Legal Protection, Equity Dependence, and Corporate Investment: Evidence from around the World*

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ABSTRACT

We investigate the effects of legal protection of investors and equity dependence on the investment-stock price sensitivity in an international setting. We find that firms in countries with strong legal protection of investors have investments that are more sensitive to stock prices than do firms in countries with weak legal protection. In addition, equity-dependent firms display higher investment-stock price sensitivities than do nonequity-dependent firms. Finally, the positive relation between legal protection and the investment-stock price sensitivity is more pronounced for equity-dependent firms than for nonequity-dependent firms. Overall, we provide evidence that both legal protection of investors and equity dependence influence managers' corporate investment decisions.

The existing literature has documented ample evidence of a positive relationship between corporate investments and stock prices. The traditional explanation for this observed positive association is the "*Q*-theory of investment" (Tobin (1969)). In an efficient market, a stock price (measured by Tobin's *Q*) reflects the market's information about a firm's investment opportunities or the marginal rate of return on capital. In addition, a stock price may also contain some private information that managers do not know. For example, the theoretical models suggested by Dow and Gorton (1997) and Subrahmanyam and Titman (1999) illustrate that since stock prices also reflect a collection of information from market participants (such as traders and investors), managers can *learn* from the information in their firms' stock prices about future investment opportunities (the prospective role of stock prices) as well as assess past decisions (the retrospective role of stock prices).[1]

Chen, Goldstein, and Jiang (2007) formally examine this learning hypothesis by arguing that managers rely on the private information in stock prices and incorporate this information into their investment decisions. This implies that the sensitivity of corporate investments to stock prices should be higher for firms whose stock prices are more informative. They use stock price non-synchronicity ($1-R^2$) and the probability of informed trading (*PIN*) as proxies for the degree of private information. Consistent with their hypothesis, they find that both measures have a positive effect on the investment-stock price sensitivity. Therefore, financial markets are not just a sideshow; they affect firms' real activities.

Recent studies in behavioral finance have suggested that stock markets may not be efficient and these studies have offered an alternative explanation for the positive relationship between corporate investments and stock prices through the equity-financing channel. More specifically,

[1] Other theoretical papers that discuss the allocational role of stock prices include Dow and Rahi (2003), Dow, Goldstein, and Guembel (2007), Foucault and Gehrig (2008), and Goldstein and Guembel (2008).

the existence of a non-fundamental component in stock prices causes the effective cost of external equity to deviate from the cost of other forms of capital. In turn, this divergence affects a firm's access to capital and, consequently, managers' corporate investment decisions.

Stein (1996) and Baker, Stein, and Wurgler (2003) argue that if the equity-financing channel is the cause of the positive relationship between corporate investments and stock prices, corporate investments should be more sensitive to changes in the non-fundamental component of stock prices in equity-dependent firms (i.e., those firms that have financial constraints and have to raise external equity to finance their investment projects) than in nonequity-dependent firms. The reason is that equity-dependent firms have incentives to raise equity for their corporate investments when their stock prices are overvalued (above their fundamental values); but they would forgo their investment opportunities rather than issue new equity when their stock prices are undervalued. In contrast, mispricing is unlikely to affect the investment decisions of nonequity-dependent firms. Using data from the U.S., Baker, Stein, and Wurgler (2003) find support for the equity-financing channel argument.

Each of the above studies was designed to test the learning and equity-financing channels on firms' capital investments in the U.S. Thus, an independent test of the learning and the equity-financing channels on investments requires an analysis of markets outside the U.S. Conducting such a test is the goal of this paper. Morck, Yeung, and Yu (2000) argue that agency problems are more rampant in countries with poor investor protection, resulting in a smaller magnitude of private information (as measured by stock price non-synchronicity) embedded in the stock prices of these firms. Hence, managers' investment decisions in these countries may not be sensitive to stock prices, resulting in inefficient allocation of investment capital. Subrahmanyam and Titman (1999) suggest that regulatory agencies (such as government) facilitate the efficiency of capital allocation as strong investor protection enables the firms' stock prices to be more informative, which, in turn, will guide managers in their investment decisions.

The empirical findings from Morck, Yeung, and Yu (2000) and DeFond, Hung, and Trezevant (2007) appear to support the argument that stock prices and earnings of firms in countries with strong legal protection are more informative than those of firms in countries with weak legal protection. Based on the learning channel argument, we argue that firms in countries with strong legal protection of investors should have higher investment-stock price sensitivities than do firms in countries with weak legal protection. In addition, by combining the learning and equity-financing channels, we predict that the effect of a country's legal protection of investors on the investment-stock price sensitivity should be stronger for equity-dependent firms than for nonequity-dependent firms. To the best of our knowledge, there has been no previous empirical study that examines these issues simultaneously.

Our study offers several contributions to the literature. First, it is related to the law and finance literature. Many recent international studies have acknowledged the impact of legal protection of investors on various aspects of financial markets.[2] Our paper is also closely related to the literature on the investment-stock price sensitivity. Earlier studies by Morck, Shleifer, and Vishny (1990) and Blanchard, Rhee, and Summers (1993) find little evidence that the stock market affects corporate investment. However, recent studies by Baker, Stein, and Wurgler (2003), Chen, Goldstein, and Jiang (2007), and Polk and Sapienza (2008) find that the stock market has an important effect on corporate investments.[3] We contribute to these two strands of literature by showing that a country's legal protection of investors is positively related to the

[2] See Beck and Levine (2005) for an excellent review of the literature on law and finance.
[3] See also Chirinko and Schaller (2001) and Gilhirst, Himmelberg, and Hubberman (2005).

investment-stock price sensitivity, which is consistent with the learning channel argument as suggested by Chen, Goldstein, and Jiang (2007).[4]

Second, we use three measures of equity dependence (the adjusted *KZ* index originally suggested by Kaplan and Zingales (1997), firm size, and a dividend dummy) and extend the tests suggested by Baker, Stein, and Wurgler (2003) to the international setting. Our results confirm the role of the equity-financing channel in corporate investments. More specifically, the investment-stock price sensitivity increases monotonically from nonequity-dependent firms to equity-dependent firms. Finally, our last test on the interaction between the learning and the equity-financing channels shows that the positive association between legal protection and the investment-stock price sensitivity is more pronounced for equity-dependent firms than for nonequity-dependent firms.

The study that is closest to ours is by Chen, Jiang, and Goldstein (2007). We find that legal protection of investors plays a complementary role to price informativeness in affecting managers' corporate investment decisions. While they emphasize the role of private information in stock prices at the firm level, we focus on the role of investor protection at the country level. Moreover, we show that the equity-financing channel reinforces the effect of legal protection on the investment-stock price sensitivity. Baker, Stein, and Wurgler (2003) argue that an increase in the investment-stock price sensitivity is often associated with greater efficiency in capital allocation. Based on their argument, our results seem to suggest that firms in countries with strong legal protection are more efficient in allocating their capital than are firms in countries with weak legal protection, in particular the equity-dependent firms.

[4] Kelley and Woidtke (2006) investigate the role of investor protection in real investments. Their focus is on the foreign investments made by multinational U.S. firms, however.

We recognize the possibility that there are alternative explanations that drive our main results and that there are potential endogeneity issues concerning several of our explanatory variables in the regressions. We, therefore, attempt to address these concerns by performing a series of robustness tests. Nevertheless, our main results that legal protection and equity dependence positively affect the investment-stock price sensitivity survive these robustness tests.

The remainder of this paper is organized as follows. Section I develops our hypotheses. Section II describes the sources of our data. Section III presents the empirical tests of our hypotheses and discusses the results. Section IV concludes the paper.

I. Hypothesis Development

A. Legal Protection, the Stock Market and Corporate Investments

Legal protection includes not only the rights prescribed by regulations and laws, but also the effectiveness of enforcement. In a series of papers, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998, and 2002) examine the various aspects of legal protection of outside investors across 49 countries. They document that countries with strong legal protection of minority shareholders have better corporate governance, more developed capital and debt markets, larger stock market capitalizations, larger numbers of listed securities per capita, higher firm valuation, and a higher rate of IPOs than do countries with weak legal protection of investors. In a more recent paper, La Porta, Lopez-de-Silanes, and Shleifer (2006) examine how securities laws affect capital market development and find that laws do matter, especially in countries that facilitate private enforcement through disclosure requirements and liability rules.

Several theoretical papers, such as those by Dow and Gorton (1997) and Subrahmanyam and Titman (1999), argue that managers can *learn* from the private information contained in stock prices in making their corporate investment decisions. Using data from the U.S. market, Chen, Goldstein, and Jiang (2007) find empirical evidence that supports this learning hypothesis. More specifically, they document that the sensitivity of corporate investments to stock prices is higher for firms whose stock prices are more informative.

Morck, Yeung, and Yu (2000) find that the magnitude of private information contained in stock prices is greater for firms in countries with strong legal protection, which suggests that the stock prices of these firms are more informative than those of firms in countries with weak legal protection. Moreover, firms in countries with strong legal protection are more likely to replace poor-performing CEOs (DeFond and Hung (2004)) and provide more informative earnings announcements (DeFond, Hung, and Trezevant (2007)) than their counterparts in countries with weak legal protection.

Taken together, the evidence on stock prices indicates that they should reflect investment opportunities better and managers should more efficiently allocate their capital to investment projects in countries with strong legal protection than in countries with weak legal protection.[5] Based on the learning hypothesis suggested by Dow and Gorton (1997), Subrahmanyam and Titman (1999) and Chen, Goldstein, and Jiang (2007), among others, and the empirical findings by Morck, Yeung, and Yu (2000) and DeFond, Hung, and Trezevant (2007), we argue that firms in countries with strong legal protection of investors should have investments that are more responsive to stock prices than their counterpart firms in countries with weak legal protection.[6] The above discussions lead to our first hypothesis:

[5] A related paper by Love (2003) documents that financial development helps to overcome the financing constraints faced in corporate investment decisions. Shleifer and Wolfenzon (2002) further discuss how an increase in legal protection will mitigate the problem of the limited pledgeability of cash flows.

[6] Hartzell, Sun, and Titman (2006) derive the same implications on the effect between corporate governance and the investments of REITs. Specifically, they hypothesize that REITs with more effective firm-level governance mechanisms (such as higher institutional ownership and lower insider ownership) should have investment spending

Hypothesis 1: *Firms in countries with strong legal protection of investors have higher investment-stock price sensitivities than do firms in countries with weak legal protection of investors*.

B. Equity Dependence, the Stock Market, and Corporate Investments

Baker, Stein, and Wurgler (2003) extend the model by Stein (1996) and derive implications on the role of the equity-financing channel in corporate investments. They argue that stock market irrationality is unlikely to affect the investment decisions of nonequity-dependent firms (those with sufficient liquidity and no debt). In contrast, equity-dependent firms will not want to go to the external market to issue equity when their stocks are undervalued, despite their need to raise funds for investments. The opposite occurs in the case of overvaluation in that equity-dependent firms are now willing to issue equity to finance their investments under such circumstances. Therefore, equity-dependent firms have investments that are more sensitive to variations in the non-fundamental component of stock prices than do nonequity-dependent firms.

Baker, Stein, and Wurgler (2003) use a modified *KZ* index first constructed by Kaplan and Zingales (1997) as a measure of equity dependence to examine the effect of equity dependence on the relationship between corporate investments and stock prices.[7] They define a firm as equity dependent if the firm's stock price is undervalued and its available capital is low enough that it has to issue undervalued equity to achieve the first-best level of investments. Our hypothesis on the effect of equity dependence and the investment-stock price sensitivity follows theirs. Specifically, we expect that the sensitivity of corporate investments to stock prices is higher for

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that is more directly related to changes in the average stock prices (Tobin's *Q*) of REITs in their respective property sectors.

[7] The original *KZ* index also includes Tobin's *Q*. The original *KZ* index has been widely used to measure the degree of financial constraints or equity dependence. For example, Lamont, Polk, and Saa-Requejo (2001) use the original *KZ* index to examine the impact of financial constraints on stock returns.

equity-dependent firms than for nonequity-dependent firms, which leads to our second hypothesis:

Hypothesis 2: *Equity-dependent firms have higher investment-stock price sensitivities than do nonequity-dependent firms*.

C. Legal Protection, Equity Dependence, the Stock Market, and Corporate Investments

In their concluding remarks, Baker, Stein, and Wurgler (2003) suggest that the presence of agency conflicts increases the incentives of managers of nonequity-dependent firms to smooth investments and that the equity-financing channel ought to mitigate managers' inefficient investment behaviors. Wurgler (2000) demonstrates that financial markets play an important role in the efficient allocation of capital. Moreover, Almeida and Wolfenzon (2005) develop a model to show that both investor protection and equity dependence affect the efficiency of capital allocation. In the absence of financial constraints and an adequate level of investor protection, managers tend to keep average projects. Therefore, corporate investments of these nonequity-dependent firms in countries with weak investor protection may not be responsive to stock prices.

When the level of investor protection increases, outside investors demand that managers terminate projects with low productivity and switch to those with high productivity. The presence of financial constraints further requires that managers commit to terminate average projects. Such actions would free up useful resources that would be channeled to more productive projects. Therefore, by considering the effects of both legal protection and equity dependence discussed above and in Hypotheses 1 and 2, we posit that the positive relationship between legal protection and the investment-stock price sensitivity should be more pronounced for equity-dependent firms than for nonequity-dependent firms, which leads to our final hypothesis as follows:

Hypothesis 3: *The effect of legal protection on the investment-stock price sensitivity is more pronounced for equity-dependent firms than for nonequity-dependent firms*.

II. Data and Sample Statistics

We collect two sets of data. The first dataset includes measures of legal protection of investors at the country level. We measure legal protection of investors based on the following four indices from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) and La Porta, Lopez-de-Silanes, and Shleifer (2006): (1) anti-director rights, (2) private enforcement, (3) public enforcement, and (4) investor protection.

The second dataset consists of firm-level financial data. We obtain our firm-level data from Worldscope and Datastream, which are provided by Thomson Financial. After excluding the U.S., we manage to retrieve firm-level data for 43 out of the 49 countries covered by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). For each firm, we collect financial variables that include capital expenditures, cash flow, cash balances, cash dividends, total debt, total assets, and book value of equity from Worldscope and market value of equity from Datastream. From the initial sample, we exclude firms with missing firm-year observations, firms operating in the financial industry (firms with SIC codes between 6000 and 6999), and firms with book values of total assets of less than US$10 million.[8] Overall, our filtering process yields an unbalanced panel of 110,882 firm-year observations for 17,009 firms from 43 countries. The sample period is from 1985 to 2004. The second column of Table I reports the total firm-year observations for each

[8] We use the exchange rates from Datastream to convert the book value of total assets from local currencies to U.S. dollars.

country in the final sample. Japan and the United Kingdom dominate the sample, each with more than 17,000 firm-year observations.

[Insert Table I here]

A. Country-Level Legal Protection Variables

Our first country-level variable, the anti-director rights index (*ANTIDIR*), has been widely used in many studies as a proxy for the effectiveness of corporate governance or legal protection of investors for a country. It is constructed by adding one to each of the six rights that are intended to measure the degree of minority shareholders' involvement in corporate decisions. It ranges from 0 to 6 with a higher value indicating a stronger degree of legal protection. *ANTIDIR* is taken from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998).

The second to fourth legal protection variables are taken directly from the work of La Porta, Lopez-de-Silanes, and Shleifer (2006).[9] The private enforcement index (*PRIENF*) is constructed by taking an arithmetic average of the disclosure requirements and liability standards indices. It ranges from 0 to 1. A higher value on this index suggests more effective private enforcement of securities laws. The disclosure requirements index captures regulations on the information that must be disclosed in an IPO transaction. The liability standards index measures the procedural difficulty in recovering losses from directors, distributors, and accountants. In sum, the private enforcement index measures the costs that investors need to incur to recover losses from corporate insiders, distributors of securities, and accountants.

The public enforcement index (*PUBENF*) is constructed by taking an arithmetic average of the supervisor characteristics, rule-making power, investigative powers, orders, and criminal

[9] See La Porta, Lopez-de-Silanes, and Shleifer (2006) for a more complete explanation on the various components that make up the private and public enforcement indices.

indices. It ranges from 0 to 1, with a higher value signifying more effective enforcement of securities laws by the regulators. The supervisor characteristics index captures three aspects of supervisors (the regulatory agency or official in charge of the securities market): its independence, its criteria for dismissal, and its focus on the securities markets. The rule-making power index measures the power of the supervisor in regulating equity-issuances and/or listing rules on the exchanges. The investigative power index measures the power of the supervisor in gathering the necessary documents and the ability to subpoena witness testimony in the case of litigation. The orders index measures the power of the supervisor in imposing sanctions on issuers, distributors, and accountants for non-criminal violations of securities laws. The criminal index measures the power to enforce sanctions for criminal violations of securities laws. In sum, the public enforcement index measures the power of the capital market supervisory agency in regulating and enforcing the securities laws.

Finally, the investor protection index (*INVPRT*) is the principal component of the disclosure requirements, liability standards, and anti-director rights indices. In addition to the four legal protection measures, we also use the legal origin variable (*LO*). La Porta et al. (1998) have shown that the countries with common-law-based legal systems offer stronger legal protection to investors than do countries with other legal traditions. For convenience, we use a dummy variable that equals one for English common-law-based countries and zero for French, German, or Scandinavian civil-law-based countries.

From the third column of Table I, we observe that there is wide variation in the legal origin of countries in our sample. The majority of countries in the Asia Pacific (9 out of 14) and Africa (2 out of 3) adopt the English common-law-based system. In contrast, the French civil-law-based system is followed in South America and most of the countries in Western Europe (8 out of 18).

The fourth to seventh columns of Table I provide the statistics on *ANTIDIR*, *PRIENF*, *PUBENF*, and *INVPRT*, respectively. *ANTIDIR* ranges from 0 to 4, *PRIENF* ranges from 0.18 (Austria) to 0.96 (Canada), *PUBENF* ranges from 0 (Japan) to 0.90 (Australia), and *INVPRT* ranges from 0 (Germany) to 0.96 (Canada). Consistent with the finding by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), we also document that there exists a positive correlation between a country's legal origin and the *ANTIDIR* score, with common-law-based countries reporting higher *ANTIDIR* scores than civil-law-based countries reported. This is consistent with the notion that common-law-based countries in general provide stronger legal protection to investors than do civil-law-based countries.

B. Firm-Level Financial Variables

For each firm, *i*, our measure of corporate investments in year *t* ($CAPX_{it}$) is calculated as capital expenditures in year *t* divided by total assets at the end of year *t*-1. Cash flow (CF_{it}) is calculated as income before extraordinary items plus depreciation and amortization in year *t* divided by total assets at the end of year *t*-1. Finally, our measure of stock prices, Tobin's *Q* (Q_{it}), is calculated as the market value of equity (the stock price multiplied by the number of shares outstanding) plus total assets minus the book value of equity divided by total assets at the end of year *t*. We winsorize all financial variables at the 1st and 99th percentile levels to minimize the outlier problem.

Kaplan and Zingales (1997) construct the original five-variable *KZ* index on a sample of 49 low-dividend manufacturing firms in the U.S. as a measure of financial constraints. They estimate the following regression equation to construct the *KZ* index for each firm-year observation:

$$KZ_{it} = -1.002CF_{it} - 39.368DIV_{it} - 1.315CASH_{it} + 3.139LEV_{it} + 0.283Q_{it}, \quad (1)$$

where KZ_{it} is the *KZ* score for firm *i* in year *t*. $CASH_{it}$ is cash balances and is calculated as cash balances at the end of year *t* divided by total assets at the end of year *t*-1. LEV_{it} is leverage and is calculated as the sum of long-term debt and debt in current liabilities divided by the sum of long-term debt, debt in current liabilities, and the book value of equity (all measured at the end of year *t*). DIV_{it} is dividends and is calculated as cash dividends paid in year *t* divided by total assets at the end of year *t*-1. CF_{it} and Q_{it} are cash flow and Tobin's *Q* in year *t* as defined earlier.

Baker, Stein, and Wurgler (2003) argue that Tobin's *Q* captures information about stock mispricing and is often used as a proxy for investment opportunities. To avoid this dual role for *Q*, Baker, Stein, and Wurgler use a modified four-component version of the *KZ* index that omits *Q* in the baseline specification as follows:

$$KZ_{it} = -1.002CF_{it} - 39.368DIV_{it} - 1.315CASH_{it} + 3.139LEV_{it}, \quad (2)$$

Firms with higher modified *KZ* scores are considered to be more equity dependent or more reliant on external equity financing for their investment projects.

One concern about the original or modified *KZ* index is that it is originally constructed for a small sample of manufacturing firms in the U.S., which might not be applicable for our sample of international firms. In order to alleviate this possible bias, we construct our version of the modified *KZ* index (called the adjusted *KZ* index) as follows. For each country, we reset the weights of each component of the index in equation (2) such that each variable contributes equally to the total variance of the index. Since each country will have different weights on the components of the index, the adjusted *KZ* index should be a better measure of equity dependence in our international sample.[10] Besides the adjusted *KZ* index, we also use firm size (*SIZE*) computed as the natural logarithm of total assets and a dummy variable to represent dividend-paying firms (*DIVD*) as our measures of equity dependence.[11]

Panel A of Table II presents the summary statistics of the financial variables. The mean (median) corporate investment measure ($CAPX_t$) across the 43 sample countries is 7.5 (4.7) percent. The value for our international sample is slightly lower compared with the mean (median) of 8.2 (6.0) percent reported by Baker, Stein, and Wurgler (2003) on a sample of U.S. firms. The mean (median) cash flow (CF_t) is 7.7 (7.8) percent; the mean (median) Tobin's *Q* (Q_t) is 1.4 (1.1); the mean (median) adjusted *KZ* index is 0.01 (0.3); and the mean (median) *SIZE* is 12.5 (11.3). Seventy-four percent of our sample firms are dividend-paying firms

Additionally, we present Pearson correlations among the financial variables and the legal protection measures in Panel B of Table II.[12] The cross-correlations between the financial variables and the legal protection variables are generally negative (16 out of 24), with magnitudes ranging from -0.32 to 0.14. The correlations between corporate investment and Tobin's *Q* and cash flow are both positive and significant at the one-percent level, which is consistent with the evidence reported in the literature. Finally, the correlations among the four legal protection variables are all in the expected direction (positive) with magnitudes ranging from 0.38 to 0.81.

[Insert Table II here]

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[10] Baker, Stein, and Wurgler (2003) also use the same approach in one of their robustness tests and find that the main results are not influenced by the weights attached to each component of the modified *KZ* index.
[11] Note that we first winsorize the components of the adjusted *KZ* index at the 1st and 99th percentile before estimating the index. We use the four-component adjusted *KZ* index in our subsequent empirical tests. However, in our unreported tests, we obtain similar results when we use the original five-component adjusted *KZ* index.
[12] The country-median values of financial variables are used to compute the correlation coefficients.

III. Empirical Results and Discussions

In this section, we empirically examine (i) if the legal protection of investors affects the investment-stock price sensitivity, (ii) if the empirical evidence found in U.S. firms on the relationship between equity dependence and corporate investment (Baker, Stein, and Wurgler (2003)) can be extended to international markets, and (iii) if equity dependence has any impact on the effect of legal protection of investors on corporate investment. Our research design closely follows that of Baker, Stein, and Wurgler (2003).

A. The Role of Legal Protection of Investors on the Investment-Stock Price Sensitivity

Following Fazzari, Hubbard, and Petersen (1988) and Baker, Stein, and Wurgler (2003), we estimate the following baseline investment equation for our international sample:

$$CAPX_{it} = a_o + bQ_{it-1} + fCF_{it} + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} b_t Year_t + u_{it}\,, \qquad (3)$$

where $CAPX_{it}$ is the corporate investment of firm i in year t, Q_{it-1} is firm i's Tobin's Q in year t-1, and CF_{it} is its cash flow in year t. These variables are as defined earlier. Regression coefficients of b and f measure the sensitivity of corporate investments to stock prices and to cash flow, respectively.

Since our measures of legal protection are country-specific variables, we use a country random-effects generalized least squares (GLS) model to estimate equation (3) for our panel data. We include industry (b_j) and year (b_t) dummies to control for industry and year effects. We follow Fama and French (1997) in classifying our international firms into 44 industries. The u_{it} is an error term that is assumed to be independent of the explanatory variables. To mitigate the problems of serial auto-correlation and heteroskedasticity, we estimate White's heteroskedasticity-corrected robust standard errors.

Column (1) of Table III presents the regression coefficients for the baseline investment equation (3). We find that both regression coefficients of *b* and *f* are positive and statistically significant at the one-percent level. The finding for our international sample corroborates the prevailing general results that corporate investments are positively correlated to both stock prices and cash flow.

Our next task is to test the role of the learning channel in the investment-stock price sensitivity. Morck, Yeung, and Yu (2000) and DeFond, Hung, and Trezevant (2007) find that stock prices and earnings of firms in countries with strong legal protection of investors, respectively, reflect a greater magnitude of private information than do those of firms in countries with weak legal protection. Therefore, in this paper, we use the legal protection of investors as our measure of the information embedded in stock prices from which managers can learn. To test Hypothesis 1, we modify equation (3) to include our measures of legal protection as follows:

$$\begin{aligned} CAPX_{it} &= a_o + bQ_{it-1} + c(Q_{it-1} \times LEGAL_i) + dLEGAL_i \\ &\quad + fCF_{it} + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} b_t Year_t + u_{it}, \end{aligned} \tag{4}$$

where $LEGAL_i$ is one of the measures of legal protection of investors for firm *i*. Note that firms from the same country will have the same value of *LEGAL*. The other variables are as defined previously. The coefficient of interest in this case is the coefficient on the interaction term, *c*. Hypothesis 1 predicts that *c* is positive. In other words, we posit that the legal protection of investors increases the sensitivity of corporate investments to stock prices.

We estimate equation (4) by including the interaction of each of the four measures of legal protection (*ANTIDIR*, *PRIENF*, *PUBENF*, and *INVPRT*) with Tobin's *Q* as an additional independent variable.[13] The results of the country random-effects regressions are reported in Columns (2) to (5) of Table III. Although the *b* coefficients (on *Q*) in Columns (2) to (5) are smaller in magnitude when compared with the *b* coefficient in Column (1), they continue to be positive and statistically significant at the one-percent level. The magnitudes of the *f* coefficients (on *CF*) are also stable across Columns (2) to (5). In addition, *LEGAL* (i.e., the coefficient *d*) is negatively and significantly associated with corporate investments in three of the four models, which suggests that firms in countries with strong legal protection tend to undertake fewer investment projects than do firms in countries with weak legal protection.

More importantly, we find that the coefficient of the interaction term, *c*, is positive and significant at the one-percent level in all four models (with *t*-statistics of 6.32, 7.52, 7.52, and 7.55, respectively), which is supportive of Hypothesis 1 (i.e., the learning channel argument). Moreover, the economic significance of the result is quite substantial. A one standard deviation increase in *ANTIDIR* increases the investment-stock price sensitivity by about 22 percent. Similarly, a one standard deviation increase in *INVPRT* leads to about a 61 percent increase in the investment-stock price sensitivity.[14]

Since legal origin is correlated with the legal protection variables, we replace *LEGAL* with the legal origin dummy (*LO*), which equals zero in civil-law-based countries and one in common-law-based countries, and re-estimate equation (4). As shown in Column (6), the result is consistent with the earlier specifications given that the coefficient of the interaction term is significant with the expected positive sign. In fact, firms in countries with English common-law-

[13] Note that except for *ANTIDIR* and *LO*, the other measures of legal protection have been standardized to the range of between 0 and 5 in all the regression specifications.
[14] For *ANTIDIR*, the increase in the sensitivity of corporate investment to stock price is [(1.31×0.002)/0.005]×100 =52%. For *INVPRT*, the value is [(1.22×0.002)/0.0004]×100=61%.

based traditions display substantially higher investment-stock price sensitivities by about 64 percent than do firms in countries with civil-law-based traditions.[15]

Since La Porta et al. (2006) report that *INVPRT* can explain about 70 percent of all variations in the components of *PRIENF* and *ANTIDIR*, we use *INVPRT* as our representative measure of legal protection in the subsequent tables.[16] We further include the interaction term between *INVPRT* and *CF* as an additional explanatory variable and estimate equation (5) below:

$$CAPX_{it} = a_o + bQ_{it-1} + c(Q_{it-1} \times INVPRT_i) + dINVPRT_i + fCF_{it} + g(CF_{it} \times INVPRT_i) + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} b_t Year_t + u_{it}. \qquad (5)$$

We present the estimation results of equation (5) in Column (7) of Table III. The coefficient of the interaction term between *INVPRT* and *Q* still displays a positive association with corporate investments. Although it is not the focus of our paper, we find that the coefficient of the interaction term between *INVPRT* and *CF* is negative and significant at the one-percent level. Our interpretation is that firms in countries with strong legal protection face fewer constraints in raising external capital to finance their investment projects than firms in countries with weak legal protection (Levine (2005)) and that strong legal protection helps to overcome the information asymmetry between managers and outside shareholders (Myers and Majluf (1984)).[17] Hence, corporate investments of firms in countries with strong legal protection are not so much affected by liquidity constraints, resulting in these firms exhibiting smaller investment-cash flow sensitivities than firms in countries with weak legal protection.

[Insert Table III here]

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[15] The increase in the investment-stock price sensitivity is (0.005/0.008)×100 = 63%.

[16] We find that the results are consistent for the other legal protection measures and they are available upon request.

[17] A related paper by Love (2003) documents that financial development helps to overcome the financing constraints faced in corporate investment decisions. Shleifer and Wolfenzon (2002) further discuss how an increase in legal protection will mitigate the problem of the limited pledgeability of cash flows.

B. The Role of Legal Protection in the Investment-Stock Price Sensitivity: Sensitivity Analysis

In this section, we perform a series of sensitivity tests to examine if our results are robust to alternative specifications. Our main regression specification is based on our unbalanced panel data and, as such, our results can be influenced by within-industry effects as well as cross-time effects. We attempt to address these issues in two ways. In the first test, we adopt the Fama-MacBeth (1973) approach in estimating equation (5) for each year and report the means and standard errors of the coefficient estimates of the cross-sectional regressions in Column (1) of Table IV. Although the coefficient on investor protection, *d*, becomes insignificant and the sign of the coefficient on *Q*, *b*, changes to negative (and significant), we observe that our main result on the coefficient of the interaction term, *c*, remains intact since it continues to be positive and significant (*t*-statistic = 5.10) at the one-percent level. Examining the results of the cross-sectional regressions further reveals that the coefficient of the interaction term, *c*, is significantly positive in 13 out of the 20 years of our sample period.

In the second test, following Wurgler (2000) and Rajan and Zingales (1998), we examine if our results can also hold at the industry level. For each country, we compute the equally weighted yearly mean values of all our explanatory variables across all firms within each industry. We then re-estimate equation (5) using the country random-effects model with industry and year dummies and present the results in Column (2) of Table IV. We observe that the main result persists even at the industry level. That is, the coefficient of the interaction term, *c*, is significantly positive.

Next, we exclude Japan and the United Kingdom from our sample to check if our results hold after dropping observations from these two countries that dominate our sample. The results are reported in Column (3) of Table IV. We show that the coefficient of the interaction term, *c*, remains positive and significant (t-statistic = 6.84) at the one-percent level. Therefore, our main finding is not driven by observations from these two countries with the most firm-year observations.

In the above analysis, the legal protection measures are taken to be constant for the entire sample period. However, a recent study by Pagano and Volpin (2005) documents that anti-director rights have evolved in the past decade due to legal reforms. By relying on questionnaire answers by respondents including legal experts and business practitioners, Pagano and Volpin (2005) manage to compile a list of updated anti-director rights for 47 out of the original 49 countries in La Porta, Lopez-de-Silanes, Shleifer, and Vishny's (1998) survey for the period from 1993 to 2002. We combine the original anti-director rights variable for the period from 1985 to 1992 with the updated anti-director rights variable for the period from 1993 to 2004 and rename it as the "new anti-directors rights index" (*NEW_ANTIDIR*).[18] We then replace *ANTIDIR* with *NEW_ANTIDIR* to re-estimate equation (5). As shown in Column (4) of Table IV, our results are robust regardless of whether we use the original or the updated anti-director rights.

Stock prices of firms with greater earnings management should be less informative and firms in countries with weak investor protection are more likely to be subject to greater earnings management. To test the robustness of our investor protection measure, we replace the *INVPRT* index in Equation (5) with the earnings management index (*EMGMT*) constructed by Leuz, Nanda, and Wysocki (2003). Unlike the other measures of legal protection, a higher score on the index implies that firms in a specific country are more prone to earnings management, indicating that legal protection is likely to be low for that country. Therefore, our prediction is that the coefficient, c, should be negative and the coefficient, g, should be positive. We find that the results (unreported) are consistent with our prediction. Firms in countries with a high *EMGMT*

[18] We thank Marco Pagano for providing us with the updated anti-director rights data.

score, which are more likely to engage in earnings manipulation, have investments that are less (more) sensitive to stock prices (cash flow) than their counterparts in countries with a low *EMGMT* score have.

We also acknowledge that our regression specification might suffer from a potential endogeneity problem for a couple of reasons. First, La Porta, Lopez-de-Silanes, and Shleifer (2006) document that investor protection matters for financial development, which implies that our measure of legal protection (*INVPRT*) could be endogenous. Second, several papers have questioned the use of Tobin's *Q* as a proxy for investment opportunities since *Q* cannot be measured without errors.[19] We employ instrumental variables as a partial means to address these concerns. We follow La Porta, Lopez-de-Silanes, and Shleifer (2006) by using the legal origin dummy, the efficiency of the judiciary score, and the natural logarithm of *GDP* per capita as instruments for *INVPRT*. Likewise, we use the lagged one- and two-period *Q* values, the legal origin dummy, and other financial variables as instruments for *Q*. We then obtain the predicted values of *INVPRT* and *Q* from the first-stage regressions.

Subsequently, we examine whether or not our main results are influenced by the level of capital market development. We use the external market capitalization measure (computed as the ratio of stock market capitalization held by small shareholders to gross domestic product and obtained from La Porta, Lopez-de-Silanes, and Shleifer (2006)) as a proxy for the level of financial development of a country's capital market (*DEV*). We then include *DEV* and the predicted *INVPRT* as well as their interactions with both the predicted *Q* and *CF* as additional control variables to re-estimate equation (5). We present the results in Column (5) of Table IV. The results indicate that the interaction-term coefficient between the predicted *INVPRT* and the

[19] For example, *Q* is also commonly used as a measure of firm valuation and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2002) have found that firms in countries with stronger legal protection tend to have higher valueation than their counterparts in countries with weaker legal protection do.

predicted *Q* remains positive and significant (*t*-statistic = 2.99) at the one-percent level. Thus, the legal protection of investors increases the investment-stock price sensitivity, even after accounting for the level of capital market development and addressing the endogeneity of *Q* and *INVPRT*.

A recent paper by Bekaert, Harvey, Lundblad, and Siegel (2007) introduces several exogenous measures of a country's growth opportunities. They find that these measures can help to predict future investments. Bekaert et al. (2007; p. 1082) further comment that "such a measure should prove useful in numerous empirical studies seeking to avoid endogeneity problems". We replace *Q* with two of their measures, local growth opportunities (*LGO*) and global growth opportunities (*GGO*), and interact them with *INVPRT* and re-estimate equation (5).[20] The results in Columns (6) and (7) of Table IV suggest that the use of these exogenous measures of growth opportunities do not alter our main results. Both interaction-term coefficients of *LGO* and *GGO* with *INVPRT* are positive and significant at the one-percent level (with *t*-statistics of 4.40 and 3.49, respectively).

Finally, we replace *Q* by ΔQ (i.e., the change in *Q*), which is calculated as the change between contemporaneous *Q* and lagged one-period *Q* and re-estimate equation (5). The result in Column (8) of Table IV shows that the coefficient on the interaction term between ΔQ and *INVPRT* remains positive and significant.

[Insert Table IV here]

[20] See Bekaert, Harvey, Lundblad, and Siegel (2007) for details on the construction of the exogenous measures of country growth opportunities. We thank Stephan Siegel for providing us with the monthly data. The data are only available for 40 out of our 43 sample countries.

To summarize, our findings so far highlight the important role that legal protection plays in the relationship between corporate investments and stock prices.[21] In general, firms in countries with strong legal protection of investors have higher investment-stock price sensitivities than do firms in countries with weak legal protection.

C. The Role of Equity Dependence on the Investment-Stock Price Sensitivity

After establishing that legal protection matters in the sensitivity of a firm's corporate investments to stock prices, we now explore the role of the equity-financing channel. As elaborated earlier, we use the adjusted *KZ* index, firm size (*SIZE*), and a dividend dummy (*DIVD*) as our measures of equity dependence to test Hypotheses 2 and 3. It is noted that the degree of equity dependence increases (decreases) with the adjusted *KZ* (*SIZE*) scores. Similarly, we also classify those firms that do not pay dividends (*DIVD* = 0) as being equity-dependent.

We first assign firms to quintile portfolios where Quintile 1 represents the portfolio of firms in the bottom 20% of the adjusted *KZ* and *SIZE* scores. Correspondingly, Quintile 5 represents the portfolio of firms in the top 20% of the adjusted *KZ* and *SIZE* scores. Following Baker, Stein, and Wurgler (2003), the assignment of firms is based on the firm's median-adjusted *KZ* and *SIZE* scores over the whole sample period.[22]

We then estimate the baseline investment equation (3) separately for each *KZ* or *SIZE* quintile portfolio. As before, we use a country random-effects model that controls for industry and year effects, with White's heteroskedasticity-corrected robust standard errors. Hypothesis 2 predicts that the coefficient, *b*, (on Tobin's *Q*) increases with *KZ* quintiles and decreases with

[21] In our unreported tests, we have also estimated several other specifications such as including lagged values of *CAPX* to account for the possibility that a firm's investment often occurs with a lag (Lamont (2000)), excluding *Q* or including Q^2 in the specification, removing all non-manufacturing firms (SIC codes between 3000 and 4000), and dividing our sample into two sub-periods (1985 to 1994 and 1995 to 2004). The results are robust to these additional controls.

[22] Alternatively, we assign firms based on the firm-year adjusted *KZ* and *SIZE* scores and obtain similar results.

SIZE quintiles and *DIVD*. In other words, we posit that the investment-stock price sensitivity should increase with the degree of equity dependence.

Panels A and B of Table V present the estimation results of equation (3) for Quintile 1 to Quintile 5 portfolios formed using the adjusted *KZ* and *SIZE* scores, respectively, and Panel C presents the results based on *DIVD*. We observe that the coefficient, *b*, (on *Q*) increases (decreases) from 0.003 (0.013) in the bottom *KZ* (*SIZE*) quintile to 0.023 (-0.002) in the top *KZ* (*SIZE*) quintile. Meanwhile, the coefficient, *f*, (on *CF*) does not appear to follow any meaningful pattern. Likewise, the coefficient, *b*, (on *Q*) decreases from 0.018 for firms that do not pay dividends (*DIVD* = 0) to 0.000 for those that pay dividends (*DIVD* = 1). Hence, firms classified as equity dependent display larger investment-stock price sensitivities than do firms that are classified as nonequity dependent. These empirical results are consistent with Hypothesis 2 and extend the findings by Baker, Stein, and Wurgler (2003) into an international sample. Thus, we interpret our result as supportive of the equity-financing channel as a potential explanation for the positive relationship between corporate investments and stock prices among international firms.

[Insert Table V here]

In terms of economic significance, a one standard deviation change in Tobin's *Q* changes corporate investment by 0.3 to 2 percentage points.[23] The economic effect is quite sizeable, considering that the median corporate investment over the whole sample period is 4.7 percent. This analysis further suggests that the effect of stock prices on corporate investments outweighs the effect of cash flow for firms in the top *KZ* quintile (those that are considered to be the most

[23] For firms in the bottom *KZ* quintile, the change in corporate investment is (0.858×0.003)×100 = 0.3%. Correspondingly, for firms in the top adjusted *KZ* quintile, the value is (0.858×0.023)×100 = 2%.

dependent on external equity).[24] This finding is again similar to that found by Baker, Stein, and Wurgler (2003) in a sample of U.S. firms.

D. The Role of Equity Dependence on the Investment-Stock Price Sensitivity: Sensitivity Analysis

An alternative specification to test Hypothesis 2 is to estimate the following equation country-by-country:

$$CAPX_{it} = a_o + bQ_{it-1} + c(Q_{it-1} \times KZ_{it}) + dKZ_{it} + fCF_{it} + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} b_t Year_t + u_{it}, \quad (6)$$

where KZ_{it} is the adjusted *KZ* score for firm *i* at time *t*. The other variables are defined previously. The coefficient of interest in this case is *c*. We expect *c* to be positive. That is, corporate investments are more sensitive to stock prices for equity-dependent firms than for nonequity-dependent firms.

We include the interaction of *Q* with *KZ*, *SIZE*, or *DIVD* as an additional regressor and estimate equation (6) for each country using the fixed-effects model that controls for industry and year effects and White's heteroskedasticity-corrected robust standard errors, clustered by industry.[25] Panel A of Table VI presents the results for the country-by-country analysis. As shown in Column (1) for *KZ*, the regressions yield positive coefficients for *c* (on *Q*×*KZ*) in 38 out of 42 countries and, among them, the coefficients for 24 countries are significant at the ten-percent level or better.[26] We find similar results for *DIVD* in Column (3). The regression coefficients for *c* are negative in 34 out of 42 countries and, among them, the coefficients for 19

[24] For firms in the top *KZ* quintile, the effect of a one standard deviation change in cash flow on corporate investment is (0.116×0.107)×100 = 1.2%.
[25] Since this is a country-by-country regression, we follow Baker, Stein, and Wurgler (2003) and use the fixed-effects model rather than the random-effects model.
[26] Zimbabwe is deleted because of too few observations for the fixed effect regressions.

countries are significant at least at the ten-percent level. However, the results for *SIZE* in Column (3) are much weaker than those with *KZ* or *DIVD*. Only half of the regression coefficients for *c* are negative and, among them, only 10 are significant at the ten-percent level or better. In Panel B of Table VI, we observe that the results are very robust in that all regression coefficients, *c*, are highly significant with the predicted signs when we adopt the Fama-MacBeth (1973) approach as well as for emerging, developed, and European countries; excluding Japan and UK, for manufacturing firms, and for both sub-periods (1985 to 1994 and 1995 to 2004).

[Insert Table VI here]

E. The Roles of Legal Protection of Investors and Equity Dependence

To explore the interaction between legal protection and equity dependence on the investment-stock price sensitivity, we estimate the following equation separately for portfolios formed using *KZ*, *SIZE*, or *DIVD:*

$$CAPX_{it} = a_o + bQ_{it-1} + c(Q_{it-1} \times INVPRT_i) + dINVPRT_i + fCF_{it} + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} b_t Year_t + u_{it}. \quad (7)$$

We present the estimation results using the country random-effects model in Panels A to C of Table VII. For portfolios of firms based on *KZ*, we observe that the regression coefficient, *b*, (on *Q*) continues to display the same monotonically increasing pattern with the *KZ* quintiles as demonstrated in Table V with *b* increasing from -0.001 for the bottom *KZ* quintile to 0.018 for the top *KZ* quintile. The coefficient, *b*, is also statistically significant at least at the one-percent level for every *KZ* quintile, except for Quintile 1. The results from *SIZE* and *DIVD* portfolios are consistent with those reported earlier in that the coefficient, *b*, decreases from the smallest firms to the largest firms or from firms that do not pay dividends to firms that pay dividends.

The coefficient of the interaction term, *c*, (on *Q*×*INVPRT*) is perhaps of more interest in this case. We detect that the coefficient, *c*, increases from 0.001 for the bottom *KZ* quintile to 0.004 for the second largest *KZ* quintile, before dropping back to 0.002 for the top *KZ* quintile. All interaction terms are positive and statistically significant at the one-percent level. In addition, we also find that the coefficient, *c*, is only significant for firms in *SIZE* Quintiles 1 and 3 and for those firms that do not pay dividends (*DIVD* = 0). In general, our results appear to be consistent with Hypothesis 3 that the effect of legal protection on the investment-stock price sensitivity is more significant for firms that are classified as equity dependent. [27]

Next, we estimate the following equation using the whole sample:

$$\begin{aligned} CAPX_{it} = a_o &+ bQ_{it-1} + c(Q_{it-1} \times INVPRT_i) + d(Q_{it-1} \times INVPRT_i \times ED_{it}) \\ &+ eCF_{it} + f(CF_{it} \times INVPRT_i) + g(CF_{it} \times INVPRT_i \times ED_{it}) \\ &+ hINVPRT_i + kED_{it} + \sum_{j=1}^{44} b_j Industry_i^j + \sum_{t=1}^{20} b_t Year_t + u_{it}, \end{aligned} \tag{8}$$

where ED_{it} is one of the measures of equity dependence for firm *i* in year *t*. The coefficient of interest is *d*. Hypothesis 3 predicts that *d* is positive when *ED* = *KZ* and negative when *ED* = *SIZE* or *DIVD*. Explicitly, the positive relationship between legal protection and the investment-stock price sensitivity should be more pronounced for equity-dependent firms than for nonequity-dependent firms. We estimate equation (8) using the country random-effects model and report the results in Panel D of Table VII. Columns (1) to (3) present the results using *KZ*, *SIZE*, and *DIVD*, respectively.

We find that even after controlling for the effect of legal protection, the coefficient of the interaction term on *Q*×*INVPRT*×*ED*, *d*, is positive (negative) and significant at the one-percent

[27] In contrast, Chen, Jiang, and Goldstein (2007) find that the magnitude of the interaction term between their measures of price informativeness and Tobin's *Q* is larger in the bottom *KZ* quintile than that in the top *KZ* quintile, which suggests that managers of financially unconstrained firms have more flexibility in responding to the changes in information in market prices when making corporate investment decisions.

level for *ED* = *KZ* (*SIZE* and *DIVD*), which is consistent with the prediction of Hypothesis 3. That is, equity-dependent firms in countries with strong legal protection exhibit higher investment-stock price sensitivities than do nonequity-dependent firms in countries with weak legal protection. The signs and significance levels of other control variables are similar to those found in the previous tables. Furthermore, we also find that the coefficient of the interaction term on *CF*×*INVPRT*×*ED*, *g*, is negative (positive) and significant for *ED* = *KZ* (*SIZE* and *DIVD*).[28]

[Insert Table VII here]

F. The Roles of Legal Protection of Investors and Equity Dependence: Sensitivity Analysis

Finally, we repeat the sensitivity tests on the roles of legal protection and investor protection in corporate investments similar to those conducted previously in Table IV. For the sake of brevity, we report only the results for the coefficients of the interaction terms, *c* and *d*, in Table VIII.[29] We find that both coefficients display the expected signs and are highly significant in all the specifications, providing additional support for Hypothesis 3. Taken together, our empirical tests provide fresh evidence that both legal protection and equity dependence are important determinants of the investment-stock price sensitivity.

[Insert Table VIII here]

IV. Conclusion

We examine the effects of legal protection and equity dependence on the sensitivity of corporate investments to stock prices in an international sample that covers 43 countries. We find

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[28] In addition, we use *INVPRT* and each of our measures of equity dependence to perform a two-way sort and obtain four subsamples of firms. In our unreported results, we find that equity-dependent firms in countries with strong legal protection display the largest investment-stock price sensitivity, while nonequity-dependent firms in countries with weak legal protection countries display the smallest sensitivity. These results are consistent with the prediction of our Hypothesis 3.

[29] The results for the other coefficients are essentially unchanged from the previous table.

that firms in countries with strong legal protection of investors display higher investment-stock price sensitivities than do firms in countries with weak legal protection. The results are consistent with the learning channel argument as suggested by Chen, Goldstein, and Jiang (2007) that stock prices are more informative and managers can learn from their firms' stock prices in making investment decisions in countries with strong legal protection of investors. In addition, the effect of stock prices on investments increases with the degree of equity dependence, which is consistent with the equity-financing channel argument suggested by Baker, Stein, and Wurgler (2003). By examining the interplay of these two effects, we observe that the positive relationship between legal protection and the investment-stock price sensitivity is more pronounced for equity-dependent firms than for nonequity-dependent firms.

By understanding that the legal environment affects both capital market development and the investment-stock price sensitivity, regulatory agencies can facilitate efficiencies in capital allocation by choosing the appropriate level of shareholder rights and enforcement of securities laws afforded to minority shareholders. Subsequently, minority shareholders' rights and securities laws influence managers' investment decisions by serving as effective mechanisms to restrain managers, particularly managers of equity-dependent firms, from engaging in firm value-destroying activities. As a conclusion, we provide corroborating evidence that helps to explain the cross-country determinants of corporate investment decisions. In addition, by using the investment-stock price sensitivity as a measure of the efficiency of capital allocation as argued by Baker, Stein, and Wurgler (2003), we have shown that the learning and equity-financing channels interact with each other, with the objective of attaining more efficient allocation of capital to investment projects.

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Table I
Legal Protection Variables

This table presents the legal protection variables for our sample. *LO* refers to the legal origin of the company law or commercial code of each country and is taken from La Porta et al. (1998). *ANTIDIR* is an index of shareholder protection also taken from La Porta et al. (1998). *PRIVENF* is an index calculated as the average of the disclosure requirements and liability standards indices from La Porta et al. (2006). *PUBENF* is an index calculated as the average of the supervisor characteristics, rule-making power, investigative powers, orders and criminal indices also from La Porta et al. (2006). *INVPRT is* the investor protection index, which is the principal component of the disclosure requirements, liability standards, and anti-director rights indices from La Porta et al. (2006). The sample consists of 43 countries and covers the period from 1985 to 2004.

Country	Firm-year observations	LO (3)	ANTIDIR (4)	PRIVENF (5)	PUBENF (6)	INVPRT (7)
Argentina	366	French	4	0.36	0.58	0.48
Australia	4,221	English	4	0.71	0.90	0.78
Austria	834	German	2	0.18	0.17	0.10
Belgium	1,104	French	0	0.43	0.15	0.07
Brazil	1,664	French	3	0.29	0.58	0.44
Canada	7,034	English	5	0.96	0.80	0.96
Chile	952	French	5	0.46	0.60	0.61
Colombia	179	French	3	0.26	0.58	0.35
Denmark	1,665	Scandinavian	2	0.57	0.37	0.36
Egypt	21	French	2	0.36	0.30	0.20
Finland	1,235	Scandinavian	3	0.58	0.32	0.47
France	6,530	French	3	0.49	0.77	0.47
Germany	5,450	German	1	0.21	0.22	0.00
Greece	271	French	2	0.41	0.32	0.32
Hong Kong	3,565	English	5	0.79	0.87	0.85
India	2,163	English	5	0.79	0.67	0.77
Indonesia	1,382	French	2	0.58	0.62	0.51
Ireland	768	English	4	0.55	0.37	0.48
Israel	287	English	3	0.66	0.63	0.59
Italy	2,289	French	1	0.44	0.48	0.20
Japan	19,005	German	4	0.71	0.00	0.42
Malaysia	4,166	English	4	0.79	0.77	0.36
Mexico	925	French	1	0.35	0.35	0.10
Netherlands	2,123	French	2	0.69	0.47	0.54
New Zealand	651	English	4	0.55	0.33	0.73
Norway	1,381	Scandinavian	4	0.48	0.32	0.44
Pakistan	546	English	5	0.48	0.58	0.46
Peru	290	French	3	0.50	0.78	0.66
Philippines	699	French	3	0.92	0.83	0.63
Portugal	544	French	3	0.54	0.58	0.57
Singapore	2,426	English	4	0.83	0.87	0.81
South Africa	2,577	English	5	0.75	0.25	0.60

Table I - Continued

Country	Firm-Year Observations	LO (3)	ANTIDIR (4)	PRIVENF (5)	PUBENF (6)	INVPRT (7)
South Korea	3,859	German	2	0.71	0.25	0.77
Spain	1,480	French	4	0.58	0.33	0.55
Sri Lanka	90	English	3	0.57	0.43	0.40
Sweden	2,053	Scandinavian	3	0.43	0.50	0.39
Switzerland	2,062	German	2	0.55	0.33	0.30
Taiwan	2,712	German	3	0.71	0.52	0.55
Thailand	2,176	English	2	0.57	0.72	0.37
Turkey	679	French	2	0.36	0.63	0.34
United Kingdom	17,559	English	5	0.75	0.68	0.78
Venezuela	91	French	1	0.19	0.55	0.22
Zimbabwe	8	English	3	0.47	0.42	0.42

Table II
Univariate Analysis

Panel A presents the summary statistics of the financial variables. $CAPX_t$ is a measure of investments and is calculated as capital expenditures in year t divided by total assets at the end of year t-1. Q_{t-1} is Tobin's Q and is calculated as the market value of equity plus total assets minus total equity at the end of year t-1. CF_t is cash flow and is calculated as income before extraordinary items plus depreciation and amortization in year t divided by total assets at the end of year t-1. *KZ* is the adjusted *KZ* index such that each component contributes equally to the total variance of the index. *SIZE* is calculated as the book value of total assets (in US dollars). *DIVD* is a dummy variable that equals 1 for dividend-paying firms and 0 otherwise. All financial variables are winsorized at the 1st and 99th percentiles. Panel B presents the Pearson correlation matrix between the country-median financial variables and the legal protection variables. The sample period is from 1985 to 2004. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively. .

Panel A: Summary statistics								
Variable	N	Mean	Median	Std Dev	Min	Max	1st Quartile	3rd Quartile
$CAPX_t$	110,082	0.075	0.047	0.092	0.000	0.578	0.021	0.091
Q_{t-1}	110,082	1.393	1.140	0.858	0.474	6.008	0.929	1.527
CF_t	110,082	0.077	0.078	0.116	-0.405	0.453	0.034	0.130
KZ	110,882	0.008	0.265	2.582	-8.217	6.131	-1.357	1.640
SIZE	110,082	12.461	12.298	1.743	9.211	19.407	11.159	13.578
DIVD	110,882	0.735	1	0.442	0	1	0	1

Panel B: Correlation matrix									
	$CAPX_t$	Q_{t-1}	CF_t	*KZ*	*SIZE*	*DIVD*	*ANTIDIR*	*PRIVENF*	*PUBENF*
Q_{t-1}	0.496[c]	1.000							
CF_t	0.555[c]	0.252[a]	1.000						
KZ	0.103	-0.276[a]	0.234	1.000					
SIZE	-0.050	-0.052	-0.031[b]	-0.420[c]	1.000				
DIVD	0.199	0.052	0.195	-0.057	0.020	1.000			
ANTIDIR	-0.070	0.078	-0.084	0.107	-0.230	0.008	1.000		
PRIVENF	-0.214	0.137	-0.296[b]	0.080	-0.260[a]	-0.308[b]	0.548[c]	1.000	
PUBENF	-0.198	-0.141	-0.085	0.077	-0.318[b]	-0.171	0.375[c]	0.396[c]	
INVPRT	-0.160	0.012	-0.182	0.150	-0.325[b]	-0.206	0.810[c]	0.802[c]	0.710[c]

Table III
The Role of Legal Protection in the Investment-Stock Price Sensitivity

This table presents the coefficients of random-effects investment regressions. The dependent variable is $CAPX_t$. $CAPX_t$ is a measure of investments and is calculated as capital expenditures in year *t* divided by total assets at the end of year *t*-1. Q_{t-1} is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity at the end of year *t*-1 CF_t is cash flow and is calculated as income before extraordinary items plus depreciation and amortization in year *t* divided by total assets at the end of year *t*-1. *ANTIDIR* is an index of shareholder protection also taken from La Porta et al. (1998). *PRIVENF* is an index calculated as the average of the disclosure requirements and liability standards indices from La Porta et al. (2006). *PUBENF* is an index calculated as the average of the supervisor characteristics, rule-making power, investigative powers, orders and criminal indices also from La Porta et al. (2006). *INVPRT is* the investor protection index, which is the principal component of the disclosure requirements, liability standards, and anti-director rights indices from La Porta et al. (2006). *LO* refers to the legal origin of the company law or commercial code of each country and is taken from La Porta et al. (1998). All the legal protection variables (except *ANTIDIR* and *LO*) have been normalized to between 0 and 5. Standard errors are reported in parentheses and are heteroskedasticially robust. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Variables	(1)	(2) *ANTIDIR*	(3) *PRIVENF*	(4) *PUBENF*	(5) *INVPRT*	(6) *LO*	(7) *INVPRT*
Q_{t-1}	0.011[c]	0.005[c]	0.000	0.005[c]	0.004[c]	0.008[c]	0.003[b]
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CF_t	0.183[c]	0.183[c]	0.182[c]	0.182[c]	0.183[c]	0.183[c]	0.267[c]
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)
LEGAL		-0.004[c]	-0.007[c]	0.001	-0.002[c]	-0.005[c]	-0.001
		(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
$Q_{t-1} \times LEGAL$		0.002[c]	0.003[c]	0.002[c]	0.002[c]	0.005[c]	0.003[c]
		(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
$CF_t \times LEGAL$							-0.027[c]
							(0.003)
Industry and Year dummies included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.175	0.176	0.176	0.178	0.176	0.176	0.178
Number of observations	110,082	110,082	110,082	110,082	110,082	110,082	110,082

Table IV
The Role of Legal Protection in the Investment-Stock Price Sensitivity: Sensitivity Analysis

This table presents the coefficients of random-effect investment regressions. The dependent variable is $CAPX_t$. $CAPX_t$ is a measure of investments and is calculated as capital expenditures in year t divided by total assets at the end of year t-1. Q_{t-1} is Tobin's Q and is calculated as the market value of equity plus total assets minus total equity at the end of year t-1. ΔQ_t is calculated as the change between Q_t and Q_{t-1}. CF_t is cash flow and is calculated as income before extraordinary items plus depreciation and amortization in year t divided by total assets at the end of year t-1. *INVPRT is* the investor protection index, which is the principal component of the disclosure requirements, liability standards, and anti-director rights indices from La Porta et al. (2006). *NEW_ANTIDIR* is the updated anti-director rights index from Pagano and Volpin (2005). *DEV* is a measure of financial development from La Porta et al. (2006). *LGO* (*GGO*) is the exogenous local (global) country growth opportunity measure from Bekaert et al. (2007). Standard errors are reported in parentheses and are heteroskedasticially robust. ^{a}, ^{b}, ^{c} denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Q_{t-1}	-0.007^{c}	0.004^{c}	0.004^{c}	0.003^{c}	-0.002			
	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)			
ΔQ_t								-0.009^{c}
								(0.001)
LGO						-0.024^{c}		
						(0.002)		
GGO							-0.028^{c}	
							(0.005)	
CF_t	0.421^{c}	0.419^{c}	0.245^{c}	0.270^{c}	0.392^{c}	0.266^{c}	0.277^{c}	0.278^{c}
	(0.046)	(0.031)	(0.011)	(0.014)	(0.020)	(0.010)	(0.010)	(0.010)
INVPRT	-0.001	0.002	-0.002^{c}		0.004^{c}	-0.008^{c}	-0.013^{c}	0.003^{c}
	(0.001)	(0.002)	(0.001)		(0.001)	(0.003)	(0.005)	(0.001)
Q_{t-1} × *INVPRT*	0.005^{c}	0.003^{c}	0.002^{c}		0.003^{c}			
	(0.001)	(0.001)	(0.000)		(0.001)			
ΔQ_t × *INVPRT*								0.004^{c}
								(0.000)
LGO × *INVPRT*						0.004^{c}		
						(0.001)		
GGO × *INVPRT*							0.005^{c}	
							(0.002)	
CF_{t-1} × *INVPRT*	-0.053^{c}	-0.049^{c}	-0.020^{c}		-0.063^{c}	-0.023^{c}	-0.025^{c}	-0.027^{c}
	(0.010)	(0.010)	(0.003)		(0.008)	(0.003)	(0.003)	(0.003)
NEW_ANTIDIR				-0.002^{c}				
				(0.000)				
Q_{t-1} × *NEW_ANTIDIR*				0.002^{c}				
				(0.000)				
CF_{t-1} × *NEW_ANTIDIR*				-0.022^{c}				
				(0.003)				
DEV					-0.009^{c}			
					(0.002)			
Q_{t-1} × *DEV*					0.001			
					(0.001)			
CF_{t-1} × *DEV*					-0.037^{c}			
					(0.012)			
Industry and Year dummies included		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square		0.211	0.162	0.176	0.185	0.171	0.166	0.173
Number of observations		16,522	73,518	110,882	110,882	103,450	103,515	110,882

Table V
The Role of Equity Dependence in the Investment-Stock Price Sensitivity

Panels A, B, and C present the coefficients of random-effects investment regressions for each quintile portfolio formed according to the firm-median *KZ* score, *SIZE,* and *DIVD* respectively. The dependent variable is $CAPX_t$. $CAPX_t$ is a measure of investments and is calculated as capital expenditures in year *t* divided by total assets at the end of year *t*-1. Q_{t-1} is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity at the end of year *t*-1. CF_t is cash flow and is calculated as income before extraordinary items plus depreciation and amortization in year *t* divided by total assets at the end of year *t*-1. *KZ* is the adjusted *KZ* index such that each component contributes equally to the total variance of the index. *SIZE* is calculated as the book value of total assets (in US dollars). *DIVD* is a dummy variable that equals 1 for dividend-paying firms and 0 otherwise. *Q*1 to *Q*5 refer to *KZ* (*SIZE*) quintiles 1 to 5. Standard errors are reported in parentheses and are heteroskedasticially robust. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Results from investment regressions using *KZ*					
Variables	*Q*1	*Q*2	*Q*3	*Q*4	*Q*5
Q_{t-1}	0.003[c]	0.015[c]	0.018[c]	0.022[c]	0.023[c]
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CF_t	0.259[c]	0.252[c]	0.269[c]	0.224[c]	0.107[c]
	(0.010)	(0.010)	(0.012)	(0.012)	(0.008)
Industry and Year dummies included	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.190	0.223	0.247	0.177	0.149
Number of observations	22,018	22,030	22,010	22,014	22,010

Panel B: Results from investment regressions using *SIZE*					
Variables	*Q*1	*Q*2	*Q*3	*Q*4	*Q*5
Q_{t-1}	0.013[c]	0.011[c]	0.009[c]	0.003[c]	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CF_t	0.100[c]	0.175[c]	0.249[C]	0.284[c]	0.406[c]
	(0.005)	(0.008)	(0.011)	(0.013)	(0.019)
Industry and Year dummies included	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.138	0.195	0.232	0.209	0.262
Number of observations	22,025	22,020	22,009	22,013	22,015

Panel C: Results from investment regressions using *DIVD*		
Variables	*DIVD=0*	*DIVD=1*
Q_{t-1}	0.018[c]	-0.000
	(0.001)	(0.000)
CF_t	0.107[c]	0.346[c]
	(0.006)	(0.006)
Industry and Year dummies included	Yes	Yes
Adjusted R-square	0.217	0.205
Number of observations	29,224	80,858

Table VI
The Role of Equity Dependence in the Investment-Stock Price Sensitivity: Sensitivity Analysis

This table presents the regression coefficients of the interaction terms between *Q* and the measures of equity dependence (*ED*) from the fixed-effects investment regressions. Panel A presents the results for each country and Panel B presents the results for sub-samples. The dependent variable is $CAPX_t$. $CAPX_t$ is a measure of investments and is calculated as capital expenditures in year *t* divided by total assets at the end of year *t*-1. *KZ* is the adjusted *KZ* index such that each component contributes equally to the total variance of the index. *SIZE* is calculated as the book value of total assets (in US dollars). *DIVD* is a dummy variable that equals 1 for dividend-paying firms and 0 otherwise. Standard errors are reported in parentheses and are heteroskedasticially robust. The sample consists of 43 countries. The sample period is from 1985 to 2004. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Country-by-country analysis						
	(1)		(2)		(3)	
Country	$Q_{t-1} \times KZ$		$Q_{t-1} \times SIZE$		$Q_{t-1} \times DIVD$	
Argentina	0.000	(0.002)	0.004	(0.003)	-0.031[c]	(0.011)
Australia	0.003[c]	(0.001)	-0.002	(0.002)	-0.014[b]	(0.006)
Austria	0.007[c]	(0.001)	0.004	(0.004)	-0.020	(0.012)
Belgium	0.003[b]	(0.001)	-0.002	(0.002)	-0.025[c]	(0.009)
Brazil	0.000	(0.002)	0.004	(0.003)	0.007	(0.019)
Canada	0.003[c]	(0.001)	-0.002	(0.002)	-0.016[b]	(0.008)
Chile	0.006[c]	(0.003)	-0.002	(0.004)	-0.016	(0.027)
Colombia	0.005[b]	(0.002)	0.016[c]	(0.005)	-0.003	(0.048)
Denmark	0.002	(0.001)	-0.005[c]	(0.002)	-0.022[b]	(0.009)
Egypt	-0.043	(0.044)	-0.200	(0.122)	-0.287[b]	(0.117)
Finland	0.002	(0.001)	-0.006[c]	(0.002)	-0.002	(0.008)
France	0.003[c]	(0.001)	-0.004[c]	(0.001)	-0.017[b]	(0.005)
Germany	0.002[b]	(0.001)	-0.003[c]	(0.001)	-0.014[b]	(0.003)
Greece	0.000	(0.001)	0.004	(0.006)	0.022	(0.017)
Hong Kong	0.002[c]	(0.001)	-0.001	(0.001)	-0.011[a]	(0.007)
India	0.001	(0.001)	0.000	(0.001)	-0.012	(0.007)
Indonesia	0.001	(0.001)	0.002	(0.002)	-0.003	(0.008)
Ireland	0.001	(0.003)	-0.003	(0.004)	-0.003	(0.015)
Israel	0.003	(0.003)	0.001	(0.002)	0.034[b]	(0.015)
Italy	0.002[a]	(0.001)	0.000	(0.001)	-0.017	(0.012)
Japan	0.002[c]	(0.000)	-0.002[c]	(0.000)	-0.007[b]	(0.003)
Korea	0.000	(0.001)	0.004[c]	(0.001)	0.007	(0.008)
Malaysia	0.001[b]	(0.001)	0.000	(0.001)	-0.010[a]	(0.005)
Mexico	0.003[b]	(0.001)	-0.002	(0.003)	-0.005	(0.012)
Netherlands	0.003[c]	(0.001)	0.001	(0.001)	-0.029[c]	(0.005)
New Zealand	0.009[c]	(0.003)	-0.010[a]	(0.006)	-0.038	(0.023)
Norway	0.004[b]	(0.002)	0.000	(0.003)	-0.006	(0.012)
Pakistan	0.005[c]	(0.002)	0.011[a]	(0.006)	-0.041[c]	(0.013)
Peru	-0.002	(0.003)	0.005	(0.005)	0.005	(0.018)
Philippines	-0.001	(0.003)	0.008[c]	(0.003)	0.008	(0.011)
Portugal	0.000	(0.001)	0.011[c]	(0.003)	-0.018	(0.009)
Singapore	0.003[b]	(0.001)	-0.004[c]	(0.001)	-0.015[a]	(0.008)
South Africa	0.003[c]	(0.001)	0.000	(0.001)	-0.019[c]	(0.005)
Spain	0.002	(0.002)	-0.002	(0.002)	-0.010	(0.007)
Sri Lanka	0.017	(0.011)	-0.025[b]	(0.010)	-0.115[c]	(0.038)
Sweden	0.002[c]	(0.001)	-0.001	(0.001)	-0.013[c]	(0.004)

Table VI - Continued

Country	(1) $Q_{t-1} \times KZ$		(2) $Q_{t-1} \times SIZE$		(3) $Q_{t-1} \times DIVD$	
Switzerland	0.002[b]	(0.001)	-0.003[b]	(0.001)	-0.002	(0.006)
Taiwan	0.004[c]	(0.001)	-0.001	(0.002)	-0.014[c]	(0.005)
Thailand	0.003[b]	(0.001)	0.002	(0.002)	-0.006	(0.011)
Turkey	-0.002	(0.002)	0.005[b]	(0.003)	0.006	(0.012)
United Kingdom	0.002[c]	(0.000)	-0.002[c]	(0.001)	-0.015[c]	(0.004)
Venezuela	0.001	(0.009)	0.014	(0.023)	0.042	(0.125)
Panel B: Sub-sample analysis						
Fama-MacBeth approach	0.004[c]	(0.001)	-0.004[c]	(0.001)	-0.024[c]	(0.004)
Emerging countries	0.001[c]	(0.000)	-0.002[c]	(0.001)	-0.018[c]	(0.002)
Developed countries	0.003[c]	(0.000)	-0.002[c]	(0.000)	-0.017[c]	(0.001)
EU countries	0.003[c]	(0.000)	-0.002[c]	(0.000)	-0.016[c]	(0.001)
Exclude Japan and UK	0.003[c]	(0.000)	-0.002[c]	(0.000)	-0.019[c]	(0.001)
Manufacturing firms	0.003[c]	(0.000)	-0.004[c]	(0.000)	-0.016[c]	(0.001)
1985 to 1994	0.006[c]	(0.000)	-0.005[c]	(0.001)	-0.030[c]	(0.004)
1995 to 2004	0.002[c]	(0.000)	-0.001[c]	(0.000)	-0.016[c]	(0.001)

Table VII
The Role of Legal Protection and Equity Dependence in the Investment-Stock Price Sensitivity

Panels A, B and C present the coefficients of random-effects investment regressions for each quintile portfolio formed according to the firm-median *KZ* score and *SIZE,* and *DIVD* respectively. Panel D presents the results for the whole sample. The dependent variable is $CAPX_t$. $CAPX_t$ is a measure of investments and is calculated as capital expenditures in year *t* divided by total assets at the end of year *t*-1. Q_{t-1} is Tobin's *Q* and is calculated as the market value of equity plus total assets minus total equity at the end of year *t*-1. CF_t is cash flow and is calculated as income before extraordinary items plus depreciation and amortization in year *t* divided by total assets at the end of year *t*-1. *KZ* is the adjusted *KZ* index such that each component contributes equally to the total variance of the index. *SIZE* is calculated as the book value of total assets (in US dollars). *DIVD* is a dummy variable that equals 1 for dividend-paying firms and 0 otherwise. *Q*1 to *Q*5 refer to *KZ* (*SIZE*) quintiles 1 to 5. Standard errors are reported in parentheses and are heteroskedasticially robust. [a], [b], [c] denote statistical significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Results from investment regressions using *KZ*					
Variables	*Q*1	*Q*2	*Q*3	*Q*4	*Q*5
Q_{t-1}	-0.001	0.006[c]	0.008[c]	0.008[c]	0.018[c]
	(0.001)	(0.002)	(0.001)	(0.003)	(0.003)
$Q_{t-1} \times INVPRT$	0.001[c]	0.003[c]	0.003[c]	0.004[c]	0.002[c]
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Industry and Year dummies included	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.191	0.224	0.249	0.179	0.151
Number of observations	22,018	22,030	22,010	22,014	22,010
Panel B: Results from investment regressions using *SIZE*					
Variables	*Q*1	*Q*2	*Q*3	*Q*4	*Q*5
Q_{t-1}	0.008[c]	0.010[c]	0.007[c]	0.004[b]	-0.003[b]
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Q_{t-1} \times INVPRT$	0.002[c]	0.000	0.001[c]	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry and Year dummies included	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.140	0.195	0.233	0.209	0.262
Number of observations	22,025	22,020	22,009	22,013	22,015

Panel C: Results from investment regressions using *DIVD*		
Variables	*DIVD=0*	*DIVD=1*
Q_{t-1}	0.011[c]	-0.000
	(0.002)	(0.001)
$Q_{t-1} \times INVPRT$	0.002[c]	0.000
	(0.000)	(0.000)
Industry and Year dummies included	Yes	Yes
Adjusted R-square	0.220	0.205
Number of observations	29,224	80,858

Table VII - Continued

Panel D: Whole sample			
Variables	(1) ED_t = *KZ*	(2) ED_t = *SIZE*	(3) ED_t = *DIVD*
$Q_{t\text{-}1}$	0.005[c]	0.004[c]	0.007[c]
	(0.001)	(0.001)	(0.001)
CF_t	0.294[c]	0.241[c]	0.240[c]
	(0.011)	(0.010)	(0.010)
ED_t	0.001[c]	-0.002[c]	0.001
	(0.000)	(0.000)	(0.001)
INVPRT	-0.004[c]	-0.001[c]	-0.000
	(0.000)	(0.000)	(0.000)
$Q_{t\text{-}1} \times INVPRT$	0.004[c]	0.010[c]	0.004[c]
	(0.000)	(0.001)	(0.000)
$CF_{t\text{-}1} \times INVPRT$	-0.013[c]	-0.174[c]	-0.029[c]
	(0.003)	(0.010)	(0.003)
$Q_{t\text{-}1} \times INVPRT \times ED_t$	0.001[c]	-0.001[c]	-0.006[c]
	(0.000)	(0.000)	(0.000)
$CF_{t\text{-}1} \times INVPRT \times ED_t$	-0.006[c]	0.014[c]	0.051[c]
	(0.000)	(0.001)	(0.003)
Industry and Year dummies included	Yes	Yes	Yes
Adjusted R-square	0.196	0.186	0.194
Number of observations	110,082	110,082	110,082

Table VIII
The Role of Equity Dependence and Legal Protection in
The Investment-Stock Price Sensitivity: Sensitivity Analysis

This table presents the coefficients of the interactions among *Q*, the investor protection index (*INVPRT*) and the measures of equity dependence (*ED*) from the random-effects investment regressions. The dependent variable is $CAPX_t$. $CAPX_t$ is a measure of investments and is calculated as capital expenditures in year *t* divided by total assets at the end of year *t*-1. *KZ* is the adjusted *KZ* index such that each component contributes equally to the total variance of the index. *SIZE* is calculated as the book value of total assets (in US dollars). *DIVD* is a dummy variable that equals 1 for dividend-paying firms and 0 otherwise. ΔQ_t is calculated as the change between Q_t and Q_{t-1}, *NEW_ANTIDIR* is the updated anti-director rights index from Pagano and Volpin (2005). *LGO* (*GGO*) is the exogenous local (global) growth opportunity measure from Bekaert et al. (2007). Standard errors are reported in parentheses and are heteroskedasticially robust. [a], [b], [c] denote significance at the 10%, 5%, and 1% levels, respectively.

Table VIII - Continued

	ED_t = KZ	ED_t = SIZE	ED_t = DIVD
1. *Fama-Macbeth approach*			
$Q_{t-1} \times INVPRT$	0.006[c]	0.015[c]	0.006[c]
	(0.001)	(0.002)	(0.001)
$Q_{t-1} \times INVPRT \times ED_t$	0.001[c]	-0.001[c]	-0.007[c]
	(0.000)	(0.000)	(0.001)
2. *Industry-level analysis*			
$Q_{t-1} \times INVPRT$	0.005[c]	0.020[c]	0.006[c]
	(0.001)	(0.003)	(0.001)
$Q_{t-1} \times INVPRT \times ED_t$	0.002[c]	-0.002[c]	-0.009[c]
	(0.000)	(0.000)	(0.001)
3. *Dropping Japan and UK*			
$Q_{t-1} \times INVPRT$	0.004[c]	0.010[c]	0.003[c]
	(0.000)	(0.001)	(0.000)
$Q_{t-1} \times INVPRT \times ED_t$	0.001[c]	-0.001[c]	-0.006[c]
	(0.000)	(0.000)	(0.000)
4. *Time-series anti-directors rights*			
$Q_{t-1} \times NEW\_ANTIDIR$	0.003[c]	0.005[c]	0.003[c]
	(0.000)	(0.001)	(0.000)
$Q_{t-1} \times NEW\_ANTIDIR \times ED_t$	0.001[c]	-0.000[c]	-0.004[c]
	(0.000)	(0.000)	(0.000)
5. *Accounting for financial development and using instrumental variables for INVPRT and Q*			
$Q_{t-1} \times INVPRT$	0.004[c]	0.003[b]	0.004[c]
	(0.001)	(0.001)	(0.001)
$Q_{t-1} \times INVPRT \times ED_t$	0.001[c]	-0.000	-0.006[c]
	(0.000)	(0.000)	(0.000)
6. *Exogenous local growth opportunity*			
$LGO_{t-1} \times INVPRT$	0.004[c]	0.012[c]	0.007[c]
	(0.001)	(0.002)	(0.001)
$LGO_{t-1} \times INVPRT \times ED_t$	0.000[a]	-0.001[c]	-0.005[c]
	(0.000)	(0.000)	(0.000)
7. *Exogenous global growth opportunity*			
$GGO_{t-1} \times INVPRT$	0.006[c]	0.014[c]	0.010[c]
	(0.002)	(0.002)	(0.002)
$GGO_{t-1} \times INVPRT \times ED_t$	0.000[a]	-0.001[c]	-0.005[c]
	(0.000)	(0.000)	(0.000)
8. ΔQ_t			
$\Delta Q_t \times INVPRT$	0.006[c]	0.038[c]	0.012[c]
	(0.000)	(0.003)	(0.001)
$\Delta Q_t \times INVPRT \times ED_t$	0.002[c]	-0.003[c]	-0.016[c]
	(0.000)	(0.000)	(0.001)