7.2%	9.6%	4.0%	4.5%	5.5%
1985	8.0%	8.9%	5.2%	7.4%	9.4%	7.0%	6.6%	7.5%	5.2%	6.4%	7.2%	4.6%	6.2%	6.3%	3.5%
1986	7.2%	8.0%	5.2%	6.7%	8.6%	7.1%	5.4%	7.7%	6.5%	7.0%	7.9%	5.0%	4.7%	5.3%	3.6%
1987	6.4%	7.1%	4.9%	7.3%	8.9%	8.8%	5.8%	7.7%	6.3%	6.6%	7.8%	5.3%	4.8%	5.0%	3.5%
1988	6.6%	7.5%	5.2%	8.1%	10.2%	8.7%	8.1%	9.5%	10.6%	7.3%	7.8%	11.0%	4.0%	4.9%	4.5%
1989	6.7%	7.7%	5.2%	8.3%	9.7%	6.9%	7.3%	8.7%	8.5%	7.0%	8.5%	7.6%	4.5%	5.0%	4.4%
1990	6.7%	7.7%	5.4%	7.8%	9.8%	13.9%	4.8%	6.1%	8.7%	7.1%	8.0%	8.4%	4.7%	5.2%	4.6%
1991	6.2%	7.4%	5.5%	5.7%	6.7%	21.4%	3.3%	4.1%	11.7%	7.5%	8.5%	7.6%	4.5%	4.9%	4.6%
1992	6.1%	6.9%	4.7%	4.8%	6.2%	10.7%	3.8%	3.0%	15.7%	6.6%	6.9%	10.5%	3.7%	4.3%	5.3%
1993	5.9%	7.0%	5.2%	5.2%	7.2%	28.0%	3.9%	4.6%	9.0%	5.3%	5.3%	15.1%	2.8%	2.9%	8.9%
1994	5.9%	7.1%	5.2%	6.4%	10.0%	10.5%	4.7%	5.9%	6.7%	5.0%	5.9%	6.0%	2.5%	2.7%	3.2%
SIC = 2xxx	7.0%	7.5%	3.9%	5.9%	6.9%	5.2%	6.2%	6.6%	7.3%	7.0%	7.9%	8.3%	4.4%	4.7%	6.4%
SIC = 3xxx	5.7%	6.5%	3.9%	5.2%	6.5%	4.8%	5.1%	6.0%	6.2%	6.4%	6.6%	11.2%	4.5%	5.1%	4.6%
Non-Manuf	6.7%	7.9%	6.0%	8.1%	9.8%	18.2%	3.8%	5.4%	12.3%	6.0%	7.4%	8.6%	2.6%	3.8%	5.4%

Panel B: First Differences of Investment as a Percentage of Previous Year's Assets (For a detailed list of SIC codes please see *Appendix B.*)

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
All	0.3%	0.5%	4.6%	0.2%	2.5%	36.1%	0.0%	1.1%	16.3%	0.2%	1.2%	15.2%	0.1%	0.3%	7.1%
1985	0.5%	0.5%	4.8%	1.0%	1.7%	6.7%	0.8%	0.7%	4.1%	0.3%	0.9%	3.8%	0.2%	0.3%	3.0%
1986	-0.1%	-0.1%	4.1%	0.1%	-0.6%	6.9%	0.4%	0.9%	5.9%	0.6%	0.5%	8.4%	-0.3%	-0.1%	3.5%
1987	0.1%	-0.1%	4.7%	0.4%	9.6%	104.8%	0.8%	1.1%	5.5%	0.2%	0.0%	7.5%	0.2%	0.4%	2.9%
1988	0.6%	1.2%	4.2%	0.9%	2.4%	9.6%	2.2%	6.2%	35.6%	1.0%	2.8%	14.6%	0.9%	1.4%	4.8%
1989	0.5%	0.8%	4.1%	0.6%	0.7%	8.1%	0.4%	2.3%	15.2%	0.6%	2.4%	16.5%	0.6%	1.1%	7.3%
1990	0.4%	0.8%	3.6%	-0.3%	-0.3%	7.1%	-0.4%	-1.6%	10.8%	0.5%	2.1%	18.4%	0.7%	0.9%	5.1%
1991	-0.1%	-0.1%	4.8%	-1.0%	-1.0%	6.8%	-0.0%	-0.2%	11.9%	0.5%	2.1%	15.0%	0.2%	0.0%	4.8%
1992	0.1%	-0.0%	4.4%	-0.4%	1.3%	21.6%	0.0%	-0.4%	16.2%	-0.2%	1.1%	19.3%	-0.5%	-0.1%	10.4%
1993	0.4%	0.8%	6.0%	0.6%	5.6%	18.6%	0.0%	1.9%	17.6%	-0.6%	-0.9%	13.3%	-0.6%	-0.8%	7.7%
1994	0.4%	0.8%	4.9%	1.1%	4.6%	26.1%	0.4%	1.8%	10.5%	-0.1%	0.7%	15.5%	-0.2%	0.1%	11.2%
SIC = 2xxx	0.5%	0.5%	3.7%	0.2%	0.9%	7.4%	0.4%	0.9%	12.3%	0.2%	1.0%	13.0%	0.0%	0.5%	9.0%
SIC = 3xxx	0.2%	0.3%	3.6%	0.4%	0.9%	4.7%	0.4%	0.5%	8.1%	0.0%	1.0%	15.2%	0.1%	0.3%	6.9%
Non-Manuf	0.3%	0.5%	5.3%	0.1%	3.5%	45.9%	0.0%	1.4%	19.5%	0.2%	1.7%	16.7%	0.1%	0.3%	5.7%

allows variables to be easily interpreted, and mimicks the effect of using assets as heteroskedasticity deflators in the regressions.

Net Income: Panel A shows that British firms produced the highest net income (5.1% of assets), followed by those in the U.S. (4.3%), Canada (3.2%), Europe (2.9%) and finally Japan (1.5%). Panel B shows that Net income growth was strongest in the three Anglo-Saxon regions, and weakest in Japan. **Dividends:** British and U.S. firms tended to pay higher dividends (2.0% and 2.4%) than firms in Canada, Europe, and Japan (0.9%, 1.1%, 0.6%). **Inventories:** Surprisingly, Japanese firms (with 10.8%) held higher inventories than their U.S. counterparts (with 8.0%). Canadian firms also held low inventories (8.2%), while European and British firms held higher inventories (about 15%). Dividing the median firm inventories by the median firm sales still indicates that the American firms have lower sales-adjusted inventory levels than their European and Japanese counterparts[26]. **Cash and Marketable Securities:** Japanese firms held enormous amounts (17% of assets!) in cash and marketable securities, reflecting their extensive cross-holdings, a pattern reflected to a lesser degree in Europe (9.2% of assets!) and even in Britain (6.3%). In contrast, U.S. and Canadian companies hold only about 2.5% to 3% of their assets in cash and marketable securities. This supports the findings of *Hoshi, Kashyap* and *Scharfstein* [1990a,1990b] that Japanese firms are likely to be more insulated from financial distress and changes in their cost of equity capital, and suggests a similar but lesser insulation of European companies. Furthermore, if anything, this cross-country difference continued to increase in the sample period[27]. **Total Income Taxes:** The tax burden in different countries ranges from about 1.8% of assets in Canada, Japan, and Europe – the lowest income tax rates in the sample! – to 2.3% of assets in the U.S. and Great Britain. A rough calculation (dividing taxes by the sum of net income and taxes) shows that most of the differences between the U.S. (35%), Canada (35%), Britain (31%), and Europe (38%) income tax payments are due to variations in net income. The fabled U.S. low-tax environment relative to the British, Canadian, and European environment does not clearly show up in this sample. Japan is an interesting exception: income taxes consume more than half of firms' net income[28]. **Sales:** Finally, sales divided by assets, grew fastest in Britain and Europe, the regions which seemed to require the most assets for a given level of sales.

3.7 Inflation Adjustment

The present paper does not need to adjust for price index changes. Accounting variables would not be affected because they are measured as a fraction of firm-size. The only variables that could potentially benefit from a CPI adjustment would thus be asset size (a simple control variable) and stock returns. Stock

26 It would be interesting to determine how firm size and industry can explain this pattern. Unfortunately, this is beyond the domain of our paper.

27 Unfortunately, neither U.S. firms nor Japanese firms regularly report the decomposition of their holdings into cash and marketable securities.

28 Please note that income taxes are total taxes, including non-paid deferred taxes (!) because of data restrictions.

Table 7: Other Internal Performance Measures

Panel A: Various Measures as a Percentage of Assets

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
Net Income	4.3%	3.7%	7.3%	3.2%	1.2%	19.4%	5.1%	4.5%	8.5%	2.9%	3.0%	5.1%	1.5%	1.7%	2.2%
Dividends	2.0%	2.2%	3.9%	0.9%	1.7%	5.3%	2.4%	2.6%	2.2%	1.1%	1.5%	1.9%	0.6%	0.6%	0.5%
Inventories	8.0%	11.6%	11.9%	8.2%	12.2%	13.9%	14.2%	15.7%	15.2%	16.5%	17.0%	12.2%	10.8%	13.0%	10.8%
Cash	2.9%	6.0%	8.4%	2.6%	8.2%	13.0%	6.3%	9.6%	10.8%	9.2%	12.1%	10.5%	17.0%	19.4%	11.8%
Taxes	2.3%	2.7%	2.8%	1.7%	2.2%	3.2%	2.3%	2.6%	2.5%	1.8%	2.3%	2.4%	1.7%	2.2%	2.4%
Sales	86.8%	99.9%	75.0%	70.0%	91.5%	84.1%	112.3%	118.4%	101.7%	108.1%	117.0%	66.4%	86.7%	98.3%	56.6%

Panel B: First Differences (t less t − 1) as a Percentage of Previous Year's Assets

	USA			Canada			GBR			Europe			Japan		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
ΔNet Income	0.4%	0.5%	6.1%	0.4%	0.9%	14.7%	0.5%	0.5%	7.3%	0.3%	0.4%	4.5%	0.0%	-0.0%	1.8%
ΔDividends	0.1%	0.1%	4.6%	0.0%	0.1%	3.8%	0.2%	0.3%	2.0%	0.0%	0.1%	1.4%	0.0%	0.0%	0.6%
ΔInventories	0.1%	0.7%	3.9%	0.0%	0.8%	6.0%	0.0%	1.1%	6.5%	0.2%	1.2%	9.8%	0.2%	0.7%	4.0%
ΔCash	0.0%	0.5%	7.1%	0.0%	1.2%	11.5%	0.2%	1.2%	7.8%	0.2%	1.3%	7.3%	0.1%	1.1%	9.6%
ΔTaxes	0.1%	0.2%	2.3%	0.1%	0.3%	2.9%	0.1%	0.2%	1.7%	0.1%	0.2%	1.7%	-0.0%	-0.0%	1.7%
ΔSales	3.6%	7.2%	23.1%	3.5%	7.3%	24.2%	4.5%	10.3%	40.4%	5.6%	9.8%	38.3%	2.9%	4.1%	20.4%

returns could be adjusted, but it would make no difference: regressions are run separately for each country (so country inflation differences do not matter [exception: Europe])[29]. (Multiplying all stock returns by a constant does not affect the cross-sectional inference for a single year.)[30]

Salinger and *Summers* (1983) offer more sophisticated inflation adjustments for inventory (LIFO/FIFO). The data set of this paper lacks proper inventory identification as well as the necessary, long time-series of data to copy this adjustment.

3.8 A Note on Japanese Homogeneity

Although the reader should be careful not to overinterpret the descriptive data, and although it does not hold for all variables and regions described above, it appears that Japanese firms tend to show lower cross-sectional heterogeneity (standard deviation) in a whole host of variables than their counterparts in other regions. There are at least three explanations for this Japanese homogeneity: [1] Japanese managers may deliberately smooth internal accounting measures towards that of comparable firms; [2] COMPUSTAT or our data requirements lead us to track a different set of firms (perhaps only partially controlled for by the sector partitioning); or [3] Japanese firms, being closely linked in Keiretsu's, tend to grow or shrink together.

4 Regressions Predicting Capital Expenditure Innovations

We now turn to the main issue of interest, the regressions forecasting corporate investment innovations.

4.1 Overall Regressions

Table 8 presents the complete sample regression estimates for each country. Panel B differs from Panel A in that it includes firm-specific intercepts for all firms. Before reporting results, the reader should be aware that we tried several specification variations. In particular, we tried one, two, and three lags, and we tried including multiple lags on each variable individually. (An earlier version reported the results with two multiple lags for each variable.) Our current draft reports only regressions in which we combined the first two lags for each variable, averaging two lags of the afore-described accounting variables and compounding two years of stock returns, when predicting a single year's subsequent asset-adjusted capital expenditures. We report this particular set of regressions, because it is easier to interpret economic significance when only one variable at a time can be consid-

29 The explanatory power of these regressions derives primarily from the large number of firms, not from the time-series.

30 Also, the sample period was not marked by dramatic inflation or dramatic changes in inflation in the sample countries. The irrelevance of CPI adjusting was confirmed by re-examining the U.S. regression.

Table 8: Overall Country Regressions

The dependent variable is capital expenditures in year t divided by average assets in year t and $t-1$. All independent variables are lagged. The flow variables (capital expenditures, dividends, net income, and taxes) are first normalized by average assets over the year (beginning and end of year assets), and then averaged over two year lags. (Explicitly, using *Table 1* definitions, the net income variable is $\{32_{t-1}/[(Sz_{t-1} + Sz_{t-2})/2]\} + \{32_{t-2}/[(Sz_{t-2} + Sz_{t-3})/2]\}/2$.) The stock variables (cash and inventories) are first divided by the contemporaneous assets, and then averaged over two year lags. (Explicitly, using *Table 1* definitions, the cash variable is $\{[60_{t-1}/Sz_{t-1} - 60_{t-2}/Sz_{t-2}] + [60_{t-2}/Sz_{t-2} - 60_{t-3}/Sz_{t-3}]\}/2$.) Stock returns are simply compounded over two years. We do not report coefficients for our controls: sales over average assets, the first difference of sales over average assets, assets, assets squared, and the percentage growth in assets. Year dummies, along with two SIC dummies (SIC = 2xxx and SIC = 3xxx, see Appendix B) are included as well. White-adjusted T-stats are provided to the right of each coefficient. One star represents significance at 10% level, two stars represent significance at 5% level, three stars represent significance at 1% level. At the bottom of each panel are the number of regressors, the number of observations, the R-squared, and the adjusted R-squared.

Panel A: No Firm Specific Intercepts

	USA		Canada		GBR		Europe		Japan	
	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
dependent	1.596	6.970***	4.705	6.247***	2.191	4.617***	2.557	3.876***	0.190	0.591
capex	72.853	28.721***	62.531	14.891***	33.890	11.792***	33.750	9.947***	50.768	13.070***
returns	2.419	8.554***	5.359	4.977***	2.241	4.803***	0.487	1.028	1.456	4.976***
dividends	-5.190	-1.955*	-17.911	-2.841***	-6.795	-0.731	7.752	0.649	63.611	3.181***
net income	5.319	2.723**	1.469	0.369	9.839	1.672	3.236	0.598	19.996	3.885***
Δcash	7.916	3.286***	7.995	1.642	14.956	3.922***	0.104	0.017	10.608	4.462***
Δinventories	-1.158	-0.333	8.915	1.360	2.144	0.426	-0.864	-0.161	-7.215	-2.235**
taxes	3.162	0.880	8.796	1.109	17.957	1.678	31.889	3.550***	-6.135	-2.081**
controls	Coefficients on Sales, Sales Changes, Assets, Asset Changes, Squared Asset Changes, Industry and Year Dummies are not reported in order to preserve space.									
	regs = 24		regs = 24		regs = 24		regs = 24		regs = 24	
	obs = 4704		obs = 2047		obs = 4562		obs = 3108		obs = 4015	
	R^2 = 55.70%		R^2 = 43.10%		R^2 = 19.50%		R^2 = 11.44%		R^2 = 24.30%	
	$\bar{R}^2$ = 55.48%		$\bar{R}^2$ = 42.45%		$\bar{R}^2$ = 19.09%		$\bar{R}^2$ = 10.78%		$\bar{R}^2$ = 23.86%	

Table 8: Overall Country Regressions (continued)

Panel B: With Firm Specific Intercepts

	USA		Canada		GBR		Europe		Japan	
	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
constant	8.824	11.401***	12.230	10.179***	-2.070	-2.173**	-2.287	-0.970	-2.549	-0.383
capex	12.495	3.278***	6.974	1.015	-8.802	-2.023**	-19.296	-3.699***	-18.058	-2.065**
returns	1.655	6.202***	4.435	3.962***	2.676	5.298***	0.394	0.736	0.792	2.378**
dividends	-2.353	-0.732	11.684	1.491	35.446	2.004**	49.622	1.368	75.733	1.910*
net income	16.750	5.359***	10.867	1.941*	12.173	1.299	14.141	1.849*	24.382	2.491**
Δcash	0.586	0.273	5.388	1.215	9.244	2.099**	-6.463	-0.901	3.742	1.359
Δinventories	-2.112	-0.658	3.095	0.491	-1.103	-0.197	-0.093	-0.017	-4.249	-1.484
taxes	16.117	2.649***	-4.549	-0.375	34.488	1.996**	42.363	2.667***	38.600	3.064***
controls	Coefficients on Sales, Sales Changes, Assets, Asset Changes, Squared Asset Changes, Industry and Year Dummies are not reported in order to preserve space.									
	regs = 791		regs = 384		regs = 970		regs = 716		regs = 636	
	obs = 4704		obs = 2047		obs = 4562		obs = 3108		obs = 4015	
	R^2 = 72.21%		R^2 = 63.23%		R^2 = 43.01%		R^2 = 43.71%		R^2 = 46.03%	
	$\bar{R}^2$ = 66.60%		$\bar{R}^2$ = 54.77%		$\bar{R}^2$ = 27.64%		$\bar{R}^2$ = 26.89%		$\bar{R}^2$ = 35.89%	

Panel C: Standard Deviation of Regressors

	USA	Canada	GBR	Europe	Japan
dependent	0.056	0.105	0.097	0.083	0.050
capex	0.056	0.095	0.094	0.069	0.042
returns	0.259	0.335	0.307	0.325	0.316
dividends	0.030	0.025	0.020	0.019	0.005
net income	0.057	0.073	0.063	0.044	0.021
Δcash	0.032	0.051	0.040	0.035	0.034
Δinventories	0.018	0.028	0.030	0.028	0.021
taxes	0.029	0.031	0.027	0.025	0.027

ered, without having to take multiple lags of obviously auto-correlated values into account. *Our results are robust to every alternative specification we tried.*

4.1.1 Persistence in Investment Heterogeneity and Overall Power

Table 8 Panel A shows that lagged capital expenditures correlate highly with future capital expenditures. This is not too surprising, because capital expenditures control for each firm's own typical level of investment in these regressions. The coefficient estimates on lagged *capex* suggest that the heterogeneity in the United States is most persistent (72%), followed by Canada (63%), Japan (51%), and Britain and Europe (34%). This ordering is responsible for the ordering in R^2 across countries. Panel B shows that when individual firms' own level of investment is controlled for, there is little if any persistence in firms' capital expenditures (except in the U.S.)[31].

31 Note that these estimates are unreliable, though, because of the standard time-series problems.

4.1.2 The Influence of Stock Returns: Regressions

The hypothesis of most interest to this paper is whether stock returns predict investment, and if so, whether stock returns predict investment better in the United States. First consider the effects of an equal, fixed 2-year lagged stock return of 30% (an arbitrary choice) in each country. The coefficients in Panels A and B suggest that this higher stock-return predicts the largest investment increase in Canada. The 30% higher two-year stock return can predict an immediate asset-normalized investment increase of 1.0% to 1.5%. Both British and U.S. firms show a smaller response without firm specific intercepts [predicting 0.7% in investment increase], although the response of U.S. firms decreases significantly when firm-specific intercepts are included (Panel B). Japanese firms show about half the response of U.S. firms (combining the two panels), responding with about an 0.25% to 0.45% asset-normalized investment increase. The clear anomaly are mainland European firms, which appear not to respond with higher capital expenditures to past stock price performance.

Table 8. Overall Country Regressions (continued)

Panel D: Economic Significance of Overall Country Regressions

Economic significance for each regressor is determined by multiplying the regressor's coefficient times the regressor's standard deviation, divided by the standard deviation of asset normalized capital expenditures.

	Without Firm Intercepts					With Firm Intercepts				
	USA	Canada	GBR	Europe	Japan	USA	Canada	GBR	Europe	Japan
capex	72.827	56.698	32.717	28.203	42.593	12.491	6.323	-8.498	-16.125	-15.150
returns	11.112	17.112	7.094	1.913	9.207	7.603	14.164	8.470	1.548	5.005
dividends	-2.735	-4.267	-1.407	1.810	6.429	-1.240	2.783	7.339	11.589	7.654
net income	5.368	1.021	6.398	1.705	8.275	16.904	7.552	7.917	7.450	10.090
Δcash	4.567	3.856	6.213	0.044	7.311	0.338	2.598	3.840	-2.753	2.579
Δinventories	-0.372	2.395	0.657	-0.292	-2.962	-0.679	0.831	-0.338	-0.031	-1.744
taxes	1.651	2.630	5.051	9.676	-3.269	8.414	-1.360	9.700	12.853	20.567

Still, it is more appropriate to measure the *economic* influence of stock returns by the investment increase that a one standard deviation higher stock performance produces relative to the cross-sectional standard deviation in observed investment innovations. Thus, Panel C provides standard deviations of the variables in the regressions, and Panel D provides an "implied economic significance" of the coefficients (computed as the coefficient multiplied by the standard deviation of the independent variable divided by the standard deviation of the dependent variable).

Using the coefficients from Panel A, these computations show that a one-standard deviation higher stock return performance can explain 11% percent of the standard deviation in asset-normalized capital expenditures in the United States. The same computations lead to a 17% influence within Canada, an 11% influence within Japan, a 7.5% influence within Britain, and an insignificant 2% factor within

Europe. According to Panel B, in which stock returns must overcome firm-specific dummies (which themselves correlate with firm-specific return performance), the U.S. (7.5%) is again behind Canada (14%) and Britain (9%), but ahead of Japan (6%) and the insignificant Europe (2%).

In conclusion, a rough ordering of countries would place Great Britain and Canada to be the countries where investment is most influenced by stock returns, followed by the U.S. and Japan. The economic difference between Japan and the United States seems mild, refuting popular claims that Japanese firms are considerably more isolated from stock market fluctuations than their U.S. counterparts. Instead, it is the European firms in the sample period which displayed considerably lower sensitivity to their own lagged stock market performance than firms in other countries.

4.1.3 The Influence of Other Variables

Lagged **Cash Changes** may or may not have an influence, depending on specification. Lagged **Net income** seems to play a significant role in predicting asset-adjusted capital expenditure innovations in both the United States and Japan, but not in other regions. The latter finding is often cited in arguing that firms' investments are profitability or cash constrained, but the fact that the United States shares this feature with Japan but not with Europe, Great Britain, or Canada sheds doubt on such interpretations. **Inventories** do not seem to matter much; **Dividends** appear to be a substitute for capital expenditures in Canada and a complement in Japan. **Income taxes** offer insignificant or inconsistent predictions (as in Japan) – except in Europe, where firms that pay higher income taxes tend to have increased their capital expenditures.

We also tried a regression (unreported) in which we included lagged stock returns *squared* in order to measure the influence of volatility on returns. Although the coefficients on this variable come out negative as one would predict, this variable correlates too highly with plain stock returns (in cross-section!) to allow us to run more meaningful tests. Indeed, the sum of the return and return-squared coefficients are almost identical to those reported in our paper.

4.2 Year-by-Year Regressions

Barro (1990) finds that firms in aggregate invested more than expected after the stock market crash, concluding that the stock market crash did not have an important negative impact on investment decisions. However, Barro does not consider the cross-sectional relationship. These year-by-year relationships are explored in *Tables 9*. The regressions run are identical to those in *Table 8*, but only the coefficient on lagged stock returns are reported.

The table shows that the return coefficient is positive in almost every year in the United States, Canada, Great Britain, and Japan; but 4 out of the 10 return coefficients in Europe are negative. This is consistent with the view that good stock return performance induced firms to increase corporate investments, except in mainland Europe.

5 Conclusion

This study has examined the cross-sectional influence of stock returns on asset-normalized capital expenditures. Our intent was to use a new data set (Standard and Poor's *Global Vantage* data base) containing similar accounting figures to compare cross-sectional investment patterns within five developed economic regions. The documented findings shed light upon the question of whether U.S. managers are behaving differently than their European and Japanese counterparts:

1. Heterogeneity in capital expenditures is first and foremost a firm-specific phenomenon, and only second explainable by outside variables *in all countries*.

2. Stock returns are important (perhaps the most important) positive predictors of investment increases in Anglo-Saxon countries and Japan, but not in Europe.

3. Japanese firms' investment may respond *less* to stock returns than large U.S. firms, whereas Canadian and British firms' investment may respond *more* to stock returns than large U.S. firms. However, the differences between the Japanese firms on one hand and large U.S. firms on the other hand are economically small.

Finally, we found that the only variable capable of predicting capital expenditure innovations among mainland European firms were firms' own income taxes. Firms with higher income taxes tended to increase their asset-adjusted capital expenditures. It would be an interesting experiment to determine if our findings hold up in a data set covering a wider range of European firms. This is left for future research.

Table 9: Year-by-Year Stock Return Coefficients

The regression specifications (identical to those in *Table 8* [Panel A]) were run separately for each country-year. We only report the coefficients on the lagged two-year compounded stock return variable, although all other variables and controls are in the regression. White- adjusted *T*-statistics are provided to the right of each coefficient. One star represents significance at 10% level, two stars represent significance at 5% level, three stars represent significance at 1% level.

	USA		Canada		GBR		Europe		Japan	
	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
1985	1.618	1.530	5.442	2.046**	1.946	1.932*	1.875	2.147**	3.466	1.920*
1986	3.876	3.314***	6.828	2.237**	3.597	2.036**	-1.123	-0.930	3.109	2.820***
1987	3.124	4.817***	10.524	1.699*	-0.104	-0.079	-1.788	-1.742*	1.380	1.633
1988	2.543	3.274***	3.905	1.432	0.948	0.385	2.977	2.010**	0.423	0.637
1989	2.061	2.778***	3.654	1.399	6.361	3.081***	1.274	0.638	0.042	0.082
1990	1.596	2.595***	5.070	1.861*	2.496	1.520	-1.559	-1.303	-0.048	-0.074
1991	4.115	2.906***	6.567	3.161***	4.365	1.834*	1.571	0.788	0.400	0.488
1992	1.726	2.205**	3.611	1.896*	3.979	2.445**	5.184	1.989**	5.358	1.952*
1993	1.597	1.644	7.897	1.991**	0.835	0.904	-0.968	-0.570	6.700	2.991***
1994	1.837	2.217**	2.040	1.551	0.947	1.368	0.868	0.774	5.275	2.733***
Average	2.409	2.728***	5.554	1.927*	2.537	1.542	0.831	0.380	2.610	1.518

APPENDIX A

DESCRIPTION OF COMPUSTAT *GLOBAL VANTAGE* DATA ITEMS

Numbers preceded by a "#" are Compustat data item array indices.

Assets (#107)
This item represents the total value of all items included in the assets section. This item is the sum of accounts receivable, other assets, cash and deposits, cash due from banks, customers' acceptances, deferred policy acquisition costs, fixed assets, foreign exchange assets, intangible assets, inventories, investment assets, reinsurance assets, securities in custody, separate account assets, and short-term investments.

Capital Expenditures

Method 1

Capital Expenditures (#193)
This item represent funds used for additions to a company's tangible fixed assets (property and equipment). This item includes expenditures for capital leases, increases in funds for construction, and reclassification of inventories/stocks to fixed assets. This item excludes capital expenditures of discontinued operations, changes in fixed assets due to foreign currency fluctuations, decreases in funds for construction reported in the uses section, fixed assets of an acquired company, and net assets of an acquired company.

Method 2

Additions to Fixed Assets (#145)
This item usually represent funds used for additions to the company's property, plant, and equipment. Since European countries often consider all long-term assets to be fixed assets, this item may include expenditures other than property, plant, and equipment. This is a supplementary balance sheet item.

Method 3
Change in fixed assets (#76) plus a proxy for depreciation (#1–#3–#14).

Fixed Assets (#76)
This item represents the net cost or valuation of tangible fixed property used in the production of revenue. It is the sum of fixed assets, depreciation, and investment grants or other deductions.

Sales (#1)
This item represents gross sales reduced by cash discounts, trade discounts, returned sales, excise taxes, value-added taxes, and allowances for which credit is given to customers.

Operating Expense (#3)
This item includes costs of goods sold, other operating expenses, and selling, general, and administrative expenses.

Operating Income (#14)
This item represents the total income from normal business operations. This item is equal to sales less operating expenses and depreciation.

Cash and short term investments (#60)
This item represents any immediately negotiable medium of exchange and funds convertible into cash within a short period of time. This item includes bank and finance company receivables, bank drafts, bankers' acceptances, cash on hand, certificates of deposit, checks, demand deposits, letters of credit, money orders, short-term deposits, cash in escrow, commercial paper, deposits for bank guarantees and similar items, deposits with other corporations, government and other marketable securities, margin deposits, marketable securities, money market funds, repurchase agreements, restricted cash, time deposits, and short-term treasury bills.

Dividends (#36)
This item represents the total amount of dividends (other than stock dividends) declared on the common/ordinary capital of the company, based on the current year's net income. For Canada, this item represents the total amount of all dividends actually paid or required to be paid during the year. For Germany, this includes guaranteed dividends to minority shareholders. For Japan, this item is the sum of dividends paid during the current year as reported on the schedule of changes in the share-holders' equity section and dividends proposed and approved by shareholders as reported in the current year's report and payable in a subsequent fiscal period, less dividends proposed and approved by shareholders and reported in a prior year. For the United States, this item represents the total amount of all dividends actually paid or required to be paid during the year.

Inventories (#66)
This item represents merchandise bought for resale and materials and supplies purchased for use in revenue production less any allowances. This item is the sum of finished goods, work in progress, raw materials, and other inventories. A partial list of included items is advanced manufacturing costs, reusable containers, leased products, merchandise in transit to customers, new and spare parts, construction in progress, tools, and work in progress net of progress payments.

Net Income (#32)
This item represents income after the deduction of all expenses, including allocations to untaxed Balance Sheet reserves, income taxes, minority interest, and net items, but before extraordinary items and provisions for dividends. This item is the sum of income before income taxes and appropriations and net items less appropriations to untaxed reserves, income taxes,

and minority interest. In Germany, this item excludes profit carried forward from prior periods and transfers or allocations to various equity reserves.

Sales (#1)
This item represents gross sales reduced by cash discounts, trade discounts, returned sales, excise taxes, value-added taxes, allowances for which credit is given to customers. A partial list of included items is equipment rental income, franchise fees, license fees, management fees, and royalty income. A partial list of excluded items is capitalized costs for companies a purchase format income statement, interest income, nonoperating income, and rental income.

Taxes (#23)
This item represents all taxes imposed on income by local, provincial/state, national, and foreign governments. This item is the sum of current, deferred, and other income taxes. This item includes charges in lieu of income taxes, deferred income taxes, income taxes on dividends or earnings of unconsolidated subsidiaries, other income taxes, and territorial income taxes. This item excludes franchise taxes, and tax carryforwards reported after net income. In Canada, this item includes charges equivalent to income tax credits and the large corporations tax. In Japan, this item includes enterprise taxes when no breakout is available. In Great Britain, this item excludes the petroleum revenue tax. In the United States, this item includes a charge equivalent to the investment tax credit and state income taxes.

Appendix B

Explanation of SIC 2000 and SIC 3000 codes

2000 Food and Kindred Products
2100 Tobacco Manufacturing
2200 Textile Mill Products
2300 Apparel and Other Textile Products
2400 Lumber and Wood Products
2500 Furniture and Fixtures
2600 Paper and Allied Products
2700 Printing and Publishing
2800 Chemicals and Allied Products
2900 Petroleum and Coal Products
3000 Rubber/Misc. Plastic Products
3100 Leather and Leather Products
3200 Stone, Clay, Glass and Concrete Products
3300 Primary Metal Industries
3400 Fabricated Metal Products
3500 Industrial and Commercial Machinery and Computer Equip
3600 Electrical Equipment and Components
3700 Transportation Equipment
3800 Measurement Analyzing, Control Instr and Related Prod.
3900 Misc. Manufacturing Industries

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