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Why Does the Law Matter? Investor Protection and Its Effects on Investment, Finance, and Growth

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ABSTRACT

Investor protection is associated with greater investment sensitivity to q and lower investment sensitivity to cash flow. Finance plays a role in causing these effects; in countries with strong investor protection, external finance increases more strongly with q, and declines more strongly with cash flow. We further find that q and cash flow sensitivities are associated with ex post investment efficiency; investment predicts growth and profits more strongly in countries with greater q sensitivities and lower cash flow sensitivities. The paper's findings are broadly consistent with investor protection promoting accurate share prices, reducing financial constraints, and encouraging efficient investment.

IN THIS PAPER, WE study how investor protection affects firm-level resource allocations. Our analyses center on two hypotheses. Our first hypothesis is that stock prices more strongly predict both investment and external finance in countries with stronger investor protection laws. Tobin (1969) shows in a frictionless setting that marginal q predicts real investment. In this framework high marginal q firms should, all else equal, also raise the most capital as these firms invest more. We use average q (q) as a proxy for marginal q, and test whether investment and external finance are more sensitive to q in countries with stronger investor protection laws.

We base our first hypothesis on three assumptions. First, we assume that investor protection laws encourage more accurate financial reporting (Leuz, Nanda, and Wysocki (2003)) and more arbitrage (Morck, Yeung, and Yu (2000)), both of which should result in stock prices that more accurately reflect fundamental values. Second, we assume that investor protections improve firms' access to external finance for value-enhancing projects (La Porta et al. (1997, 1998, 2000, and 2002) and La Porta, Lopez-de-Silanes, and Shleifer (2006)). Our third assumption is that, in countries with stronger investor protection

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laws, managers and controlling shareholders are less likely to expropriate the firm's resources and more likely to invest in projects that benefit shareholders (Wurgler (2000), Shleifer and Wolfenzon (2002), and Bekaert, Harvey, and Lundblad (2010)).

Our second hypothesis is that investment is less sensitive to cash flow, and external finance has negative sensitivity to cash flow, in countries with strong investor protection laws. In formulating this hypothesis we assume that, all else equal, low cash flow firms have greater need for external finance. If investor protection laws reduce the cost of external finance, then we should observe low cash flow firms issuing more shares and debt in countries with strong investor protection laws. If low cash flow firms can more easily raise capital in countries with strong investor protection, then investment should be less dependent on cash flow in these countries. This hypothesis stems from Fazzari, Hubbard, and Petersen (1988, 2000) and Hubbard (1998), who contend that investment sensitivity to cash flow should be lower for firms facing lower external financing costs.

We test these hypotheses in a sample of firms drawn from 44 countries during the period 1990 to 2007.[1] We use several different measures of investor protection from La Porta, Lopez-de-Silanes, and Shleifer (2006) and Djankov et al. (2008). These papers show that laws mandating disclosure and the private enforcement of these laws are important for financial development, so we use legal indices that capture these effects in our study. We find that q predicts investment, and that this relation is significantly stronger in countries with more investor protection. We also find that q predicts both share and debt issuance, and that these relations are stronger in countries with greater investor protection. These findings suggest that investment sensitivity to q is stronger in countries with greater investor protection in part because, in these countries, high q firms can more easily obtain external finance to fund their investments.

We find that cash flow has a positive relation with investment and that this relation weakens across countries as investor protection laws strengthen. This finding is consistent with less binding financial constraints in countries with stronger investor protection.[2] Share issuance has a negative relation with cash flow, and this relation becomes more negative as investor protection strengthens. The relation between cash flow and debt issuance also becomes negative as investor protection strengthens. These findings suggest that investment sensitivity to cash flow is lower in countries with strong investor protection because firms with good investment opportunities and limited internal financing raise capital and use the proceeds to invest.

[1] Our two hypotheses are consistent with the theoretical model in DeMarzo et al. (2010), which predicts that agency problems cause investment to be less sensitive to q, and more sensitive to past profits.

[2] This interpretation is consistent with the findings in Lins, Strickland, and Zenner (2005), who show that investment sensitivity to cash flow declines when firms from emerging markets cross-list on U.S. exchanges.

All of our tests control for real per capita GDP (*GDP*). We find that *GDP* also has a significant effect on the q and cash flow sensitivities. Like with investor protection, countries with higher *GDP* have significantly higher q sensitivities and significantly lower cash flow sensitivities. These results suggest that resources are allocated more efficiently and financial constraints are less binding in wealthier countries.[3] The fact that we get robust results for investor protection after controlling for *GDP* shows that the law has its own impact on efficiency and financial constraints that goes beyond what is captured in *GDP*.

To verify our interpretations, we test whether q and cash flow sensitivities are associated with ex post efficiency. We find that investment predicts greater growth and higher profits in countries with higher investment sensitivity to q and lower investment sensitivity to cash flow. These results are consistent with higher q sensitivity and lower cash flow sensitivity, reflecting greater investment efficiency and fewer financial constraints. We find the same effects with external finance; both share and debt issuance predict greater growth and higher profits in countries with higher share and debt issuance sensitivity to q and negative share and debt issuance sensitivity to cash flow.

We consider some alternative explanations for our findings. A literature that begins with Keynes (1936) contends that investment sensitivity to q can be caused by investor sentiment (captured in q) altering the cost of external finance.[4] Therefore, it could be the case that, in countries with stronger investor protection, investor sentiment exerts a stronger influence on share issuance and investment, and this is what causes investment sensitivity to q to vary with investor protection.[5] Although such investor sentiment effects may be present, our findings that investment and share issuance predict growth and profits more strongly in countries with higher q sensitivities are consistent with q sensitivities reflecting investment and share issuance in response to growth opportunities.

Our investment sensitivity to cash flow findings has an alternative explanation as well. A literature that begins with Poterba (1988) points out that, if q is estimated with error, then investment could be sensitive to cash flow because cash flow reflects growth opportunities.[6] Therefore, it could be the case that investment sensitivity to cash flow is higher in countries with low investor protection because q is measured more noisily in these countries and

[3] A number of nonfinancial factors could cause high *GDP* countries to have greater investment sensitivity to q. These include human capital complementarities, infrastructure complementarities, real costs of investment adjustments, time-to-build, and less-regulated good markets. We thank an anonymous referee for pointing this out to us.

[4] This framework is further developed in Fischer and Merton (1984), Morck, Shleifer, and Vishny (1990), Blanchard, Rhee, and Summers (1993), Stein (1996), and Baker, Stein, and Wurgler (2003).

[5] Mispricing is proposed as a motivation for share issuance in Loughran and Ritter (1995) and Baker and Wurgler (2002). Kim and Weisbach (2008) and Henderson, Jegadeesh, and Weisbach (2006) contend that mispricing plays an important role in firms' decisions to issue shares in international markets.

[6] The effects of measurement error in q and cash flow correlation with either growth opportunities or q are further studied in Erickson and Whited (2000), Povel and Raith (2001), Gomes (2001), Almeida and Campello (2002), and Alti (2003).

cash flow portends growth. Although we assume that q is measured more noisily in countries with poor investor protection, several of our findings contradict the idea that cash flow portends growth. First, as we explain above, across countries the relation between investment and subsequent growth weakens as investment sensitivity to cash flow increases, which is inconsistent with the conjecture that cash flow portends growth in high investment sensitivity to cash flow countries. Second, both share and debt issuance cash flow sensitivities are negative in countries with moderate and high levels of investor protection. This is inconsistent with the view that cash flow measures growth opportunities, because it is unlikely that securities issuance would be greatest when investment opportunities are weakest. Third, in the paper's Internet Appendix we report results with a cash flow measure that is orthogonal to lagged q, past 1-year stock returns, and past 3-year sales growth.[7] This orthogonal cash flow measure should be uncorrelated with growth opportunities, yet we get the same results with the orthogonal and regular cash flow measures, which again suggests that cash flow does not measure growth opportunities.

Our cash flow sensitivity findings build on the insights of Love (2003), who shows that investment is less sensitive to cash (holdings) in countries with greater financial development and stronger investor protection. In our sample, cash and cash flow have a negative correlation of -0.14, so these two variables capture different firm-attributes. In the Internet Appendix, we show that our findings do not change if cash-investor protection interactions are included in our regressions. In these regressions, the cash-investor protection interactions are rarely significant, suggesting that cash flow better reflects financing constraints than cash holdings. We think that cash flow is a better measure of financial constraints than cash holdings because of the evidence that firms choose their level of cash holdings; Opler et al. (1999) and Bates, Kahle, and Stulz (2009) show that firms with valuable growth opportunities and volatile cash flow choose to hold more cash due to precautionary motives.[8]

Our study further extends the financing constraints literature by showing that share issuance and debt issuance sensitivities to cash flow become increasingly negative as investor protection improves. Prior studies tend to focus on investment sensitivities, and then infer things about the use of external finance. Our ex post tests extend this literature as well. These tests show that, in countries with lower investment sensitivity to cash flow, investment leads to greater growth in revenue and profitability. This finding lends credibility to the argument that low investment sensitivity to cash flow reflects greater investment efficiency and fewer financial constraints.

[7] The Internet Appendix is available at the *Journal of Finance* website at http://www.afajof.org/supplements.asp.

[8] Another consideration with using cash in our setting is that Pinkowitz, Stulz, and Williamson (2006) and Kalcheva and Lins (2007) show that cash destroys firm value in countries with fewer investor protections, whereas the Love (2003) framework implies that cash is especially value enhancing in these countries.

The rest of our study is organized is follows. Section I describes our empirical framework, develops our hypotheses, discusses the related literature, and describes our sample. Section II discusses our empirical findings. Section III concludes the paper. Variables' descriptions are provided in the Appendix.

I. Hypotheses, Estimation, Related Studies, and Sample

A. Empirical Framework: Firm-Level Tests

The two hypotheses that we test in this paper can be described within our empirical framework. Our framework builds on a methodology used in Fazzari, Hubbard, and Petersen (1988), Baker, Stein, and Wurgler (2003), Rauh (2006), and others. We estimate linear relations between investment (I) (or external finance) and both lagged q and cash flow (CF).[9]

$$\frac{I_{i,t}}{A_{i,t-1}} = \alpha_i + \alpha_t + \alpha_{c,t} + \alpha_{l,t} + \beta_3 q_{i,t-1} + \beta_4 \frac{CF_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}. \quad (1)$$

The terms I and CF are scaled by lagged book value of assets (A). The variables α_i and α_t are firm and year fixed effects. The variables $\alpha_{c,t}$ and $\alpha_{I,t}$ are country-year and industry-year fixed effects. Our empirical tests revolve around equation (2), which is an augmented version of equation (1) in that it includes four interaction terms:

$$\begin{aligned}\frac{I_{i,t}}{A_{i,t-1}} = {} & \alpha_i + \alpha_t + \alpha_{c,t} + \alpha_{I,t} + \beta_3 q_{i,t-1} + \beta_4 \frac{CF_{i,t-1}}{A_{i,t-1}} + \beta_5 q_{i,t-1} \times P_c \\ & + \beta_6 \frac{CF_{i,t-1}}{A_{i,t-1}} \times P_c + \beta_7 q_{i,t-1} \times GDP_c + \beta_6 \frac{CF_{i,t-1}}{A_{i,t-1}} \times GDP_c + \varepsilon_{i,t}. \quad (2)\end{aligned}$$

Our primary hypotheses are tested with the P-interaction terms. The variable P is a country-level measure of either investor protection or a variable that more directly measures how easily firms can raise capital. In all of our tests, a higher value of P means either stronger investor protection or an easier environment to raise capital. Because P does not vary over time, and our regressions include firm fixed effects, we do not include P by itself in our regressions, as time-invariant measures have no explanatory power in a firm fixed effects framework. For the same reason, industry and country fixed effects are irrelevant in a firm fixed effects framework and therefore are not included in our regressions, although the variables $\alpha_{c,t}$ and $\alpha_{I,t}$ are included to control

[9] Tobin (1969) shows that marginal q should predict investment; however, marginal q is unobservable, and hence many studies use average q (q) as a proxy for marginal q (e.g., Brainard and Tobin (1968), von Furstenberg (1977), Fazzari, Hubbard, and Petersen (1988), Blanchard, Rhee, and Summers (1993), and Rauh (2006)). Hayashi (1982) shows that average q will differ from marginal q whenever average profit differs from marginal profit. Therefore, using q as a proxy for marginal q assumes that average profit and marginal profit are highly correlated. Discussions regarding when marginal q and average q differ can be found in Hayashi (1982), Barro (1990), and Blanchard, Rhee, and Summers (1993).

for country-year and industry-year shocks to investment or finance.[10] We include q and cash flow interactions with *GDP* (log of real GDP per capita) to control for other country-level effects. We estimate our standard errors by clustering on country, which is consistent with the recommendations of Petersen (2009).[11]

Alternatively, one can estimate cash flow sensitivities with Euler equations. Hubbard (1998) and Love (2003) contend that the primary advantage of using an Euler equation is that it does not include q in the model's estimation, so whether q is measured with error is not an issue. As we mention in the introduction, Poterba (1988) points out that, if q is measured with error and cash flow is correlated with growth opportunities, then cash flow could predict investment for reasons unrelated to financial constraints.

In this paper we study six sensitivities: investment, share issuance, and debt issuance sensitivity to q, and investment, share issuance, and debt issuance sensitivity to cash flow. The variable q is not included in an Euler equation, so the three q sensitivities cannot be tested with an Euler equation. As we explain in the Introduction, our share issuance and debt issuance sensitivity findings are inconsistent with cash flow measuring growth opportunities, so there is no clear advantage to using an Euler equation to estimate these coefficients. The investment sensitivity to cash flow coefficient could be tested with an Euler equation, but the primary benefit of doing so would be to avoid measurement error with q, and the findings in this study suggest that measurement error with q is not affecting our investment sensitivity to cash flow findings. For these reasons we chose to use the simpler and more transparent q-equation.

B. Empirical Framework: Country-Level Tests

We also conduct our analyses with country-level regressions. To conduct our country-level tests we first estimate q and *CF* coefficients for each country, and then, in a second-pass regression, the resulting q and *CF* coefficients are regressed on the different country-level measures of investor protection or stock market activity along with *GDP*. [12] Hence, the slope coefficients in the second-pass regressions estimate the marginal impacts of investor protection on the q and *CF* coefficients, just as the interactive coefficients in equation (2) do.[13]

[10] The inclusion of country-year and industry-year dummies limits us to testing for differences in sensitivities that are due only to firm-level shocks, while differences in sensitivities could also result from industry-level and country-level shocks. We get similar results with and without the industry-year and country-year dummies, which suggests that the law mainly helps facilitate the transmission of firm-specific information into prices. This finding is consistent with Morck, Yeung, and Yu (2000), who argue that the law increases the amount of firm-specific information in prices.

[11] We estimate our standard errors with additional clusters on either firm or time and find that statistical significance is not affected.

[12] In the Internet Appendix we report results with additional controls for capital stock, education, and average firm size and obtain similar findings.

[13] We also estimate country-level regressions in which we weight each observation by the log of the firm's market value in the first-pass regressions and obtain similar findings, which are reported in the paper's Internet Appendix.

Differences between the country-level and firm-level approaches come from the firm-level regressions giving equal weight to each firm, whereas the country-level regressions give equal weight to each country and therefore place more weight on firms from smaller countries.[14] Hence, a benefit of the country-level framework is that, because it equal weights each country, we can be confident that idiosyncratic aspects of the larger countries do not drive our results. A cost of the country-level approach is that it places more weight on firms from smaller countries.[15]

The firm-level regressions yield at least two additional advantages. First, the firm-level regressions described in equation (2) are more powerful than the country-level regressions, because we have many more firm-year observations in our sample (243,423) than we have countries (44). Second, the country-level regressions consist of estimating a slope coefficient in the first step that is used as the dependent variable in the second step. Pagan (1984) shows that regressions of slopes on explanatory variables can lead to generated-regressor problems; the firm-level regressions avoid this issue. We therefore have more confidence in the standard errors from our firm-level tests, although both methods should yield consistent parameter estimates (see Holderness (2009) for a detailed discussion regarding firm-level versus country-level analyses).

C. Tobin's q, Investment, and External Finance

Our first hypothesis is that β_5 is positive; that is, the relations between q and investment and q and external finance are stronger in countries with greater investor protection. This hypothesis is grounded within the traditional framework (e.g., Tobin (1969), von Furstenberg (1977), and Hayashi (1982)) regarding the relation between marginal q and investment. If investor protection laws are effective, and result in more accurate prices, better managerial incentives, and less financial constraints, then in the traditional q-framework the relations between q and investment and q and external finance should both strengthen with investor protection.

Our cross-country analyses with respect to investment and q are related to a line of research that begins with King and Levine (1993), who show that financial markets promote efficient resource allocation and economic growth. Beck, Levine, and Loayza (2000) show that financial development increases growth by increasing factor productivity, rather than capital accumulation. Bekaert

[14] In the Internet Appendix we report results where we weight each country by the inverse of the log of the country coefficient's standard error. This method, which places a larger weight on countries in which the first-pass coefficients are estimated with greater precision, produces similar findings to those reported in the paper.

[15] As an example, Sri Lanka has 226 firm-year observations, while the United States has 101,129, so when we use country-level regressions we give each Sri Lankan observation 447 times more weight than each U.S. observation. The country-level regressions are therefore biased towards the effects of firms from smaller countries.

et al. (2007) show that real investment is more efficient in liberalized financial markets. Bekaert, Harvey, and Lundblad (2010) show that equity market liberalization promotes growth more strongly in countries with stronger investor protection. Foley and Greenwood (2010) contend that ownership concentration falls faster after listing in countries with strong investor protection because firms are better able to raise capital to fund growth opportunities. A contemporaneous working paper by Kusnadi, Titman, and Wei (2009) finds that investment sensitivity to q increases with measures of market efficiency, which the authors interpret as evidence of managers inferring information from prices.

In another important paper in this literature, Wurgler (2000) studies investment efficiency with industry-level data and shows that countries that have a larger share of their investment allocated by financial markets have more efficient investment.[16] In contrast, our study uses firm-level data and compares the investments of publicly traded firms located in different legal environments. Hence, the question we ask is "Do individual, publicly traded firms allocate resources more efficiently if investor protection laws are stronger?," whereas the question that Wurgler (2000) asks is more in the spirit of "Do financial markets allocate resources more efficiently than non-market mechanisms?" Another important difference is that the majority of our tests directly study the allocations of share and debt issuance, whereas Wurgler (2000) limits his analyses to investment.

D. Cash Flow, Investment, and External Finance

Our second hypothesis is that β_6 is negative, or the relation between investment and cash flow is weaker, and the relation between external finance and cash flow is negative, in countries with greater investor protection. Like Fazzari, Hubbard, and Petersen (1988, 2000) and Hubbard (1998), we assume that investment sensitivity to cash flow reflects financial constraints.[17] We assume that low cash flow firms are more likely to need external funds, and that firms are more able to access external funds in countries with more investor protections, which should make investment sensitivity to cash flow lower in these places.

With respect to external finance, we expect that, within the full sample share, issuance has a negative relation with cash flow, because low cash flow firms need more finance. We expect this relation to become increasingly negative as investor protection improves, as firms can more easily issue shares to finance their investment needs. With respect to debt issuance, its expected relation

[16] Wurgler (2000) measures ex-ante investment efficiency by regressing investment growth on contemporaneous value-added growth, which is similar to regressing investment growth on cash flow growth. In contrast, we measure ex-ante efficiency by regressing investment on lagged q while controlling for cash flow. Another difference is that we estimate ex-post efficiency, and show that, in countries with higher investment-sensitivity to q, investment leads to greater growth in revenue and profits. Wurgler (2000) does not relate his efficiency measure to ex-post consequences.

[17] See Hubbard (1998) for a review of the investment sensitivity to cash flow literature.

with cash flow is less clear. On the one hand, low cash flow firms are more likely to need external finance, so low cash flow firms should be more likely to borrow. On the other hand, low cash flow firms are riskier to lend to, making it more costly for such firms to borrow. However, it should be less costly for low cash flow firms to borrow in countries with stronger investor protection, so we expect the relation between cash flow and debt to be weak or even negative in countries with stronger investor protection.

Kaplan and Zingales (1997) argue that the relation between investment sensitivity to cash flow and financing constraints is theoretically unclear, because it depends on rigid assumptions regarding the firm's production function. This criticism does not apply to our external finance regressions, which make up two-thirds of our sensitivity regressions, and are consistent with investment sensitivity to cash flow measures financing constraints. Fazzari, Hubbard, and Petersen (2000) argue that the Kaplan and Zingales (1997) analysis mischaracterizes the cash flow sensitivity literature, and contend that within the Kaplan and Zingales (1997) framework it can be shown that firms with greater financing costs have higher investment sensitivity to cash flow, although Kaplan and Zingales (2000) disagree. We delve deeper into these issues in the paper's Internet Appendix, and show that within the Kaplan and Zingales (1997, 2000) framework investment sensitivity to cash flow decreases with static measures of investor protection.

Our cash flow sensitivity tests are related to Demirguc-Kunt and Makismovic (1998), Levine and Zervos (1998), Rajan and Zingales (1998), Wurgler (2000), Love (2003), Khurana, Martin, and Periera (2006), and Becker and Sivadasan (2010). The findings in these papers suggest that firms face fewer financing constraints in countries with stronger investor protection laws and more developed financial markets. Several differences exist between our paper and these studies. First, as mentioned in the previous section, our paper focuses on the effects of investor protection on public firms. We do not include the size of financial markets in our tests as these other studies do, and in the Internet Appendix we show that such measures of financial development have no effect on our sensitivities if *GDP* is controlled for. A second difference is that none of these papers use external finance in their tests like we do. These papers infer things about external finance, but, to the best of our knowledge, our's is the only paper to test whether firms facing potential financial constraints are more likely to issue shares and debt in countries with stronger investor protection. A third difference is that we use ex post tests to verify our interpretations. We test whether investment and external finance predict faster growth and higher profits in countries with low investment sensitivity to cash flow and negative external finance sensitivity to cash flow. Such relations are consistent with investment sensitivity to cash flow reflecting financial constraints due to weak investor protection, but are not consistent with cash flow reflecting growth opportunities. We therefore help to resolve the question of what investment sensitivity to cash flow measures, a question that is not addressed by these other studies.

Table I
Sample Descriptive Statistics

This table reports summary statistics of the variables used in this study. The variables are defined in the Appendix.

Statistics	Investment	q	Log q	Cash Flow	Issue	Debt
Mean	0.094	2.492	0.396	0.063	0.166	0.340
Std. Dev	0.239	6.679	0.711	0.221	0.655	1.263
25th %ile	−0.008	0.980	−0.020	0.028	−0.003	−0.074
Median	0.035	1.260	0.231	0.082	0.007	0.056
75th %ile	0.120	1.876	0.629	0.147	0.063	0.282
N	298,531	269,100	269,096	274,747	266,596	304,088

E. Sample

Our initial sample comprises all of the firms in Worldscope during the years 1990 to 2007.[18] From Worldscope, we obtain accounting data and year-end share prices. For some of our tests we merge our Worldscope sample with stock return data from Datastream. We screen the Data stream data for coding errors via the methods of Ince and Porter (2006). Like Baker, Stein, and Wurgler (2003), we exclude financial firms and firms that do not have positive book values of equity. We winsorize each of the accounting variables at the top and bottom 1% to reduce the effects of outliers. Our variables are described in the Appendix at the end of the paper. Summary statistics are provided in Table I.

Our investor protection measures are from La Porta, Lopez-de-Silanes, and Shleifer (2006) and Djankov et al. (2008). We use five different measures of investor protection, along with two variables that more directly measure how easily firms can issue shares. With each of our investor protection and share issuance measures, a higher value is associated with greater investor protection. The log of real GDP per capita (*GDP*) is included as a control variable in each of our regressions. We use the yearly average *GDP* value for each of the countries in our sample, although we obtain similar results if we use *GDP* values that are measured at the beginning of the sample period. We describe each of the country-level variables in detail in the paper's Appendix. Summary statistics for the country-level measures are provided in Table II.

As we mention previously, we experimented with broad measures of financial development, such as the value of the stock market and private credit, each scaled by real GDP. We report these findings in the paper's Internet Appendix. If *GDP* is controlled for, the results using these broad financial development measures are insignificant. This suggests that the size of a financial market may not be a very good measure of market efficiency or financial constraints. This finding is consistent with Demirguc-Kunt and Maksimovich (1998), who

[18] We estimate all of our firm-level regressions in the first and second halves of our sample separately, and get the same results in each of the subsamples, so we only report findings for the entire sample period.

Table II

Country-Level Measures of Protection and Development

This table provides descriptive statistics for the country-level measures of investor protection and equity market access and the country-level q and cash flow sensitivities. The investor protection measures are displayed in Panel A and their correlations are displayed in Panel B. The country-level q and cash flow coefficients are displayed in Panel C and their correlations are reported in Panel D. The country-level q and cash flow coefficients are estimated via equation (3). A variable denoted *Law* is also reported in Panels C and D. *Law* is the first principal component of the investor protection and equity market access measures. The other variables are defined in the Appendix.

Panel A: Observations per Country and Country-Level Measures

Country	*N*	GDP	Common	Disclosure	Liability	Protection	Anti-Self	Access	Nonzero
Argentina	943	9.406	0	0.500	0.220	0.479	0.34	3.23	24.00
Australia	11,867	10.270	1	0.750	0.660	0.784	0.76	6.00	60.85
Austria	1,331	10.308	0	0.250	0.110	0.104	0.21	4.89	13.81
Belgium	1,830	10.247	0	0.417	0.440	0.068	0.54	5.70	18.35
Brazil	3,413	9.031	0	0.250	0.330	0.442	0.27	4.05	24.09
Canada	15,446	10.285	1	0.917	1.000	0.959	0.64	6.39	64.95
Chile	1,897	9.495	0	0.583	0.330	0.610	0.63	4.80	11.06
Colombia	385	8.809	0	0.417	0.110	0.355	0.57	2.78	
Denmark	2,407	10.255	0	0.583	0.553	0.363	0.46	5.87	22.23
Egypt	272	8.413	0	0.500	0.220	0.202	0.20	5.20	8.31
Finland	2,148	10.103	0	0.500	0.660	0.465	0.46	6.37	36.04
France	11,536	10.165	0	0.750	0.220	0.473	0.38	5.75	39.66
Germany	11,315	10.233	0	0.417	0.000	0.000	0.28	5.93	20.15
Greece	3,326	9.917	0	0.333	0.495	0.319	0.22	5.28	28.96
Hong Kong	7,722	10.382	1	0.917	0.660	0.851	0.96	5.50	52.88
India	8,758	7.845	1	0.917	0.660	0.769	0.58	5.30	26.18
Indonesia	2,773	8.348	0	0.500	0.660	0.507	0.65	4.53	26.20
Ireland	1,121	10.188	1	0.667	0.440	0.478	0.79	5.29	70.44
Israel	1,431	9.942	1	0.667	0.660	0.594	0.73	5.35	
Italy	3,623	10.160	0	0.667	0.220	0.197	0.42	4.41	38.14
Japan	51,468	10.250	0	0.750	0.660	0.417	0.50	4.92	41.90
Korea	9,439	9.771	0	0.750	0.660	0.358	0.47	5.02	37.95
Malaysia	8,189	9.467	1	0.917	0.660	0.729	0.95	5.11	34.88
Mexico	1,676	9.174	0	0.583	0.110	0.098	0.17	3.90	44.85
Netherlands	3,165	10.284	0	0.500	0.888	0.537	0.20	6.43	45.23
New Zealand	1,237	9.942	1	0.667	0.440	0.465	0.95	5.82	52.62
Norway	2,691	10.565	0	0.583	0.385	0.436	0.42	5.57	43.58
Pakistan	1,385	7.932	1	0.583	0.385	0.625	0.41		21.91
Peru	778	8.495	0	0.333	0.660	0.656	0.45	3.84	38.07
Philippines	1,606	8.215	0	0.833	1.000	0.812	0.22	4.62	27.60
Portugal	1,049	9.789	0	0.417	0.660	0.574	0.44	4.5	16.18
Singapore	5,365	10.353	1	1.000	0.660	0.770	1.00	5.5	42.11
South Africa	4,344	9.035	1	0.833	0.660	0.599	0.81	5.94	39.50
Spain	2,245	10.063	0	0.500	0.660	0.553	0.37	5.09	37.49
Sri Lanka	226	8.361	1	0.750	0.385	0.403	0.39		
Sweden	4,743	10.164	0	0.583	0.275	0.386	0.33	6.15	39.73
Switzerland	3,228	10.420	0	0.667	0.440	0.304	0.27	6.07	24.77
Taiwan	11,842	9.858	0	0.750	0.660	0.547	0.56	5.54	72.05
Thailand	4,543	8.900	1	0.917	0.222	0.373	0.81	4.24	45.08

(continued)

Table II—*Continued*

Panel A: Observations per Country and Country-Level Measures

Country	*N*	GDP	Common	Disclosure	Liability	Protection	Anti-Self	Access	Nonzero
Turkey	1,896	8.725	0	0.500	0.220	0.338	0.43	5.03	48.75
U.K	24,810	10.154	1	0.833	0.660	0.776	0.95	6.26	55.35
U.S.	101,129	10.504	1	1.000	1.000	1.000	0.65	6.74	87.48
Venezuela	279	9.280	0	0.167	0.220	0.224	0.09	3.51	
Zimbabwe	207	7.867	1	0.500	0.440	0.418	0.39	4.93	
Total	341,084	9.611	0.612	0.822	0.713	0.691	0.51	5.87	57.92

Panel B: Investor Protection Correlation Matrix

	GDP	Common	Disclosure	Liability	Protection	Anti-Self	Access	Nonzero
GDP	1							
Common	0.057	1						
Disclosure	0.062	0.728	1					
Liability	0.028	0.352	0.465	1				
Protection	−0.048	0.614	0.635	0.788	1			
Anti-Self	0.118	0.834	0.654	0.323	0.553	1		
Access	0.549	0.329	0.333	0.368	0.244	0.237	1	
Nonzero	0.326	0.552	0.556	0.415	0.504	0.463	0.393	1

Panel C: Law and Country-Level Coefficients

Country	Law	Investment-q	Issue-q	Debt-q	Investment-Cash Flow	Issue-Cash Flow	Debt-Cash Flow
Argentina	−2.185	0.046	0.054	−0.116	0.187	−0.228	−0.244
Australia	2.582	0.187	0.612	0.696	0.030	−0.852	−0.472
Austria	−3.390	0.080	0.230	0.702	0.554	−0.769	1.956
Belgium	−1.809	0.095	0.056	0.367	0.490	0.269	1.645
Brazil	−2.464	0.006	0.122	−0.055	0.077	0.045	0.223
Canada	3.690	0.194	0.499	0.579	0.139	−0.902	−0.085
Chile	−0.988	0.061	−0.025	−0.043	0.575	0.954	3.497
Colombia	−2.222	0.022	0.140	−0.027	0.600	0.123	−0.099
Denmark	−0.819	0.063	−0.029	0.061	0.423	0.559	1.405
Egypt	−2.604	−0.011	0.189	−0.135	1.769	0.087	4.442
Finland	−0.245	0.062	0.030	0.336	0.328	0.021	0.709
France	−0.552	0.036	0.246	0.175	0.486	0.407	2.019
Germany	−2.825	0.096	0.198	0.476	0.287	−0.127	0.327
Greece	−1.906	0.017	0.037	0.141	0.792	1.617	2.404
Hong Kong	3.046	0.078	0.226	0.333	0.196	−0.277	0.540
India	1.690	0.024	0.060	0.054	0.539	0.382	1.117
Indonesia	−0.617	0.072	0.146	−0.057	0.321	−0.570	0.886
Ireland	1.633	0.076	0.322	0.172	0.228	−0.580	0.523
Israel	1.563	0.092	0.323	0.440	−0.017	−0.207	−0.437
Italy	−1.559	0.065	0.161	0.531	0.494	0.068	0.835
Japan	−0.073	0.039	0.108	0.182	0.307	−0.131	0.276

(continued)

Table II—*Continued*

Panel C: Law and Country-Level Coefficients

Country	Law	Investment-q	Issue-q	Debt-q	Investment-Cash Flow	Issue-Cash Flow	Debt-Cash Flow
Korea	−0.272	0.056	0.063	0.042	0.159	0.305	0.024
Malaysia	2.333	0.055	0.124	0.241	0.571	0.662	1.774
Mexico	−2.453	0.019	0.038	−0.218	0.650	−0.153	2.391
Netherlands	−0.016	0.071	0.244	0.339	0.397	−0.041	0.907
New Zealand	1.661	0.186	0.399	0.424	0.073	−1.356	−0.711
Norway	−0.638	0.103	0.458	0.613	0.255	−0.502	0.870
Pakistan	0.029	0.026	0.052	−0.086	0.525	0.299	1.600
Peru	−0.987	0.087	0.151	0.144	−0.013	−0.573	−0.853
Philippines	0.389	0.090	0.268	0.344	0.258	−0.593	−0.264
Portugal	−1.217	0.053	−0.011	−0.101	1.323	0.736	0.845
Singapore	2.916	0.112	0.296	0.373	0.301	0.273	0.666
South Africa	2.069	0.092	0.272	0.427	0.482	−0.017	1.491
Spain	−0.584	0.051	0.148	0.228	0.862	0.324	3.039
Sri Lanka	0.310	0.071	0.052	−0.200	−0.015	0.212	0.006
Sweden	−0.914	0.069	0.322	0.084	0.145	−0.434	0.346
Switzerland	−1.102	0.137	0.270	0.454	0.305	−0.667	1.285
Taiwan	1.057	0.058	0.094	0.178	0.686	0.303	1.768
Thailand	0.869	0.068	0.155	0.099	0.330	0.069	1.049
Turkey	−1.237	0.090	0.196	0.321	0.529	0.258	1.176
U.K	3.009	0.130	0.440	0.499	0.179	−0.780	−0.061
U.S.	4.514	0.127	0.424	0.508	0.077	−0.909	−0.493
Venezuela	−3.408	0.129	−0.013	−0.189	0.872	−0.050	0.835
Zimbabwe	−0.147	0.150	0.221	0.634	0.269	0.345	1.721

Panel D: Law and Country-Level Coefficients Correlation Matrix

	Law	Investment-q	Issue-q	Debt-q	Investment-Cash Flow	Issue-Cash Flow	Debt-Cash Flow
Law	1						
Investment-q	0.471	1					
Issue-q	0.568	0.672	1				
Debt-q	0.374	0.636	0.700	1			
Investment-CF	−0.429	−0.479	−0.433	−0.322	1		
Issue-CF	−0.302	−0.604	−0.709	−0.422	0.498	1	
Debt-CF	−0.361	−0.471	−0.421	−0.258	0.733	0.584	1

show that law and order and an active stock market promote firm growth, but the size of the stock market is not related to firm growth.

II. Results

In this section, we describe the findings from our empirical tests. In each of the tables results are reported for both firm-level regressions (Panel A) and country-level regressions (Panel B). Standard errors are clustered by country

in all of the firm-level regressions. In our country-level regressions, the dependent variables are the natural log of one plus the country coefficients. We also report country-level results in Figures 1 and 2, which plot the country-level investment and external finance q and cash flow coefficients against one another.

We organize our discussion as follows. In Section A (Table III), we discuss the results from equations (1) and (2) in which *Investment* is the dependent variable. In Sections B and C (Tables IV and V), we describe our share issuance and debt issuance findings. Section D (Table VI) describes the results from our regressions of future growth and profits on investment and external finance.

A. *Investment*

A.1. Firm-Level Investment Results

Panel A of Table III displays results from estimations of equations (1) and (2) in which *Investment* is the dependent variable. In the first regression, which does not include any of the interactions, the coefficients of both q and cash flow are positive and statistically significant. The coefficient of q is 0.117. Table I shows that the standard deviation for q (log of q) is 0.711. Hence, a one-standard-deviation increase in q yields a 0.083 increase in *Investment*. The mean value for *Investment* is 0.094, so a one-standard-deviation increase in q creates an 88% increase in *Investment*.

Six out of the seven q–investor protection interactions are positive and statistically significant. The results are therefore consistent with our hypothesis that the relation between q and investment is stronger in countries that offer more investor protection. The *q–GDP* interactions are also significant in five of the eight regressions, which suggests that country factors other than investor protection, such as overall wealth and economic development, also make investment more sensitive to q.

In the regressions with the interactions, the overall q coefficient is the sum of the q coefficient and the interaction coefficient(s) multiplied by the mean value of the interactive variable(s). This explains why the q coefficient is negative in the regressions with the *GDP* interactions; the *GDP* values are very large, and when the product of *GDP* and the interaction coefficient is added to the q coefficient the sum is positive for all of the countries in our sample, showing that the overall q coefficient is positive for all of the countries in our sample.

As an example, in the second regression in Panel A of Table III the total q coefficient is the sum of the q coefficient plus the *q–GDP* interaction coefficient multiplied by the level of *GDP* in the firm's country. The q coefficient in this regression is -0.244, whereas the *q–GDP* interaction is 0.035. The lowest *GDP* value is for India, at 7.845. Hence, for an Indian firm the overall q coefficient is $-0.244 + 0.035 \times 7.845 = 0.031$. The United States has a *GDP* value of 10.504, so for a U.S. firm the overall q coefficient is $-0.244 + 0.035 \times 10.504 = 0.124$, which is four times that of India.

The effects of investor protection on the q coefficient are economically significant, even after controlling for the effect of *GDP*. Consider the regression

Table III

Investment Regressions

Panel A of this table reports firm-level regression estimates of equations (1) and (2) in which *Investment* is the dependent variable. Panel B reports the country-level regression results. The dependent variable in Panel B1 is the log of one plus the country coefficient of q, and the dependent variable in Panel B2 is the log of one plus the country cash flow coefficient. All firm-level regressions include firm, country-year, industry-year, and year-fixed effects. Standard errors are clustered at the country level in Panel A. Variables are defined in the Appendix. Robust t-statistics are reported in parentheses in both panels. * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Firm-Level Investment Regressions

			Common	Disclosure	Liability	Protect	Anti-Self	Access	Nonzero
Lagged q (q)	0.117***	−0.244***	−0.145	−0.202**	−0.141*	−0.114	−0.253***	−0.091	−0.105
	(12.07)	(4.09)	(1.50)	(2.59)	(1.80)	(1.22)	(3.53)	(0.77)	(1.02)
Cash flow (CF)	0.141***	1.646***	1.284***	1.485***	1.251***	1.123***	1.630***	1.286***	1.102**
	(3.96)	(4.03)	(3.06)	(3.79)	(3.20)	(2.89)	(3.83)	(3.23)	(2.11)
GDP*q		0.035***	0.021***	0.026***	0.021**	0.016	0.032***	−0.003	0.017
		(6.02)	(2.11)	(2.56)	(2.20)	(1.50)	(4.48)	(0.19)	(1.31)
GDP*CF		−0.147***	−0.098***	−0.121***	−0.093***	−0.074*	−0.142***	−0.070	−0.075
		(3.69)	(2.47)	(2.89)	(2.34)	(1.90)	(3.45)	(1.55)	(1.41)
Interaction with q			0.063***	0.064	0.060**	0.083***	0.072*	0.039***	0.001*
			(4.50)	(1.53)	(2.06)	(2.61)	(1.93)	(3.48)	(1.72)
Interaction with CF			−0.159***	−0.122	−0.197***	−0.272***	−0.051	−0.069*	−0.003***
			(3.06)	(0.77)	(2.94)	(4.71)	(0.45)	(1.84)	(3.43)
Observations	240,300	240,173	240,173	240,173	240,173	240,173	240,173	238,993	238,433
R^2	0.15	0.15	0.16	0.15	0.15	0.15	0.15	0.15	0.15

Panel B1: Country-Level Investment q Coefficient Regressions

Regression 1									
Country variable			0.038***	0.050	0.054***	0.055*	0.063***	0.020***	0.001***
			(2.76)	(1.57)	(2.25)	(1.87)	(2.31)	(3.00)	(3.04)
Constant			0.060***	0.043**	0.047***	0.047***	0.042***	−0.029	0.027*
			(9.74)	(2.04)	(3.57)	(3.04)	(2.72)	(0.84)	(1.89)
Observations			44	44	44	44	42	39	44
R^2			0.18	0.06	0.10	0.09	0.18	0.24	0.13

(continued)

Table III—*Continued*

Panel B1: Country-Level Investment q Coefficient Regressions								
		Common	Disclosure	Liability	Protect	Anti-Self	Access	Nonzero
Regression 2								
GDP	0.016*	0.019***	0.015*	0.014*	0.016**	0.013	0.004	0.016***
	(1.94)	(2.29)	(1.80)	(1.83)	(1.96)	(1.61)	(0.31)	(2.47)
Country-variable		0.041***	0.044	0.048***	0.056***	0.055***	0.018***	0.001***
		(3.30)	(1.48)	(2.30)	(2.24)	(2.14)	(2.16)	(2.56)
Constant	−0.081	−0.120	−0.096	−0.087	−0.110	−0.081	−0.055	−0.118*
	(1.00)	(1.49)	(1.10)	(1.11)	(1.29)	(0.99)	(0.58)	(1.95)
Observations	44	44	44	44	44	44	42	39
R^2	0.10	0.31	0.14	0.18	0.19	0.19	0.18	0.32
Panel B2: Country-Level Investment Cash Flow Coefficient Regressions								
Regression 1								
Country variable		−0.176***	−0.319***	−0.229**	−0.318***	−0.302***	−0.054*	−0.006***
		(3.04)	(2.13)	(2.07)	(2.76)	(2.49)	(1.66)	(2.65)
Constant		0.383***	0.518***	0.431***	0.473***	0.472***	0.606***	0.536***
		(9.00)	(4.69)	(6.47)	(6.76)	(5.98)	(3.30)	(5.76)
Observations		44	44	44	44	44	42	39
R^2		0.15	0.10	0.07	0.12	0.11	0.05	0.21
Regression 2								
GDP	−0.039	−0.051	−0.030	−0.031	−0.040	−0.024	−0.031	−0.017
	(0.97)	(1.25)	(0.76)	(0.84)	(1.05)	(0.64)	(0.52)	(0.43)
Country-variable		−0.185***	−0.305**	−0.216***	−0.319***	−0.288***	−0.040	−0.005***
		(3.17)	(2.07)	(2.13)	(2.99)	(2.56)	(0.92)	(2.55)
Constant	0.696*	0.873**	0.798*	0.722*	0.859***	0.697*	0.831*	0.690*
	(1.72)	(2.09)	(1.87)	(1.87)	(2.13)	(1.75)	(1.74)	(1.76)
Observations	44	44	44	44	44	44	42	39
R^2	0.02	0.19	0.11	0.08	0.14	0.12	0.06	0.22

with the common law interactions, in which *Common* is equal to one if the firm is from a common law country and zero otherwise. Assume we have two firms from countries with similar *GDP*, only one is from a common law country and the other from a civil law country. The mean *GDP* value is 9.611, so for simplicity assume that both firms come from countries with this value. The overall q coefficient for the common law country firm is $-0.145 + 0.021 \times 9.611 + 0.063 = 0.120$, while for the civil law country the overall coefficient is $-0.145 + 0.021 \times 9.611 = 0.057$, which is less than half as large as the overall coefficient for the firm from the common law country.

The cash flow (*CF*) coefficient is 0.141 (t-statistic = 3.96) in regression 1, and Table I shows that the standard deviation for *CF* is 0.221. Hence, a one-standard-deviation decrease in cash flow yields a decline of 0.031 in *Investment*. The mean value for *Investment* is 0.094, so a one-standard-deviation decrease in cash flow yields a 33% decline in *Investment*. If we use the interpretations of investment-cash flow sensitivities in Fazzari, Hubbard, and Petersen (1988, 2000), then these findings show that within our sample the average firm is financially constrained.[19]

All seven *CF*–investor protection interactions are negative and five are significant, whereas eight of the *CF–GDP* interactions are negative and six are significant. We therefore conclude that investment is less sensitive to cash flow in countries with stronger investor protections and greater development. One interpretation of these findings is that investment is less constrained in countries with more investor protection and higher *GDP* because law and development create greater access to external finance.

As with q, the *CF* interactions are also economically significant. As an example, in the second regression the *CF–GDP* interaction term is -0.147 (t-statistic = 3.69), whereas the *CF* coefficient in this regression is 1.646. Comparing the United States to India, the overall *CF* coefficient is 0.102 in the United States and 0.493 in India, or four times greater. The additional effects of investor protection are large as well; if we assume the mean value of *GDP*, then the overall *CF* coefficient is 0.183 in a common law country and 0.342 in a civil law country, which is almost twice as large.

As we mention earlier, Poterba (1988) points out that investment sensitivity to cash flow might be the result of q being measured with error and cash flow being correlated with growth opportunities. We therefore report results in the Internet Appendix with stock returns in place of q (as done in Barro (1990), Morck, Shleifer, and Vishny (1990)), and residual cash flow in place of cash flow. Residual cash flow is cash flow that is orthogonal to lagged q, past 1-year stock returns, and past 3-year sales growth. The results in the Internet Appendix

[19] This interpretation is also consistent with Khurana, Martin, and Periera (2006), who find that cash flow more strongly predicts increases in cash savings in countries with less financial development. Almeida, Campello, and Weisbach (2004) argue that such *cash flow-sensitivity of cash* signals financial constraint. In the Internet Appendix we show that the investor protection and stock market activity measures used in this study dominate financial development measures (e.g., the amount of private credit scaled by GDP, or the size of the stock market scaled by GDP) with respect to explaining cross-country differences in the cash flow sensitivity of cash.

are consistent with the results that we report in Table III, so it is doubtful that Poterba's framework can explain these investment cash flow sensitivities.

A.2. Country-Level Investment Results

Panel B of Table III reports the results from our country-level investment regressions. These findings are consistent with those from our firm-level regressions. In Panel B1 in the first set of regressions, the country-level q coefficient is regressed on each of the investor protection measures separately; in the second set of regressions the q coefficients are regressed on both *GDP* and one of the investor protection measures. In the first set of regressions, all seven of the investor protection coefficients are positive and six are statistically significant, showing that investment sensitivity to q increases with investor protection. The coefficients are economically significant as well. As an example, in the common law regression the intercept is 0.060, whereas the *Common* dummy variable's coefficient is 0.038, showing that the q coefficient is more than 50% larger in common law as compared to civil law countries. The results in the second set of regressions are similar, and the investor protection variables are significant in six of the seven regressions.

The regressions in Panel B2 use the cash flow coefficients as the dependent variables. In both sets of regressions, all of the coefficients are negative and six are significant, showing that investment sensitivity to cash flow declines with investor protection. The findings here are consistent with our firm-level analyses, and suggest that investor protection reduces financial constraints.

B. Share Issuance Results

B.1. Firm-Level Share Issuance Results

The regressions reported in Panel A of Table IV use share issuance as the dependent variable. The findings in Table IV are consistent with our hypotheses; q is a stronger predictor of share issuance in markets that offer better investor protection, whereas cash flow is more negatively correlated with share issuance in these same places.

In regression 1, the q coefficient is 0.380 (t-statistic = 10.94), showing that in our sample higher q leads to more share issuance. The q interactions show that this relation is stronger in countries with stronger investor protection. All seven of the investor protection interactions are positive and significant. *GDP* creates similar effects, as four of the *GDP* interactions are positive and significant.

The cash flow coefficient is negative and significant in the first regression, showing that firms are more likely to issue shares when their cash flows are low and less likely to issue shares when their cash flows are high. This finding is sensible, as it suggests that firms issue shares when internal finance is less available. All of the investor protection–cash flow interactions are negative and five out of seven are significant, showing that low cash flow firms are more likely to issue shares in countries with stronger investor protection. The

Table IV

Share Issuance Regressions

Panel A of this table reports firm-level regression results of equations (1) and (2) in which *Issue* is the dependent variable. Panel B reports the country-level regression results. The dependent variable in Panel B1 is the log of one plus the country coefficient of q, and the dependent variable in Panel B2 is the log of one plus the country cash flow coefficient. All firm-level regressions include firm, country-year, industry-year, and year-fixed effects. Standard errors are clustered at the country level in Panel A. Variables are defined in the Appendix. Robust t-statistics are reported in parentheses in both panels. * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Firm-Level Issue Regressions

			Common	Disclosure	Liability	Protect	Anti-Self	Access	Nonzero
Lagged q (q)	0.380***	−1.087***	−0.339	−0.646**	−0.618***	−0.343	−1.076***	−0.171	−0.125
	(10.94)	(3.73)	(1.06)	(2.27)	(3.03)	(1.38)	(3.02)	(0.64)	(0.29)
Cash flow (CF)	−0.729***	4.864***	3.222***	3.494***	3.172***	2.778***	4.784***	2.756***	1.683
	(7.14)	(4.80)	(2.91)	(3.35)	(4.48)	(3.94)	(4.28)	(2.73)	(1.26)
GDP*q		0.143***	0.050	0.073*	0.080***	0.043	0.124***	−0.039	0.027
		(5.14)	(1.56)	(1.77)	(3.17)	(1.47)	(3.59)	(0.99)	(0.53)
GDP*CF		−0.544***	−0.333***	−0.341***	−0.320***	−0.262***	−0.515***	−0.092	−0.161
		(5.50)	(3.04)	(2.71)	(4.06)	(3.43)	(4.60)	(0.71)	(1.13)
Interaction with q			0.249***	0.305*	0.211**	0.341***	0.275*	0.152***	0.003**
			(6.37)	(1.74)	(2.44)	(3.76)	(2.01)	(4.78)	(2.29)
Interaction with CF			−0.595***	−0.810**	−0.746***	−0.961***	−0.317	−0.403***	−0.011***
			(6.24)	(2.22)	(3.90)	(5.85)	(0.93)	(4.99)	(3.69)
Observations	216,421	216,312	216,312	216,312	216,312	216,312	216,312	215,534	214,662
R^2	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.21

Panel B1: Country-Level Issue q Coefficient Regressions

Regression 1									
Country variable			0.113***	0.240***	0.139**	0.215***	0.194***	0.069***	0.004***
			(3.02)	(3.36)	(2.22)	(3.00)	(3.08)	(3.77)	(3.96)
Constant			0.125***	0.017	0.098***	0.062*	0.068*	−0.185**	0.011
			(6.58)	(0.39)	(3.06)	(1.76)	(1.98)	(2.07)	(0.28)
Observations			44	44	44	44	44	42	39
R^2			0.20	0.17	0.08	0.16	0.15	0.25	0.35

(continued)

Table IV—*Continued*

Panel B1: Country-Level Issue q Coefficient Regressions								
		Common	Disclosure	Liability	Protect	Anti-Self	Access	Nonzero
Regression 2								
GDP	0.052***	0.059***	0.045**	0.047***	0.052***	0.043**	0.004	0.024
	(2.78)	(2.91)	(2.37)	(2.72)	(2.93)	(2.24)	(0.21)	(1.23)
Country variable		0.124***	0.219***	0.119**	0.216***	0.169***	0.067***	0.004***
		(3.97)	(3.39)	(2.15)	(3.60)	(2.86)	(3.39)	(3.38)
Constant	−0.329*	−0.448**	−0.403**	−0.344**	−0.440**	−0.330*	−0.216	−0.206
	(1.92)	(2.25)	(2.24)	(2.09)	(2.53)	(1.81)	(1.20)	(1.17)
Observations	44	44	44	44	44	44	42	39
R^2	0.12	0.35	0.26	0.18	0.28	0.22	0.26	0.37
Panel B2: Country-Level Issue Cash Flow Coefficient Regressions								
Regression 1								
Country variable		−0.547	−0.550	−0.375	−0.544*	−1.211	−0.236*	−0.019***
		(1.46)	(1.36)	(1.32)	(1.73)	(1.25)	(1.88)	(2.36)
Constant		0.271***	0.415*	0.257	0.337	0.688*	1.272**	0.755***
		(3.74)	(1.72)	(1.16)	(1.57)	(1.79)	(2.36)	(3.48)
Observations		44	44	44	44	44	42	39
R^2		0.08	0.01	0.01	0.02	0.09	0.05	0.11
Regression 2								
GDP	−0.208**	−0.244*	−0.194*	−0.196*	−0.209**	−0.149*	−0.064	−0.040
	(2.08)	(1.86)	(1.95)	(1.93)	(2.16)	(1.76)	(0.65)	(0.39)
Country variable		−0.590	−0.461	−0.294	−0.550*	−1.122	−0.206	−0.018***
		(1.56)	(1.20)	(1.00)	(1.95)	(1.16)	(1.57)	(2.16)
Constant	2.062**	2.626**	2.216**	2.097**	2.342***	2.066**	1.732*	1.120
	(2.42)	(2.05)	(2.44)	(2.60)	(2.90)	(2.22)	(1.85)	(1.26)
Observations	44	44	44	44	44	44	42	39
R^2	0.03	0.12	0.04	0.04	0.05	0.11	0.05	0.11

results in Table III show that investment sensitivity to cash flow declines with investor protection. The results in Table IV suggest that this is because investor protection makes it less costly for low cash flow firms to issue shares to fund their investment.

Poterba (1988) posits that, if cash flow is correlated with investment opportunities, then investment sensitivity to cash flow could simply show that investment and a measure of investment opportunities are correlated. Yet here we find that the relation between share issuance and cash flow is negative, particularly in countries with stronger investor protection laws. In Poterba's framework this would mean that firms with weaker investment opportunities issue more shares, whereas firms with stronger investment opportunities buy their shares back, which seems implausible. However, it does seem plausible that low cash flow firms tend to need external finance and issue shares to fund their investment. Our findings are therefore consistent with the Fazzari, Hubbard, and Petersen (1988, 2000) framework, which contends that investment sensitivity to cash flow reflects financial constraints.

B.2. Country-Level Share Issuance Results

Panel B of Table IV shows that the country-level regression results are consistent with the proposition that high q and low cash flow firms issue more shares in countries with stronger investor protection laws. In Panel B1, in the first set of regressions, all of the investor protection measures predict a significantly higher q coefficient. These findings are also economically significant. As an example, in the common law regression the coefficient on *Common* is 0.113, although the intercept is 0.125, showing that the q coefficient is on average almost twice as large in common law countries as compared to civil law countries. In the second set of q coefficient regressions, which include *GDP*, all of the investor protection coefficients are both positive and significant as well.

The country-level regressions further show that the relation between share issuance and cash flow becomes more negative as investor protection improves. In Panel B2, in the first set of regressions all seven of the protection coefficients are negative and three are significant. In the second set of regressions (which include *GDP*), all of the protection coefficients are negative and two are significant. All of the *GDP* coefficients are also negative and seven are significant. The results show that the relation between cash flow and share issuance is more negative in countries with higher levels of investor protection and development. These findings support the idea that investment sensitivity to cash flow is weaker in countries with stronger investor protection because in these countries low cash flow firms issue more shares and invest the proceeds.

Figures 1A and B plot the investment sensitivity coefficients against the share issuance sensitivity coefficients. The figures show that cross-country differences in investment sensitivity to q and investment sensitivity to cash flow are associated with cross-country differences in share issuance sensitivity to q and share issuance sensitivity to cash flow. Figure 1A shows that countries with high investment sensitivity to q tend to have high share issuance sensi-

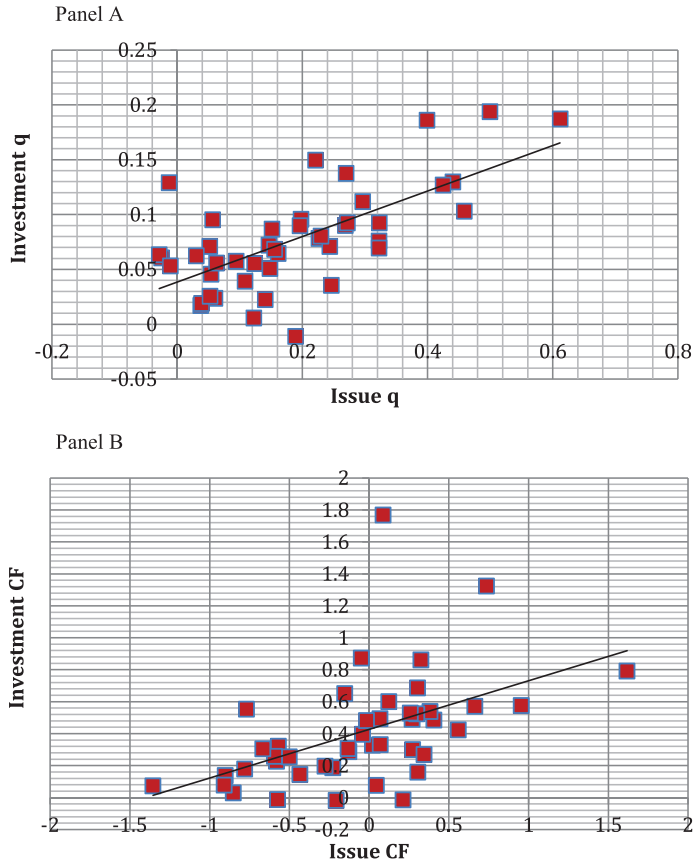

Figure 1. Country-level investment sensitivity to *q* and cash flow plotted against country-level share issuance sensitivity to *q* and cash flow. Panel A of this figure plots investment sensitivity to q against share issuance sensitivity to q. Panel B plots investment sensitivity to cash flow against share issuance sensitivity to cash flow. The q and cash flow sensitivities are estimated by equation (1), using either investment or share issuance as the dependent variable, for each of the 44 countries in our sample.

tivity to q. Figure 1B shows that countries with low investment sensitivity to cash flow tend to have negative share issuance sensitivity to cash flow. Hence, the figures show that, in countries with high q sensitivity to investment and low cash flow sensitivity to investment, high q and low cash firms are more likely to issue shares, which helps to explain the investment sensitivities.

C. Debt Issuance Results

C.1. Firm-Level Debt Issuance Results

The regressions reported in Panel A of Table V use the percentage change in total debt as the dependent variable. The findings in Table V show that q

Table V

Debt Issuance Regressions

Panel A of this table reports firm-level regression results of equations (1) and (2) in which *DEBT* is the dependent variable. Panel B reports the country-level regression results. The dependent variable in Panel B1 is the log of one plus the country coefficient of q, and the dependent variable in Panel B2 is the log of one plus the country cash flow coefficient. All firm-level regressions include firm, country-year, industry-year, and year-fixed effects. Standard errors are clustered at the country level in Panel A. Variables are defined in the Appendix. Robust t-statistics are reported in parentheses in both panels. * Significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A Firm-Level Debt Regressions

			Common	Disclosure	Liability	Protect	Anti-Self	Access	Nonzero
Lagged q (q)	0.444***	−1.428***	−1.050***	−1.233***	−1.080***	−0.956***	−1.457***	−0.787*	−0.870**
	(10.99)	(4.43)	(2.95)	(3.94)	(3.57)	(2.89)	(4.09)	(1.96)	(2.03)
Cash flow (CF)	−0.120	7.750***	6.161***	6.418***	5.401***	5.166***	7.672***	5.629***	2.960
	(0.63)	(4.51)	(3.41)	(3.97)	(3.72)	(3.72)	(4.19)	(3.29)	(1.44)
GDP*q		0.183***	0.128***	0.144***	0.134***	0.114***	0.169***	0.028	0.111**
		(5.85)	(3.62)	(3.69)	(3.74)	(2.94)	(4.99)	(0.54)	(2.17)
GDP*CF		−0.768***	−0.555***	−0.549***	−0.446***	−0.406***	−0.741***	−0.305	−0.182
		(4.49)	(3.15)	(3.10)	(2.82)	(2.72)	(3.97)	(1.47)	(0.84)
Interaction with q			0.227***	0.232	0.187*	0.286**	0.261*	0.153***	0.003*
			(4.77)	(1.42)	(1.80)	(2.32)	(1.95)	(4.52)	(1.76)
Interaction with CF			−0.702***	−1.044*	−1.178***	−1.352***	−0.286	−0.421***	−0.018***
			(3.38)	(1.72)	(3.34)	(4.00)	(0.57)	(2.72)	(4.68)
Observations	243,352	243,224	243,224	243,224	243,224	243,224	243,224	242,041	241,458
R^2	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Panel B1: Country-Level Debt q Coefficient Regressions

Regression 1									
Country variable			0.126*	0.295*	0.273**	0.209	0.286**	0.143***	0.005**
			(1.89)	(1.95)	(2.04)	(1.32)	(2.38)	(5.96)	(2.66)
Constant			0.136***	−0.003	0.047	0.080	0.036	−0.545***	0.016
			(3.34)	(0.02)	(0.54)	(0.84)	(0.44)	(4.08)	(0.20)
Observations			44	44	44	44	44	42	39
R^2			0.08	0.08	0.10	0.05	0.10	0.38	0.17

(*continued*)

Table V—*Continued*

Panel B1: Country-Level Debt q Coefficient Regressions								
		Common	Disclosure	Liability	Protect	Anti-Self	Access	Nonzero
Regression 2								
GDP	0.130***	0.139***	0.122***	0.121***	0.130***	0.118**	0.030	0.123***
	(3.03)	(3.36)	(2.79)	(2.87)	(3.07)	(2.69)	(0.54)	(3.22)
Country variable		0.150***	0.239*	0.223*	0.213*	0.215**	0.129***	0.003
		(2.76)	(1.85)	(1.93)	(1.75)	(2.05)	(3.58)	(1.59)
Constant	−1.060**	−1.203***	−1.139**	−1.086**	−1.168***	−1.060**	−0.765*	−1.102***
	(2.51)	(2.96)	(2.65)	(2.69)	(2.77)	(2.44)	(1.76)	(3.24)
Observations	44	44	44	44	44	44	42	39
R^2	0.24	0.34	0.29	0.30	0.29	0.29	0.39	0.36
Panel B2: Country-Level Debt Cash Flow Coefficient Regressions								
Regression 1								
Country variable		−0.371*	−0.430	−0.889**	−1.157***	−0.798*	0.030	−0.017***
		(1.68)	(0.80)	(2.47)	(3.19)	(1.87)	(0.21)	(3.11)
Constant		0.586***	0.719*	0.889***	1.014***	0.856***	0.295	1.130***
		(4.34)	(1.89)	(4.54)	(5.82)	(3.77)	(0.39)	(5.23)
Observations		44	44	44	44	44	42	39
R^2		0.06	0.02	0.10	0.14	0.07	0.00	0.17
Regression 2								
GDP	−0.037	−0.060	−0.024	−0.002	−0.040	0.005	−0.072	0.116
	(0.26)	(0.39)	(0.18)	(0.02)	(0.31)	(0.04)	(0.47)	(0.69)
Country variable		−0.382	−0.419	−0.888**	−1.158***	−0.801*	0.063	−0.019***
		(1.64)	(0.81)	(2.38)	(3.22)	(1.91)	(0.47)	(2.99)
Constant	0.804	1.169	0.944	0.910	1.394	0.807	0.815	0.080
	(0.59)	(0.74)	(0.63)	(0.72)	(1.14)	(0.58)	(0.52)	(0.05)
Observations	44	44	44	44	44	44	42	39
R^2	0.00	0.07	0.02	0.10	0.14	0.07	0.01	0.18

predicts higher levels of debt issuance, and that this relation is stronger in more developed markets and in markets that offer better investor protection. All of the investor protection interactions are positive, of which seven are significant. All eight of the *q*–*GDP* interaction coefficients are also positive, of which seven are significant.

The findings show that overall in our sample the relation between cash flow and *Debt* is not significant. In the first regression the cash flow coefficient is not significant, whereas in the other regressions the cash flow coefficient is positive, although, if we combine it with the interaction terms and the mean values for *GDP*, then the overall cash flow coefficient is still very close to zero. These findings are sensible. On the one hand, firms are more likely to need debt when they have weak cash flow, so we would expect the cash flow coefficient to be negative. On the other hand, debt is more suitable to firms that have the cash flow to handle the repayment, so we would expect the cash flow coefficient to be positive. These two effects appear to cancel one another out in our overall sample.

The relation between cash flow and debt becomes negative as investor protection improves, as the cash flow–investor protection interactions are all negative and six are significant. All eight of the *GDP* interactions are negative and six are significant, showing that low cash flow firms raise more capital in wealthier countries. The findings therefore show that firms with weaker internal cash flow have better access to debt capital in countries with strong investor protection laws, which is consistent with the idea that lenders are more willing to lend to riskier firms in countries where legal protections for investors and creditors are stronger. Like the share issuance findings in the previous table, the findings here help explain why cash flow is less correlated with investment in countries with stronger investor protection; in strong investor protection countries low cash flow firms are more able to issue debt to fund their investments.

C.2. Country-Level Debt Issuance Results

Our country-level results for debt issuance are reported in Panel B of Table V. The results here are consistent with those in our firm-level analyses. In Panel B1 in the first set of regressions, all of the investor protection variables predict higher *q* coefficients, and six of the seven coefficients are significant. In the second set of regressions, either *GDP* or one of the investor protection measures is significant in each of the regressions. Hence, debt issuance is more sensitive to *q* in more developed countries that offer stronger investor protections.

The cash flow results in Panel B2 are consistent with the hypothesis that debt issuance is negatively related to cash flow in countries with stronger investor protection. In the first set of regressions all of the investor protection coefficients are negative and four are significant, and we get the same results in the second set of regressions, which include *GDP*. These country-level cash flow regressions show that cash flow has a negative relation with debt issuance

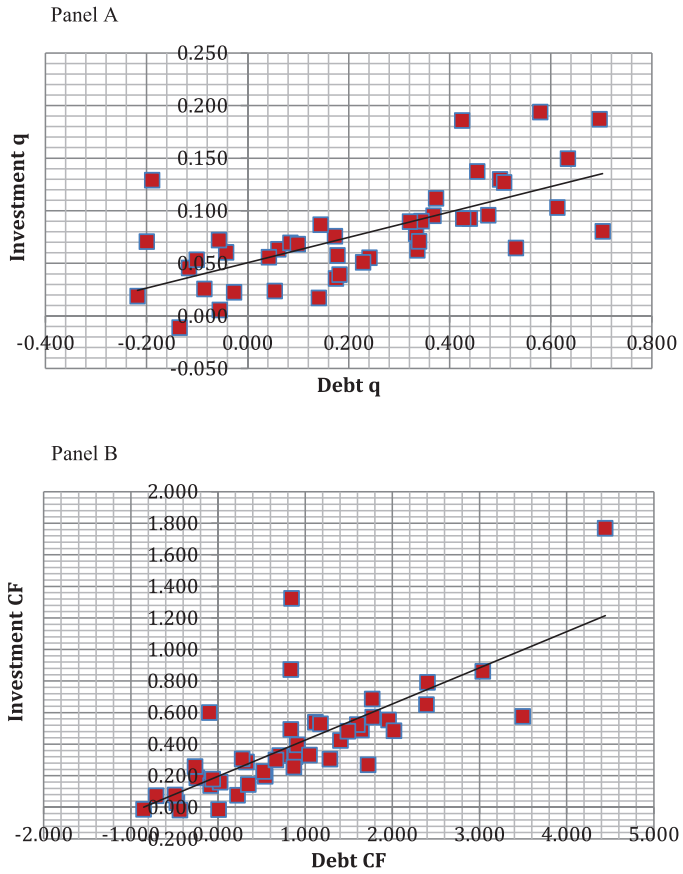

Figure 2. Country-level investment sensitivity to *q* and cash flow plotted against country-level debt issuance sensitivity to *q* and cash flow. Panel A of this figure plots investment sensitivity to q against debt issuance sensitivity to q. Panel B plots investment sensitivity to cash flow against debt issuance sensitivity to cash flow. The q and cash flow sensitivities are estimated by equation (1), using either investment or debt issuance as the dependent variable, for each of the 44 countries in our sample.

in high investor protection countries, and a positive relation in low investor protection countries. These findings are consistent with investor protection increasing the availability of external finance for riskier firms.

The patterns in Figure 2 support the notion that cross-country differences in investment sensitivity to q and cash flow are caused in part by cross-country differences in debt issuance sensitivity to q and cash flow. Panel A of Figure 2 shows that countries with high debt issuance sensitivity to q also have high investment sensitivity to q. Panel B of Figure 2 shows that countries with low or negative debt issuance sensitivity to cash flow also have low investment sensitivity to cash flow. Like the share issuance coefficients plotted in Figure 1, the patterns in Figure 2 show that, in countries with high q sensitivity and low

cash flow sensitivity to investment, high q and low cash firms are more likely to issue debt, which helps to explain the investment sensitivities.

D. Are q and Cash Flow Sensitivities Associated with Future Growth?

Our findings show that both investment sensitivity to q and external finance-sensitivity to q increase with investor protection. We interpret these findings as evidence that investor protection promotes economic efficiency. If this interpretation is valid, then investment and external finance ought to predict growth more strongly in countries with high q sensitivities.

Our findings also show that investment sensitivity to cash flow declines with investor protection, and that external finance sensitivity to cash flow is negative in countries with high levels of investor protection. We interpret these findings as evidence of investor protection reducing financial constraints. If our interpretations are valid, then investment and external finance should predict growth more strongly in countries with low investment sensitivity to cash flow. Alternatively, Poterba (1988) contends that investment sensitivity to cash flow could reflect investment in response to growth opportunities. If Poterba's framework is more valid, then investment and external finance should predict growth at least as strongly in countries with high investment and external finance sensitivity to cash flow.

To validate our interpretations, we test whether investment and external finance lead to faster growth and higher profits in countries with higher sensitivity to q and lower sensitivity to cash flow. We test these hypotheses using the following regression model:

$$Growth_{i,t} = \alpha_i + \alpha_t + \alpha_{c,t} + \alpha_{I,t} + \beta_3 \frac{I_{i,t}}{A_{i,t-1}} \times IS_c + \beta_4 \frac{I_{i,t}}{A_{i,t-1}} \times GDP + \varepsilon_{i,t}. \quad (3)$$

The dependent variable in equation (3) is either 5-year real revenue growth (log of revenue in year $t + 5$ – log of revenue in year t), or 5-year real total factor productivity growth, or average return on assets (ROA) over the subsequent 5 years.[20] We estimate ROA as operating income scaled by total assets. To estimate growth in factor productivity, we follow King and Levine (1993) and decompose revenue growth into two components: the rate of physical capital accumulation and factor productivity. Let y = revenue, k = capital stock, x = other determinants of revenue growth, and α = the parameter in the production function. The firm's revenue can then be modeled as $y = k^{\alpha}x$. Taking logarithms and differencing shows that growth in revenue can be expressed as $gy = \alpha(gk) + gx$. We use growth in property, plant, and equipment as a measure of gk. Like King and Levine (1993), we assume a value of 0.30 for α, although we experimented with values between 0.20 and 0.40 and obtained similar findings. We refer to gx as growth in total factor productivity as it captures anything related to firm growth besides capital accumulation. We estimate

[20] If a firm leaves our sample before the fifth year, then we use the final year's revenue or ROA.

growth in factor productivity over the 5 years subsequent to the year of the investment.

The independent variables include year, firm, industry-year, and country-year fixed effects; investment; and an interaction between investment and a country-level coefficient for either investment sensitivity to q, or investment sensitivity to cash flow.[21] If investment efficiency increases with investment sensitivity to q, then the coefficient β_4 should be positive and significant when we interact investment with the investment sensitivity to q coefficient. If investment efficiency decreases with investment sensitivity to cash flow, then the coefficient β_4 should be negative and significant when we interact investment with the investment sensitivity to cash flow coefficient.

We also replace investment with share issuance and debt issuance and interact these variables with the share issuance and debt issuance sensitivity to q and cash flow coefficients. If external finance is allocated more efficiently in countries where it is more sensitive to q, then the coefficient β_4 should be positive and significant when we interact our external finance measures with the q coefficients. If efficiency decreases with external finance sensitivity to cash flow, then the β_4 coefficient should be negative and significant when we interact our external finance measures with the cash flow coefficients.

D.1. q and Cash Flow Sensitivities and Growth: Results

Our findings are reported in Table VI. Panel A contains the results from estimates of equation (3) in which investment is used as an independent variable. In the first set of regressions, investment is the only independent variable, along with the fixed effects. Investment predicts faster factor productivity growth, while its effects on revenue growth and ROA are positive but insignificant. In the second set of regressions we include interactions with the q coefficient and *GDP*. The q coefficient interaction is positive and significant in each of the three regressions. The findings therefore show that investment more strongly predicts growth in countries with greater investment sensitivity to q, which is consistent with investment sensitivity to q measuring investment in response to growth opportunities.

In the third set of regressions, we use the investment sensitivity to cash flow coefficients in place of the investment sensitivity to q coefficients. The cash flow coefficient interactions are all negative, and each is significant. These findings are consistent with the framework that we develop in the introduction, which posits that investment sensitivity to cash flow measures financing constraints. These findings are inconsistent with Poterba's (1988) framework, in which investment sensitivity to cash flow represents investment in response to growth opportunities.

Panel B reports the results for equation (3), in which share issuance is the independent variable. In the first set of regressions we see that share issuance

[21] In the paper's Internet Appendix we add firm size as a control variable, and report similar findings.

Table VI

q Sensitivity, Cash Flow Sensitivity, and Ex Post Efficiency

This table reports firm-level regression results in which either 5-year sales growth, 5-year growth in factor productivity, or average operating income scaled by assets over the subsequent 5 years is the dependent variable. *Investment* is the independent variable in Panel A, *Issue* is the independent variable in Panel B, and *Debt* is the independent variable in Panel C. In each regression, the independent variable is interacted with either the firm's country's *q* sensitivity coefficient or cash flow sensitivity coefficient. Some of the regressions also have interactions with *GDP*. The variables are defined in the Appendix. All regressions include firm, country-year, industry-year, and year-fixed effects. Standard errors are clustered at the country level. Robust *t*-statistics are reported in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Investment and Efficiency									
	Revenue Growth	Total Factor Productivity	Average ROA	Revenue Growth	Total Factor Productivity	Average ROA	Revenue Growth	Total Factor Productivity	Average ROA
Investment	0.027	0.177***	0.003	−0.624	−0.141	−0.067**	−0.436	−0.033	−0.051
	(0.99)	(8.22)	(0.99)	(1.43)	(0.42)	(2.11)	(0.97)	(0.09)	(1.58)
q coefficient*Investment				0.865**	1.096**	0.181***			
				(2.09)	(2.21)	(3.58)			
CF coefficient*Investment							−0.211**	−0.202*	−0.032**
							(2.34)	(1.86)	(2.39)
GDP*Investment				0.054	0.018	0.005	0.051	0.026	0.006*
				(1.17)	(0.50)	(1.33)	(1.20)	(0.75)	(1.93)
Observations	281,609	281,330	271,123	281,609	281,330	271,018	281,609	281,330	271,018
R^2	0.05	0.05	0.06	0.05	0.05	0.06	0.05	0.05	0.06
Panel B: Share Issuance and Efficiency									
Issue	0.078***	0.076***	0.002	−0.355**	−0.044	−0.002	−0.220	0.113	0.020
	(10.41)	(10.26)	(1.24)	(2.08)	(0.22)	(0.10)	(1.10)	(0.49)	(0.61)
q coefficient*Issue				0.123***	0.129***	0.038***			
				(3.09)	(2.94)	(3.64)			

(*continued*)

Table VI—*Continued*

	Revenue Growth	Total Factor Productivity	Average ROA	Revenue Growth	Total Factor Productivity	Average ROA	Revenue Growth	Total Factor Productivity	Average ROA
Panel B: Share Issuance and Efficiency									
CF coefficient*Issue							−0.040**	−0.044**	−0.009**
							(2.61)	(2.63)	(2.67)
GDP*Issue				0.037**	0.006	−0.001	0.032*	−0.001	−0.001
				(2.15)	(0.31)	(0.41)	(1.69)	(0.03)	(0.36)
Observations	250,731	249,952	240,702	250,731	249,952	240,615	250,731	249,952	240,615
R^2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Panel C: Debt Issuance and Efficiency									
Debt	0.011***	0.023***	−0.000	−0.113	−0.019	−0.017***	−0.094	−0.015	−0.008
	(2.86)	(9.62)	(0.33)	(1.19)	(0.27)	(2.75)	(1.01)	(0.20)	(1.30)
q coefficient*Debt				0.037*	0.042***	0.003			
				(1.81)	(2.92)	(1.42)			
CF coefficient*Debt							−0.008*	−0.007**	−0.001***
							(1.82)	(2.17)	(4.04)
GDP*Debt				0.010	0.001	0.001**	0.011	0.004	0.001
				(0.93)	(0.17)	(2.14)	(1.24)	(0.63)	(1.55)
Observations	286,247	285,352	275,189	286,247	285,352	275,083	286,247	285,352	275,083
R^2	0.05	0.05	0.06	0.05	0.05	0.06	0.05	0.05	0.06

predicts faster growth in sales and factor productivity, but not higher average ROA. All of the share issuance q coefficient interactions are positive and significant, which is consistent with share issuance sensitivity to q reflecting issuance in response to growth opportunities. The share issuance–cash flow coefficient interactions are negative and significant, showing that share issuance portends growth more strongly in countries where low cash flow firms issue the most shares. This is consistent with the framework that we describe in the introduction, in which investor protection encourages efficiency, and this in turn allows financially constrained firms to access capital markets. The findings in Panel C are similar, and show that debt issuance portends growth more strongly in countries where debt issuance is more sensitive to q and less sensitive to cash flow.

Taken in their entirety, the results in Table VI validate the assumptions that we make in the introduction. We first assume that q sensitivity represents investment and external finance in response to growth opportunities, and the results in Table VI confirm that, in countries with higher q sensitivities, both investment and external finance more strongly predict growth in revenue and factor productivity and higher profits. We also assume that investment sensitivity to cash flow represents financing constraints, and the results in Table VI confirm that investment predicts growth and profits more weakly in countries with higher investment sensitivity to cash flow. Finally, we assume that low cash flow firms issue more shares and debt in countries where firms use resources efficiently, and the results in Table VI show that, in countries with negative external finance sensitivity to cash flow, both share and debt issuance more strongly predict growth and profits.

D.2. Share Issuance and Subsequent Profits in the United States

Our finding that share issuance predicts higher ROA in high q sensitivity and low cash flow sensitivity countries appears to be inconsistent with Loughran and Ritter (1997). Loughran and Ritter (1997) find that, in the United States public seasoned equity offerings (SEOs) are preceded by increasing profits and then followed by declining profits during the period 1979 to 1989. We therefore replicate all of the regressions in Table VI for U.S. firms only. We report these findings in the Internet Appendix. The results show that, in our U.S. sample, investment, share issuance, and debt issuance all predict faster growth and higher ROA, so our share issuance findings are different from those in Loughran and Ritter (1997). As we discuss in subsections C and D of Section I, several studies show that financial development promotes economic growth (e.g., King and Levine (1993), Rajan and Zingales (1998)). The United States has what is perhaps the world's most developed stock market, so our finding that share issuance promotes growth in the United States is consistent with the finance and growth literature.

Several factors could account for the difference between our findings and those in Loughran and Ritter (1997). Loughran and Ritter (1997) study 1,338 public offerings during the period 1979 to 1989. Fama and French (2005)

explain that public offerings are rare, but share issues are frequent, as firms also issue shares by mergers, rights offerings, private placements, warrants, and other mechanisms. Our interest is whether capital is allocated more efficiently in some countries than others, so we measure share issuance as broadly as possible. We follow Baker, Stein, and Wurgler (2003) and use an aggregate net share issuance (issues minus repurchases) measure that is constructed from several balance sheet items and reflects all types of share issues and repurchases. Our U.S. sample contains 56,649 firm-year observations with positive net share issues during the period 1990 to 2007. In our U.S. sample, we have data to compute share issuance for 81,892 observations; of these, 69% have positive values of net share issuance. Fama and French (2005) report a similar percentage of firms issuing shares in their U.S. sample. We therefore study a different time period, more types of share issues, and a much larger sample as compared to Loughran and Ritter (1997).

Despite this difference in findings, we do not view our findings as conflicting with the market timing literature. Our finding is that, in the United States and other strong investor protection countries, firms tend to raise capital when growth opportunities are highest. The main argument of the market timing literature is that managers prefer to issue equity when shares are valued favorably from the firm's perspective. We see no reason why both of these things cannot be true.

III. Conclusions

In this paper, we study how investor protection affects firm-level resource allocations. We test for these effects using both ex ante and ex post measures of efficiency. We conduct our analyses in a large sample of firms from 44 countries during the period 1990 to 2007. We show that the relations between q and investment and q and external finance are stronger in countries with stronger investor protection laws. These findings are consistent with the notion that investor protection laws encourage accurate share prices, efficient investment, and better access to external finance.

We find that investment is less sensitive to cash flow in countries with stronger investor protection laws. We further find that both share issuance and debt issuance tend to have negative sensitivity to cash flow in countries with strong investor protections, but positive sensitivities in countries with weak investor protections. Taken together, these cash flow sensitivity findings suggest that investment is less sensitive to cash flow in countries with strong investor protections because low cash flow firms issue more shares and debt in these countries, thereby overcoming financing shortfalls.

Our q sensitivity and cash flow sensitivity measures are associated with ex post economic outcomes. In countries with high investment sensitivity to q and low investment sensitivity to cash flow, investment predicts faster growth and higher profits. We get similar results with external finance. In countries where share issuance and debt issuance have strong sensitivity to q and negative

sensitivity to cash flow, share issuance and debt issuance predict faster growth and higher profits.

Our paper sheds light on how investment sensitivity to cash flow should be interpreted. Our findings cast doubt on the idea that this sensitivity measures investment in response to growth opportunities. Across countries, the relation between investment and subsequent growth weakens with investment sensitivity to cash flow; if cash flow were correlated with growth opportunities, then we should find the opposite. Moreover, in countries with strong investor protection both share issuance and debt issuance have negative sensitivity to cash flow. If cash flow measures growth opportunities, then this result shows that firms with the weakest growth opportunities raise the most capital, which seems unlikely. The more plausible explanation for our findings is that low cash flow firms are in need of external finance and, in countries with strong investor protection, raise capital to fund their projects, which explains why investment sensitivity to cash flow is lower in countries with greater investor protections.

With respect to q sensitivity, our findings suggest that cross-country differences in investment sensitivity to q are associated with more efficient investment. We find that, in countries with high investment sensitivity to q, investment predicts growth, but, in countries with weak investment sensitivity to q, investment does not predict growth. These findings do not rule out the possibility that q is correlated with mispricing and that some firms raise capital and invest in response to mispricing. However, even if these sentiment effects are present, our results do show that higher levels of investment sensitivity to q are associated with stronger relations between investment and subsequent growth.

Appendix: Variable Descriptions

A. Firm-Level Variables

Investment. Our measure of investment (*Investment*) is the combination of the yearly growth in property, plant, and equipment, plus growth in inventory, plus R&D spending, all scaled by total assets. We also used growth in property, plant, and equipment, R&D spending, total asset growth, and capital expenditures separately, and obtained similar findings with each measure.

Cash Flow (CF). *CF* is net income plus R&D and depreciation and amortization, all scaled by the beginning of the year's book value of assets.

Tobin's q (q). Tobin's q is estimated as the market value of equity, minus the book value of equity, plus the book value of assets, all scaled by the book value of assets. Our measurement of q follows Baker, Stein, and Wurgler (2003) and Rauh (2006). We use the log of this q measure in our regression analyses.

Issue. *Issue* is the change in book equity, plus the change in deferred taxes, minus the change in retained earnings, all scaled by lagged assets. Our measure of *Issue* follows Baker, Stein, and Wurgler (2003).

Debt. Debt is estimated as the annual percentage change in total debt. Our results remain the same if we use change in long-term debt instead of change in total debt.

B. Country-Level Variables

Our objective is to test whether measures of investor protection are related to better capital allocation and investment efficiency. Our strategy with respect to picking indices was to choose variables that the existing literature had shown to be most important for access to finance. This approach has two advantages. First, it helps tie the literature together, because we test whether the indices that matter most for financial development also matter most for investment and financing sensitivities. Second, it eliminates our ability to cherry-pick indices, so the reader can have more confidence in our findings.

The two papers that we rely on for showing which legal variables matter most for finance are La Porta, Lopez-de-Silanes, and Shleifer (2006) and Djankov et al. (2008). We stress that both the strength of a law and the strength of its enforcement are important with respect to the law's effect on investors, so we explain how our investor protection measures capture both of these characteristics. With each of the measures, a higher value is associated with a more investor-friendly legal environment.

Common. Johnson et al. (2000) explain that the very nature of the civil law system makes its courts poorly suited to discipline controlling shareholders accused of self-dealing transactions such as tunneling, whereas the common law system, which allows for greater judicial discretion in determining the appropriateness of self-dealing transactions, yields courts that afford better protection to minority shareholders. La Porta et al. (1998), La Porta, Lopez-de-Silanes, and Shleifer (2006), and Djankov et al. (2008) show that common law countries tend to have stronger investor protection laws and greater private enforcement than do civil law countries. Hence, we create the dummy variable *Common* that is equal to one if a country is of common law origin and zero if the country is of civil law origin.

Disclosure and Liability. La Porta, Lopez-de-Silanes, and Shleifer (2006) show that disclosure requirements and liability standards are more strongly associated with financial development than other legal factors. We therefore use their disclosure and liability indices as measures of investor protection. *Disclosure* is the arithmetic mean of six sub indices. One of these sub indices indicates whether new issues need to be accompanied by a prospectus. The five other subindices measure disclosure requirements within the prospectus regarding directors' and officers' compensation, controlling shareholders, insider ownership, irregular contracts, and any transactions between the issuer and its officers and directors. *Liability* is the arithmetic mean of three subindices that measure the ease with which an investor can pursue an issuer and its directors, the distributors, and the accountants in civil court if the investor suffers losses due to misleading statements in a prospectus.

Protect. La Porta, Lopez-de-Silanes, and Shleifer (2006) also develop a comprehensive investor protection index, which we refer to as *Protect*. This measure is the first principal component of *Liability*, *Disclosure*, and an index of anti-director rights. *Protect* therefore measures both the letter of the law and the strength of law enforcement.

Anti-Self. The anti-self-dealing index (*Anti-Self*) is created by Djankov et al. (2008). *Anti-Self* is meant to capture the regulation of a transaction between two firms controlled by the same person that has the potential to improperly enrich the person in control. A higher value of *Anti-Self* means the transaction is more tightly regulated, so small investors are more protected. *Anti-Self* is the combination of an ex ante anti-self-dealing index, which captures the strength of anti-self-dealing laws, and an ex post anti-self-dealing index, which captures the enforcement of these laws.

Anti-Director Rights. Measures of anti-directors rights are popular in earlier law and finance papers. However, recent studies by La Porta, Lopez-de-Silanes, and Shleifer (2006) and Djankov et al. (2008) show that liability, disclosure, and anti-self-dealing indices are more strongly associated with financial development than are anti-director rights. Moreover, there is controversy regarding how to best measure anti-director rights. According to Spamann (2009), the original anti-director rights index of La Porta et al. (1997) is measured incorrectly, and many of the results in the law and finance do not hold with Spamann's version of this index. We were able to locate three different versions of the anti-director rights index. The first is from La Porta et al. (1997), the second is from Djankov et al. (2008), while the third is from Spamann (2009). In the Internet Appendix we report results with all three measures. We obtain robust results with the La Porta et al. (1997) measure, but not with the measures from Djankov et al. (2008) and Spamann (2009). It is unclear to us which index is the right one to use, and, according to La Porta, Lopez-de-Silanes, and Shleifer (2006) and Djankov et al. (2008), anti-director rights are less important than other legal protections, so for these reasons we use none of the anti-director rights indices in the paper.

Access and Nonzero. We use two variables that directly measure how easy it is for firms to raise equity capital. An advantage of these measures is that they are both outcome-based and reflect the costs and obstacles of issuance that managers encounter, but researchers may not observe. *Access* is an index from Schwab et al. (1999) that measures the ease with which firms issue securities. Business executives in a country are asked the extent to which they agree with the statement "Stock markets are open to new firms and medium-sized firms." Responses can range from 1 (strongly disagree) to 7 (strongly agree). *Nonzero* is the percentage of firm-month observations in each country that either issued or repurchased shares. We obtain *Nonzero* from McLean, Pontiff, and Watanabe (2009).

GDP. We include real per capita GDP (*GDP*) in all of our regression tests as a control variable. We use the average of the yearly values for each of the

countries in our sample, although we obtain similar results if GDP is measured at the beginning of our sample period. There are a number of nonfinancial factors that could cause high *GDP* countries to have greater investment sensitivity to q, such as human capital complementarities, infrastructure complementarities, real costs of investment adjustments, time-to-build, and less regulated good markets. We might also expect high *GDP* countries to have lower investment sensitivity to cash flow, as firms in rich countries should have an easier time raising capital.

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