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The contribution of stock repurchases to the value of the firm and cash holdings around the world

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ABSTRACT

Using corporate payout data from 33 economies, this study investigates the contribution of stock repurchases to the value of the firm and cash holdings in different country-level investor protection environments. We find that stock repurchases contribute *more* to firm value in countries with strong investor protection than in countries with weak investor protection. We also report that dividends contribute approximately 60% more to firm value than repurchases in countries with weak investor protection. Furthermore, as the proportion of repurchases in total payouts increases, the marginal value of cash increases in countries with strong investor protection, whereas it declines in countries with weak investor protection. In a poor investor protection environment, the marginal value of cash for a firm that makes 100% of its payouts via repurchases is 12 cents lower than that for a firm that distributes 100% of its payouts via dividends. Overall, our findings highlight that stock repurchases are less effective than dividends in mitigating agency problems associated with free cash flow in countries with poor investor protection.

1. Introduction

Open market stock repurchases have become an increasingly important method of distributing cash to shareholders in the U.S. and have been the subject of intense scrutiny from both academics and practitioners. Several recent studies report that U.S. firms have spent more money annually on share repurchases than on dividend payments over the last two decades (Grullon and Ikenberry, 2000; Grullon and Michaely, 2002, 2004; Skinner, 2008). Share repurchases have also surged in other parts of the world. Eije and Megginson (2008) show that the fraction of European firms paying dividends has declined significantly, while the proportion of repurchasing firms has grown steadily. A similar trend can be observed in East Asia, as an increasing number of Asian countries have adopted laws legalizing repurchases. For example, Japanese firms have been able to execute stock repurchases without approval at a shareholders' meeting since 1997 following revision of the Commercial Law.[1]

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[1] According to our statistics, only 23 and 32 Japanese firms repurchased shares in 1998 and 1999 and the number of repurchasing firms increased to 494, 584, 845, 1043, and 1054 in 2000 to 2004, respectively. A similar trend exists in South Korea, where firms have been allowed to buy back shares since 1994.

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Despite the growing importance of stock repurchases as a payout method, international research on stock repurchases is sparse. Given the high degree of institutional variation across countries, what we know about stock repurchases in the U.S. may not be generalizable elsewhere. As an attempt to fill in the void, this study investigates the contribution of stock repurchases to the value of the firm and cash holdings using a multinational sample. Specifically, the objectives of our study are threefold. First, we investigate how stock repurchases are valued across countries with different investor protection environments. Second, we examine the *relative* contributions of stock repurchases and dividends to firm value in countries with varying investor protection institutions. Third, we examine how stock repurchases contribute to the value of cash in countries with different investor protection environments.

The literature suggests that managers who undertake repurchases are motivated by various reasons including signaling undervaluation, mitigating the free cash flow problem, deterring takeovers, and maintaining an optimal leverage ratio (e.g., Chan et al., 2004; Comment and Jarrell, 1991; Dittmar, 2000; Gup and Nam, 2001; Grullon and Michaely, 2004; Ikenberry et al., 1995; Lie, 2005; Nohel and Tarhan, 1998; Stephens and Weisbach, 1998).[2] The free cash flow problem may be more severe in countries with poor investor protection institutions because cash reserves can be turned into private benefits at a lower cost. Corporate payouts are considered an important governance mechanism in reducing the agency costs of free cash flow by distributing cash to outside shareholders (Easterbrook, 1984; Jensen, 1986; La Porta et al., 2000). The effectiveness of stock repurchases in mitigating agency conflicts, however, is largely dependent on the country-level investor protection environment.

Given the discretionary and flexible nature of repurchases, corporate insiders in a weak investor protection environment are likely to employ repurchases as a tool to mislead investors or extract private control benefits rather than to genuinely disgorge excess cash balances to shareholders. For instance, a number of recent studies find that insiders may use repurchases as a tool to meet or beat analysts' earnings forecasts (Chan et al., 2010; Gong et al., 2008; Hribar et al., 2006) or to mimic good firms (Massa et al., 2007), which in turn would facilitate the issuance of new shares, the resale of treasury shares, or the exercise of executive stock options at higher prices. In contrast, strong country-level investor protection institutions constrain insiders' incentives and ability to pursue private benefits by making wealth expropriation legally riskier and more expensive (e.g., La Porta et al., 1998, 2000). To the extent that the credibility of repurchases is low due to expropriation risk in a weak investor protection environment and investors can partially see through opportunistic repurchases (Stephens and Weisbach, 1998), investors are likely to discount the value of stock repurchases in countries with weak investor protection.

Although agency theories do not distinguish between the governance roles of the two primary forms of payout, stock repurchases differ from dividend payments in that they allow for greater managerial discretion and involve fewer pre-commitments to investors and less permanence than dividend payments. Prior studies find that firms that cut or omit their dividends experience significantly negative excess returns (e.g., Benartzi et al., 1997; Denis et al., 1994; Michaely et al., 1995). These studies suggest that dividend payments impose a significant constraint on managers through the greater cost of deviation and serve as an effective governance mechanism. Consistent with this line of argument, Pinkowitz et al. (2006) find that the relationship between dividends and firm value is stronger in countries with weak investor protection. In contrast, stock repurchases are irregular in nature. They are primarily used to distribute temporary cash windfalls and could be employed by insiders as a tool to mislead investors or to pursue private benefits, thus potentially making them less effective in resolving agency conflicts. To the extent that stock repurchases are less effective than dividends in mitigating agency conflicts and that opportunistic repurchases are more likely to occur in countries with weak investor protection, we predict that investors assign a lower value to repurchases than they do to dividends in countries with weak investor protection.

Using a sample of 59,011 firm-year observations from 33 economies over the period 1998 to 2004, we find that the positive relation between stock repurchases and firm value is *greater* in countries with strong investor protection than in countries with weak investor protection. More specifically, a repurchase payout rate corresponding to 1% of the firm's total assets increases firm value by 17.59% in countries with strong investor protection, but by only 11.5% in those with weak investor protection. These results support the view that the effectiveness of stock repurchases in resolving the free cash flow problem is conditional on the country-level investor protection environment. Furthermore, we document that dividends contribute approximately 60% more to firm value than do stock repurchases in countries with weak investor protection. This underscores the different governance roles of the two major payout methods—stock repurchases and dividends—in alleviating the agency costs associated with free cash flow, and suggests that repurchases are *less* effective than dividends in mitigating agency conflicts in the presence of weak external governance.

A recent line of studies finds that corporate governance has a significant impact on cash value (Dittmar and Mahrt-Smith, 2007; Kalcheva and Lins, 2007; Pinkowitz et al., 2006). In addition, the value of cash may vary according to how cash is distributed to shareholders, because different payout methods have distinct implications for cash value. For example, using a U.S. sample Faulkender and Wang (2006) find that cash value increases with the share of repurchases in total payouts and show that the difference in the tax rates applicable to dividends and repurchases is the primary factor contributing to this cash value difference. From the agency theory perspective, the discretionary nature of repurchases makes them less effective than committed dividends in mitigating the agency problem of free cash flow. Therefore, in an international setting in which the agency cost implication might be an important consideration over and above the tax implication due to repurchases having a small tax advantage over

[2] See, for example, Comment and Jarrell (1991) and Ikenberry et al. (1995) on information signaling; Chan et al. (2004), Gup and Nam (2001), and Lie (2005) on undervaluation; Grullon and Michaely (2004), Stephens and Weisbach (1998), and Nohel and Tarhan (1998) on free cash flows; Dittmar (2000) on leverage adjustment.

dividends (La Porta et al., 2000), we expect that making a greater proportion of cash payout via repurchases rather than dividends will *lower* the marginal value of cash in a weak investor protection environment.

Based on the same set of sample firms, we find that the marginal value of cash *declines* with the proportion of total payouts represented by repurchases in countries with weak investor protection. More specifically, the marginal value of cash for a firm that makes 100% of its payouts via repurchases is 12 cents lower than that for a firm that distributes 100% of its payouts via dividends in countries where investors are weakly protected. In contrast, the marginal value of cash increases when firms distribute a greater proportion of cash via repurchases rather than dividends in countries with strong investor protection. Our results support the view that in addition to their tax effects, the agency cost implications of dividends and repurchases also play an important role in determining the marginal value of cash. Our main results are robust to a series of sensitivity tests including analyses using alternative country-level investor protection proxies, the use of change model, the use of refined measures of stock repurchases, and a two-stage least squares (2SLS) analysis to address the endogeneity issue.

This study contributes to the literature in several ways. First, it extends the existing literature on stock repurchases to an international setting with substantial variance in the country-level investor protection environment. This study therefore advances our understanding of the differential valuation impact of repurchases across countries with different investor protection institutions. Second, this study provides evidence on the different economic consequences of alternative corporate payout methods. Our findings indicate that dividend payments are more effective than repurchases in mitigating the free cash flow problem in countries with weak investor protection and that the two payout methods may not be perfect substitutes from the agency theory perspective. Third, our study supplements the findings of Faulkender and Wang (2006) showing that cash value increases with the share of repurchases in total payouts for U.S. firms, primarily due to differential tax effects. Our investigation underlines that in addition to the tax effect, the distinction between dividends and repurchases from the agency theory perspective is also essential in determining the marginal value of cash. Finally, Allen and Michaely (2003, page 420) state that "we still do not have a firm understanding of what determines the choice (between repurchases and dividends)." Our study implies that the differing degrees of effectiveness of dividends and repurchases in mitigating agency conflicts might be an important factor underlying managers' choice of payout methods.

The remainder of this study is organized as follows. Section 2 develops the hypotheses. Section 3 describes the methodology, sample, and data. The empirical results and robustness tests are discussed in Sections 4 and 5, respectively. Section 6 concludes the paper.

2. Hypothesis development

2.1. Corporate payouts, firm value, and investor protection

Stock repurchases can both mitigate the over-investment problem and avoid the under-investment concern related to a lack of capital. When firms have high cash levels but no good investment opportunities, they return cash to shareholders through stock repurchases; when they have new projects in subsequent periods, they can resell treasury shares or issue new shares to finance such projects. The flexible nature of stock repurchases indicates that they are a tool that can be easily used to reduce the agency problem of free cash flow. In support of this view, a recent strand of literature shows that stock repurchases are undertaken to prevent management from investing in unprofitable projects (e.g., Grullon and Michaely, 2004; Nohel and Tarhan, 1998; Stephens and Weisbach, 1998).

The effectiveness of stock repurchases in mitigating agency conflicts, however, depends largely on the country-level investor protection environment. In countries with weak investor protection, the agency problem and information asymmetry are severe, thus allowing controlling shareholders to enjoy great private benefits of control (Dyck and Zingales, 2004). In such a context, corporate insiders are likely to use repurchases as a tool to extract private benefits rather than as a measure genuinely taken to disgorge cash to shareholders (e.g., Gong et al., 2008; Massa et al., 2007). Chan et al. (2010) find that management uses repurchase programs to manipulate market opinion. Hribar et al. (2006) document that firms use stock repurchases to manipulate earnings to meet or beat analysts' earnings forecasts. On the other hand, strong investor protection institutions constrain corporate insiders' incentives and ability to pursue private benefits by making insider expropriation more costly and compel managers to use cash reserves efficiently (e.g., La Porta et al., 1998, 2000). Ginglinger and L'her (2006) find that the positive price reaction to repurchases exists only for firms with a low takeover threat and a low risk of insider expropriation. Taken together, these studies indicate that investors are more likely to suspect the incentive underlying stock repurchases undertaken in countries with poor investor protection and to discount the value of repurchases due to the risk of expropriation. The preceding discussion leads to our first hypothesis:

Hypothesis 1. Stock repurchases contribute less to firm value in countries with weak investor protection than in countries with strong investor protection.

2.2. The relative contributions of repurchases and dividends to firm value

Agency theory identifies corporate payouts as an important bonding mechanism that mitigates the free cash flow problem by committing managers to disgorge cash to outside shareholders and reducing the amount of wealth available for private benefits extraction or inefficient investment (Easterbrook, 1984; Jensen, 1986). Although the free cash flow hypothesis does not

distinguish between the governance roles of dividends and share repurchases, the effectiveness of a payout method in lowering agency costs depends on the extent to which it restricts managerial use of free cash flows for expropriation or inefficient investment.

Prior studies find that firms distribute permanent cash flows through dividends and allocate temporary cash flows through stock repurchases (Guay and Harford, 2000; Jagannathan et al., 2000). Because a dividend cut or omission would trigger a negative market reaction, dividend payments impose a tighter constraint on managers through the high cost of deviation and serve as a more effective governance mechanism (e.g., Benartzi et al., 1997; Denis et al., 1994). DeAngelo et al. (2006) reveal that the avoidance of agency costs plays an important role in the dividend decisions of the 25 largest longstanding dividend-paying firms in the U.S. Pinkowitz et al. (2006) document a stronger relationship between dividends and firm value in countries with weak investor protection, presumably because a high level of current dividends predicts a high level of future dividends and hence lower consumption of private benefits.

In contrast, stock repurchases are temporary payouts that do not involve a long-term commitment and can be cancelled by reselling treasury shares or issuing new shares (John and Knyazeva, 2006; Oded, 2008). Whether or not controlling shareholders renege on such payouts rests on the trade-off between the costs and benefits accruing to them.[3] In addition, managers exercise great discretion over the timing and size of repurchases (Brockman and Chung, 2001). From the perspective of information asymmetry, stock repurchases render less informed shareholders vulnerable to expropriation by the better informed (Brennan and Thakor, 1990). Existing evidence shows that the market perceives and interprets the two payout methods differently. For instance, Guay and Harford (2000) find that stock price reactions to announcements of dividend increases are greater than reactions to repurchases. Taken together, evidence from prior studies suggests that repurchases are less effective than dividends in mitigating the agency problem of free cash flow.

In countries with strong investor protection, the private benefits of control are low and firms are likely to stick to their commitments. The flexible nature of stock repurchases lowers the cost to repurchasing firms and allows for ex post adjustment of payout policy without a significant drop in market value. In countries with weak investor protection, however, because it is easier to appropriate private benefits and information asymmetry is more severe, outside investors would prefer dividends—which represent an ongoing commitment—to stock repurchases. The preceding discussion suggests the second hypothesis:

Hypothesis 2. Stock repurchases contribute less to firm value than do dividends in countries with weak investor protection.

2.3. Payout structure and the value of cash

Recent studies on cash holdings generally show that corporate governance has a significant impact on the value of cash holdings. In particular, Pinkowitz et al. (2006) find that a dollar of cash holdings is worth less in countries with weak investor protection than in countries with strong investor protection. Dittmar and Mahrt-Smith (2007) document that investors assign a lower value to an additional dollar of cash reserves when firm-level governance is weak. Kalcheva and Lins (2007) find that high cash holdings in firms with entrenched managers are not associated with lower firm value in countries with strong country-level governance.[4]

These studies indicate that corporate governance affects cash value through its impact on cash usage. If cash is used efficiently, each dollar of cash reserves is worth more than one dollar to investors. Using cash in investment projects is a good choice if firms have sound investment opportunities. Otherwise, firms may choose to distribute excessive cash balances to shareholders. However, the value of cash may vary according to how it is distributed to shareholders because different payout methods have distinct value implications. Faulkender and Wang (2006) argue that the different tax rates applicable to dividends and capital gains in the U.S. cause the discrepancy in the value of cash payouts through dividends and repurchases. They find that the marginal value of cash is higher for firms that distribute more cash via repurchases than through dividends.

La Porta et al. (2000) show that the tax advantage of capital gains over dividends is particularly pronounced in the U.S., whereas the difference between the tax treatment of dividends and capital gains is small in most other countries. Instead, outside the U.S., dividends and repurchases have agency implications for cash value over and above the tax effect due to the varying level of countries' investor protection environments.[5] From the agency theory perspective, dividends are more effective than the discretionary nature of repurchases in mitigating the agency problem. Nevertheless, the flexibility of repurchases allows firms to wait for uncertainties surrounding future investment opportunities to be resolved and to allocate internal cash more efficiently. Pre-commitments on dividends may force managers to forgo positive NPV projects or obtain costly external financing in a period of low cash flow.

In a strong country-level investor protection environment, the benefits of dividend payments diminish due to the lower agency costs engendered by the external environment, whereas the potential costs associated with forgone profitable projects or external

[3] Massa et al. (2007) provide evidence consistent with firms' mimicking behavior to avoid the negative market effect. Mimicry is costly when bad firms' long-run gains from informed trading do not compensate for the short-run costs of announcements. Although mimicry is costly, bad firms have incentives to mimic as long as their private benefits exceed the costs. With the development of investor protection and increasing concerns over expropriation, firms with controlling shareholders may mimic good firms by announcing or implementing repurchase programs to issue false signals or take private control benefits.

[4] In the absence of strong external protections, the combination of agency problems and high cash holdings is negatively related to firm value.

[5] Nevertheless, we perform a sensitivity test to control for tax rate differences between dividends and repurchases using the country-level tax treatment data provided by La Porta et al. (2000, Table III and Table A.I). The inclusion of tax rates does not qualitatively change our main results on the marginal cash value of corporate payouts across countries.

financing are high. Consequently, managers may use cash wisely by either storing it for future investment or distributing it to shareholders through discretionary payouts. Under such circumstances, the distribution of cash via repurchases rather than dividends represents a more efficient method of resource allocation and could therefore enhance the value of cash reserves. In contrast, in countries with weak investor protection, dividends are more effective than repurchases in mitigating the free cash flow problem and preventing wastage of cash, and thus any increase in cash is valued more highly when cash is distributed through dividends rather than repurchases. Drawing on the preceding discussion, our third hypothesis is stated as follows:

Hypothesis 3. Stock repurchases contribute less to cash value than do dividends in countries with weak investor protection.

3. Methodology and data

3.1. Methodology

To test our three hypotheses, we augment the valuation regression model developed by Fama and French (1998) and modified by Pinkowitz et al. (2006) by introducing payout variables, country-level investor protection indices, and relevant interactions terms.[6] The generic regression model takes the following form:

$$\begin{aligned} V_{i,t} = {} & \alpha + \beta_1 INST + \beta_2 E_{i,t} + \beta_3 dE_{i,t} + \beta_4 dE_{i,t+1} + \beta_5 dNA_{i,t} + \beta_6 dNA_{i,t+1} + \beta_7 RD_{i,t} + \beta_8 dRD_{i,t} \\ & + \beta_9 dRD_{i,t+1} + \beta_{10} I_{i,t} + \beta_{11} dI_{i,t} + \beta_{12} dI_{i,t+1} + \beta_{13} dV_{i,t+1} + \beta_{14} dC_{i,t} + \beta_{15} dC_{i,t+1} + \beta_{16} D_{i,t} \\ & + \beta_{17} D_{i,t}{}^{*}\ INST + \beta_{18} dD_{i,t} + \beta_{19} dD_{i,t+1} + \beta_{20} Rep_{i,t} + \beta_{21} Rep_{i,t}{}^{*}\ INST + \beta_{22} dRep_{i,t} \\ & + \beta_{23} dRep_{i,t+1} + \beta_{24} PS_{i,t} + \beta_{25} PS_{i,t}{}^{*} INST + \beta_{26} dC_{i,t}{}^{*} INST + \beta_{27} PS_{i,t}{}^{*} dC_{i,t} \\ & + \beta_{28} PS_{i,t}{}^{*} dC_{i,t}{}^{*} INST + \sum \delta_i IndustryDummies + \sum \eta_i YearDummies + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where X_t is the level of X in year t divided by total assets in year t; dX_t is the change in X from year $t-1$ to t divided by total assets in year t; dX_{t+1} is the change in X from year t to $t+1$ divided by total assets in year t; V is the market value of the firm at the fiscal year-end measured as the market value of equity plus the book value of total debt; *INST* is the proxy for the country-level investor protection environment and is measured by multiple investor protection indices. *INST* is a dummy variable that takes the value of 1 if the country's investor protection index is equal to or lower than the median value across sample countries (i.e., weak investor protection countries) and 0 otherwise. Alternatively, we measure *INST* with the raw index.[7] E is earnings before interest and tax; C is cash and cash equivalents; *NA* is non-cash assets and is measured by total assets minus cash and cash equivalents; I is interest expenses; D is common dividends paid; *RD* is research and development expenses; and *Rep* is the dollar amount spent on repurchases. We deflate all variables by total assets to control for heteroskedasticity. Payout structure (*PS*) is defined as the amount spent on stock repurchases divided by the total payout (the sum of repurchases and cash dividends). We adopt two estimation methods to control for potential bias in standard errors estimated from panel data: (i) pooled sample analysis with robust standard errors adjusted for heteroskedasticity and cross-sectional and serial correlations in residuals (Petersen, 2009); and (ii) the Fama and MacBeth (1973) method that addresses cross-sectional dependence in residuals across firms. Hypothesis 1 predicts β_{21} to be negative. Hypothesis 2 predicts that the sum of β_{20} and β_{21} is smaller than that of β_{16} and β_{17}. Hypothesis 3 predicts β_{28} to be negative.

We use the anti-self-dealing index developed by Djankov et al. (2008) as the "main index" to proxy for country-level investor protection environment (*INST*) because (i) Djankov et al. (2008) show that this index is better grounded in theory and generally works better than the commonly used anti-director rights index in explaining a variety of stock market outcomes; and (ii) it is one of the two most widely used investor protection indices in the literature in recent years.[8] The anti-self-dealing index measures the legal protection afforded to minority shareholders against expropriation by corporate insiders and is calculated on the basis of legal rules prevailing in 2003.

We employ six other indices in the robustness tests: the anti-director rights, judicial efficiency, control of corruption, and rights and responsibilities of shareholders indices, and the World Bank regulation and World Bank corruption indicators. The anti-director rights index measures the protection of shareholder rights. The judicial efficiency index assesses the efficiency and integrity of the legal environment. The control of corruption index gauges the risk of corruption among high-level government

[6] We include all two-way interaction terms in the regression specification when there is a three-way interaction (Jaccard et al., 1991).

[7] While we employ both a dummy variable and a raw index to measure the country-level investor protection environment, we prefer the binary measure because (i) the distributions underlying each investor protection index tend to be non-normal; (ii) each index is measured using a different scale, making it difficult to compare coefficients and economic effects between high- and low-protection countries; (iii) partitioning institutions into a broad dichotomy of high versus low realizations eliminates measurement errors in our independent variables to the extent country institutional indices include noise (for more details, see Bushman and Piotroski, 2006; DeFond and Hung, 2004; Pinkowitz et al., 2006).

[8] The anti-director rights index (La Porta et al., 1998) is another most widely used proxy for the country-level investor protection environment. However, a recent paper by Spamann (2010) raises concerns over the reliability of the anti-director rights index and shows that it could be improved. Djankov et al. (2008) further state that because the anti-self-dealing index exhibits some of the same properties as the anti-director rights index and indices of shareholder protection through securities laws presented in La Porta et al. (2006), it is therefore preferred to the anti-director rights index in cross-country empirical work (pages 461–462). Nevertheless, we use the anti-director rights index as an alternative index.

officials. These three indices are obtained from La Porta et al. (1998). The rights and responsibilities of shareholders index measures whether shareholders' rights and responsibilities are well-defined in regulations and is taken from the *IMD World Competitiveness Yearbook* for 2003. The two World Bank indicators are year-based indices developed by the World Bank and obtained from Kaufmann et al. (2009). The World Bank regulation indicator assesses the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The World Bank corruption indicator measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption.

Faulkender and Wang (2006) use a change model to test the relative contributions of repurchases and dividends to cash value. To enhance the validity of our study, we employ their change model and modify it to test our three hypotheses as follows:

$$\begin{aligned} XRet_{i\,t} = {} & \alpha + \beta_1 INST + \beta_2 dE_{i,t} + \beta_3 dC_{i,t} + \beta_4 dNA_{i,t} + \beta_5 dRD_{i,t} + \beta_6 dI_{i,t} + \beta_7 C_{i,t-1} + \beta_8 Lev_{i,t} + \beta_9 NF_{i,t} \\ & + \beta_{10} dD_{i,t} + \beta_{11} dD_{i,t}{}^{*} INST + \beta_{12} dRep_{i,t} + \beta_{13} dRep_{i,t}{}^{*} INST + \beta_{14} PS_{i,t} + \beta_{15} PS_{i,t}{}^{*} INST \\ & + \beta_{16} dC_{i,t}{}^{*} INST + \beta_{17} PS_{i,t}{}^{*} dC_{i,t} + \beta_{18} PS_{i,t}{}^{*} dC_{i,t}{}^{*} INST + \sum \delta_i IndustryDummies \\ & + \sum \eta_i YearDummies + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where *XRet* is the value-weighted excess annual stock return; *C* is cash and cash equivalents divided by the market value of equity at the beginning of the fiscal year; *Lev* is market leverage defined as total debt over the sum of total debt and the market value of equity; *NF* is total equity issuance minus repurchases plus debt issuance minus debt redemption, scaled by the market value of equity at the beginning of the fiscal year. Other variables are as defined in Eq. (1), but are scaled by the market value of equity at the beginning of the fiscal year. Hypothesis 1 predicts β_{13} to be negative. Hypothesis 2 predicts that the sum of β_{12} and β_{13} is smaller than that of β_{10} and β_{11}. Hypothesis 3 predicts β_{18} to be negative.

3.2. Sample and data

Our sample consists of listed firms from 33 economies over the 1998–2004 period. We choose this sample period for two reasons. First, stock repurchases were prohibited in most of our sample countries in the early 1990s. For example, South Korean firms were legally prohibited from buying back their shares prior to 1994, and Japanese firms were first allowed to execute stock repurchases without redeeming repurchased shares in 1999.[9] Second, we begin our sample period in 1998 to avoid the influence of the Asian financial crisis, as Asian firms account for a large portion of our sample. All financial data are retrieved from the *Worldscope* database. We begin with the entire sample of listed firms in *Worldscope*. After excluding financial firms (those with SIC codes between 6000 and 6999) and constructing payout measures, payout structure (*PS*), firm value, and a set of firm-specific characteristics, we have a final sample of 59,011 firm-year observations representing 14,495 unique firms. To reduce the effect of outliers, we winsorize extreme values at the 1st and 99th percentiles.

The compilation of repurchase data deserves further elaboration. We first search for repurchase programs in the *Securities Data Corporation* (SDC) database. However, we note that many announced repurchase programs were not executed. More importantly, the SDC database contains actual repurchase data for a very small portion of non-U.S. firms. Because most countries do not require disclosure of the number of shares repurchased subsequent to the initial repurchase announcement, the SDC data are far from complete for international repurchase activities (e.g., Cook et al., 2004). We therefore follow the alternative approach suggested by Stephens and Weisbach (1998) and Allen and Michaely (2003), who posit that the dollar amount spent on repurchases in the cash flow statement is likely to yield the least biased estimate of the actual dollar amount spent on repurchases. Specifically, we estimate actual stock repurchases for each of our sample firms using *Worldscope* data item #04751 (common/preferred redeemed, retired, converted, etc.). This item represents funds used to reduce the number of outstanding shares of common and/or preferred stock. Because this item includes stock transaction types other than repurchases (e.g., purchases of treasury stock and conversions of preferred stock into common stock), it may lead to the overestimation of actual repurchases. To reduce the measurement noise in the estimated repurchase data, we conduct sensitivity analyses using refined measures by excluding (i) observations in which the number of preferred shares falls during the fiscal year and (ii) those in which repurchases account for less than 0.1% of total assets to remove repurchases undertaken for stock options programs (which are likely to be small).[10] Furthermore, to check the accuracy of our repurchase data estimated on the basis of *Worldscope* item, we manually collect a subset of actual repurchases disclosed on the websites of the stock exchanges in four of our sample economies: Hong Kong, South Korea, Malaysia, and Taiwan. The correlation coefficient between the manually collected repurchase data and those estimated from *Worldscope* items is 0.98, providing a reasonable level of comfort about our estimated measure.

[9] Japanese firms were required to redeem all their repurchased shares until 1999. Similar regulations have also applied in the U.K., Hong Kong, India, and Singapore. We re-estimate the regression after excluding observations from these countries to avoid the potential effect of regulatory changes and find that the results are qualitatively similar to our main findings.

[10] We acknowledge that our measure of stock repurchases based on the dollar amount spent on repurchases could be noisier than the measure based on the number of shares repurchased. However, *Worldscope* does not provide the number of repurchased shares. The sensitivity tests using these refined measures produce qualitatively similar results (see for details, Section 5.3).

Table 1
Country-level descriptive statistics.

Country	Mean no. of firms/year	Median no. of firms/year	Mean no. of repurchase firms/year	Median no. of repurchase firms/year	*V*	*D*	*Rep*	*PS*	*dC*	*E*	*RD*	*I*	*dNA*
Australia	244.0	236	48.1	49	1.652	0.036	0.006	0.102	0.002	0.069	0.005	0.016	0.059
Austria	42.9	45	5.3	5	1.336	0.017	0.002	0.059	−0.007	0.064	0.010	0.016	0.045
Belgium	53.1	54	4.0	4	1.584	0.021	0.002	0.033	0.005	0.087	0.008	0.013	0.060
Brazil	109.9	125	20.4	20	1.065	0.027	0.002	0.053	0.011	0.136	0.001	0.071	0.080
Canada	243.9	241	120.7	123	1.529	0.025	0.009	0.332	0.000	0.077	0.010	0.017	0.065
Colombia	10.7	10	1.7	1	0.834	0.028	0.001	0.048	0.015	0.087	0.000	0.021	0.088
Denmark	80.6	83	23.7	23	1.610	0.018	0.007	0.149	−0.010	0.084	0.016	0.018	0.056
Finland	86.1	87	10.7	9	1.663	0.036	0.002	0.040	0.000	0.099	0.017	0.016	0.054
France	325.4	327	29.6	28	1.560	0.018	0.002	0.047	0.006	0.085	0.008	0.013	0.066
Germany	273.3	274	30.9	40	1.545	0.022	0.002	0.066	−0.005	0.071	0.014	0.016	0.045
Hong Kong	238.9	223	62.1	58	1.216	0.031	0.003	0.103	0.007	0.059	0.003	0.011	0.032
India	233.3	224	23.3	26	1.774	0.022	0.002	0.053	0.011	0.123	0.004	0.031	0.067
Ireland	27.9	28	4.0	4	1.435	0.018	0.002	0.059	0.005	0.088	0.004	0.019	0.087
Israel	29.7	29	10.3	13	1.529	0.032	0.005	0.224	0.002	0.068	0.024	0.014	0.067
Italy	105.6	105	8.1	10	1.463	0.018	0.001	0.030	−0.001	0.071	0.006	0.012	0.064
Japan	2344.3	2396	582.1	584	1.131	0.007	0.002	0.088	−0.003	0.037	0.010	0.005	0.011
Korea (South)	332.7	377	130.7	144	0.912	0.008	0.005	0.242	0.004	0.066	0.004	0.026	0.023
Malaysia	298.6	326	21.4	22	1.156	0.019	0.001	0.021	0.006	0.064	0.000	0.012	0.041
Mexico	44.1	44	25.4	24	1.146	0.016	0.009	0.355	0.011	0.106	0.000	0.026	0.093
Netherlands	93.3	94	28.0	27	1.636	0.021	0.005	0.139	0.004	0.095	0.007	0.017	0.043
New Zealand	45.4	46	7.7	8	1.609	0.050	0.007	0.071	0.002	0.121	0.001	0.019	0.031
Norway	54.0	53	15.7	15	1.570	0.026	0.005	0.150	0.005	0.081	0.009	0.020	0.050
Peru	19.3	23	2.0	1	1.029	0.039	0.004	0.050	0.008	0.108	0.000	0.016	0.042
Philippines	28.7	27	10.4	10	1.091	0.020	0.010	0.255	−0.003	0.083	0.000	0.024	0.010
Portugal	28.1	28	10.9	11	1.206	0.016	0.004	0.148	0.003	0.062	0.000	0.017	0.072
Singapore	185.1	198	12.3	15	1.257	0.021	0.001	0.023	0.006	0.064	0.001	0.009	0.039
South Africa	128.0	131	19.6	22	1.369	0.027	0.004	0.073	0.012	0.139	0.003	0.024	0.072
Spain	64.3	66	17.1	17	1.456	0.022	0.003	0.098	0.009	0.090	0.002	0.014	0.078
Sweden	116.3	116	13.4	15	1.784	0.030	0.004	0.049	0.002	0.090	0.012	0.013	0.063
Switzerland	129.0	128	35.0	37	1.639	0.017	0.007	0.155	−0.002	0.074	0.021	0.014	0.014
Taiwan	267.1	226	64.7	72	1.339	0.024	0.004	0.162	0.020	0.076	0.016	0.009	0.072
U.K.	732.3	728	121.4	126	1.725	0.030	0.005	0.074	0.002	0.079	0.011	0.014	0.063
U.S.	1414.9	1440	1,057.9	1,047	2.103	0.013	0.024	0.585	−0.002	0.020	0.029	0.025	0.030
Median	109.9	116	20.4	22	1.463	0.022	0.004	0.074	0.004	0.081	0.006	0.016	0.059

This table reports the mean values of all firm-specific variables for each sample country. *V* is the market value of the firm at the fiscal year-end, measured as the market value of equity plus the book value of total debts. *D* is common dividends paid. *Rep* is the cost of actual repurchases. Payout structure, *PS*, is defined as the cost of stock repurchases divided by total payouts (the sum of repurchases and cash dividends). *dC* is the change in the level of *C* (cash and cash equivalents) from year $t-1$ to year *t*. *E* is earnings before interest and tax. *RD* is research and development expenses. *I* is interest expenses. *dNA* is the change in the level of *NA* (non-cash assets, which is total assets minus cash and cash equivalents). All variables except *PS* are scaled by total assets at the end of the year. When *RD* or *Rep* is missing, it is set to equal zero.

4. Empirical results

4.1. Descriptive statistics

Table 1 reports the country-level summary statistics for our key variables. The first four columns report the mean and median of number of firms and the mean and median frequency of repurchases undertaken in each sample country, respectively. The next nine columns present the country-level means of firm-specific variables. Most of our sample countries have a mean firm value (*V*) greater than one. Payout policy varies substantially across countries. The average dividend payout ratio of payers (*D*) is lowest in Japan (0.7%) and highest in New Zealand (5.0%), with a cross-country median of 2.2%. The mean repurchase payout ratio (*Rep*) ranges from 0.1% for Colombia, Italy, Malaysia, and Singapore to 2.4% for the U.S., with a cross-country median of 0.4%. Dividends continue to be the dominant form of payout in all countries except the U.S. The average percentage of repurchases in total payouts (*PS*) exhibits a high degree of variation across countries, with the lowest value being for Malaysia (2.1%) and the highest for the U.S (58.5%). The average change in cash (*dC*) ranges from −1% of total assets for Denmark to 2% for Taiwan. The mean value of earnings before interest and tax (*E*) ranges from 2% of total assets for the U.S. to 13.9% for South Africa. Average R&D expenses (*RD*) ranges from 0% of total assets in six countries to 2.9% in the U.S.[11] Average interest expenses (*I*) and average change in non-cash assets (*dNA*) also exhibit considerable variation across countries. The trend in our country-level mean values appears to be consistent with that observed in prior cross-country studies (e.g., Kalcheva and Lins, 2007; Pinkowitz et al., 2006).

[11] In our final sample, about 57% of observations have a missing R&D value. We follow the standard practice and set the missing R&D value to zero (e.g., Faulkender and Wang, 2006).

Table 2
Summary statistics for country-level investor protection indices and correlation coefficients.

Country	Anti-self-dealing	Anti-director rights	Judicial efficiency	Control of corruption	Rights and responsibilities	WB regulation	WB corruption
Panel A: Summary statistics for country-level investor protection indices							
Australia	0.76	4	10	8.52	8.286	1.54	1.93
Austria	0.21	2	9.5	8.57	7.508	1.5	1.95
Belgium	0.54	0	9.5	8.82	6.970	1.27	1.5
Brazil	0.27	3	5.75	6.32	6.444	0.2	0.06
Canada	0.64	5	9.25	10	7.778	1.48	1.98
Colombia	0.57	3	7.25	5	5.429	0.13	−0.46
Denmark	0.46	2	10	10	8.031	1.69	2.22
Finland	0.46	3	10	10	8.703	1.7	2.37
France	0.38	3	8	9.05	6.333	1.04	1.41
Germany	0.28	1	9	8.93	7.592	1.42	1.97
Hong Kong	0.96	5	10	8.52	7.467	1.75	1.34
India	0.58	5	8	4.58	5.886	−0.25	−0.37
Ireland	0.79	4	8.75	8.52	7.037	1.67	1.52
Israel	0.73	3	10	8.33	7.045	1	1.04
Italy	0.42	1	6.75	6.13	5.183	0.88	0.65
Japan	0.5	4	10	8.52	4.519	0.87	1.18
Korea (South)	0.47	2	6	5.3	4.571	0.63	0.35
Malaysia	0.95	4	9	7.38	6.769	0.51	0.42
Mexico	0.17	1	6	4.77	5.212	0.42	−0.31
Netherlands	0.2	2	10	10	7.226	1.77	2.14
New Zealand	0.95	4	10	10	7.208	1.7	2.28
Norway	0.42	4	10	10	7.929	1.3	2.06
Peru	0.45	3	6.75	4.7	.	0.31	−0.2
Philippines	0.22	3	4.75	2.92	5.160	0.07	−0.51
Portugal	0.44	3	5.5	7.38	5.645	1.12	1.25
Singapore	1	4	10	8.22	7.600	1.87	2.27
South Africa	0.81	5	6	8.92	7.178	0.42	0.44
Spain	0.37	4	6.25	7.38	5.514	1.21	1.4
Sweden	0.33	3	10	10	8.271	1.48	2.21
Switzerland	0.27	2	10	10	7.063	1.55	2.12
Taiwan	0.56	3	6.75	6.85	6.583	1.02	0.84
U.K.	0.95	5	10	9.1	7.229	1.74	2.07
U.S.	0.65	5	10	8.63	7.294	1.51	1.74
Median	0.47	3	9.25	8.52	7.054	1.27	1.41
Panel B: Correlations among investor protection indices							
Anti-self-dealing	1.000						
Anti-director rights	**0.633**	1.000					
Judicial efficiency	**0.343**	0.161	1.000				
Control of corruption	0.199	0.125	**0.764**	1.000			
Rights and responsibilities	0.261	0.183	**0.693**	**0.756**	1.000		
WB regulation	0.228	0.032	**0.714**	**0.813**	**0.674**	1.000	
WB corruption	0.142	0.049	**0.761**	**0.903**	**0.735**	**0.945**	1.000

Panel A reports the descriptive statistics for the country-level investor protection indices. The anti-self-dealing index developed by Djankov et al. (2008) measures the protection of minority shareholders against self-dealing transactions benefiting controlling shareholders. The anti-director rights index measures the protection of shareholder rights. The judicial efficiency index assesses the efficiency and integrity of the legal environment. The control of corruption index assesses the risk of corruption among high-level government officials. All three of the aforementioned indices are obtained from La Porta et al. (1998). The rights and responsibilities index measures whether shareholders' rights are well-defined in regulations and is extracted from the *IMD World Competitiveness Yearbook* for 2003. WB regulation indicator measures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. WB corruption indicator measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. Both WB indices are obtained from Kaufmann et al. (2009). Panel B presents the correlation coefficients among investor protection indices. Coefficients in bold are significant at the 5% level or less.

Panel A of Table 2 reports the raw values of country-level investor protection indices, with high scores representing strong investor protection. For the two year-based indices—the World Bank (WB) regulation and corruption indicators—we report the mean values for each country across the years covered by our sample period. The values for our main index—the anti-self-dealing index—range from 0.17 for Mexico to 1 for Singapore, indicating substantial variation in the investor protection environment across our sample countries. A high degree of cross-country variation is evident in the other six indices. Panel B of Table 2 presents the correlation coefficients among the country-level investor protection indices. In general, the correlations among the indices are relatively high. For instance, the correlation coefficient between the anti-self-dealing and anti-director rights indices is 0.633, while the correlation coefficients between judicial efficiency and control of corruption, rights and responsibilities, WB regulation, and WB corruption are 0.764, 0.693, 0.714, and 0.761, respectively.

Table 3
Main results for firm value, corporate payouts, investor protection, and cash value.

Variables	Anti-self-dealing—dummy		Anti-self-dealing—raw		Split-sample analysis based on anti-self-dealing		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pooled sample analysis	Fama–MacBeth method	Pooled sample analysis	Fama–MacBeth method	High	Low	Diff. (p-value)
Intercept	0.85***	0.88***	0.79***	0.81***	1.15***	0.95***	0.078
	(0.066)	(0.021)	(0.067)	(0.026)	(0.071)	(0.065)	
INST	0.00	−0.04	0.06***	0.04**	0.12***	0.13***	0.848
	(0.018)	(0.028)	(0.010)	(0.014)	(0.029)	(0.037)	
E_t	−2.40***	−2.28***	−2.42***	−2.30***	−2.45***	2.46**	0.001
	(0.252)	(0.190)	(0.253)	(0.191)	(0.183)	(0.712)	
dE_t	0.55***	0.66**	0.55***	0.66**	0.61**	−0.36	0.062
	(0.252)	(0.194)	(0.191)	(0.192)	(0.202)	(0.287)	
dE_{t+1}	−0.55**	−0.39	−0.55**	−0.39	−0.49	0.94 ***	0.012
	(0.228)	(0.298)	(0.228)	(0.301)	(0.325)	(0.131)	
dNA_t	0.80***	0.74***	0.81***	0.75***	0.76***	0.44**	0.207
	(0.105)	(0.104)	(0.106)	(0.102)	(0.107)	(0.171)	
dNA_{t+1}	1.09***	0.98***	1.09***	0.99***	1.03***	0.72**	0.395
	(0.089)	(0.232)	(0.089)	(0.233)	(0.218)	(0.302)	
RD_t	6.25***	5.86***	6.29***	5.90***	5.12***	8.32***	0.038
	(0.657)	(1.142)	(0.655)	(1.138)	(1.168)	(1.140)	
dRD_t	1.18	1.38	1.13	1.34	1.24	−0.20	0.567
	(1.547)	(1.952)	(1.546)	(1.948)	(2.046)	(1.860)	
dRD_{t+1}	9.12***	7.38***	9.15***	7.45***	6.85***	7.78**	0.705
	(1.516)	(1.126)	(1.513)	(1.138)	(0.675)	(2.661)	
I_t	5.05***	4.68**	4.96***	4.56**	5.87***	−3.07**	0.003
	(1.082)	(1.362)	(1.063)	(1.333)	(1.486)	(1.254)	
dI_t	−3.93**	−2.86	−3.85**	−2.77	−2.94	0.22	0.050
	(1.931)	(1.941)	(1.923)	(1.944)	(2.810)	(1.757)	
dI_{t+1}	−1.66	−1.46	−1.74	−1.57	−0.51	−3.67**	0.157
	(2.038)	(1.447)	(2.041)	(1.444)	(2.087)	(1.279)	
dV_{t+1}	−0.17***	−0.20	−0.17***	−0.19	−0.18	−0.37	0.576
	(0.036)	(0.168)	(0.036)	(0.168)	(0.155)	(0.242)	
dC_t	1.96***	1.77***	2.39***	1.54***	1.88***	0.63***	0.019
	(0.261)	(0.334)	(0.381)	(0.386)	(0.344)	(0.160)	
dC_{t+1}	2.91***	2.64***	2.92***	2.65***	2.86***	1.25**	0.013
	(0.227)	(0.482)	(0.227)	(0.482)	(0.492)	(0.515)	
D_t	**16.49*** **	**17.17*** **	**17.16*** **	**17.72*** **	**18.13*** **	**10.26*** **	**0.001**
	(0.586)	**(1.101)**	**(0.703)**	**(1.295)**	**(1.277)**	**(0.581)**	
D_t*INST	**1.90** **	**1.79**	**0.034**	**0.06**			
	(0.795)	**(1.670)**	**(0.389)**	**(0.821)**			
dD_t	1.29*	2.18*	1.21*	2.08*	3.56**	−1.57*	0.013
	(0.728)	(1.090)	(0.730)	(1.063)	(1.401)	(0.780)	
dD_{t+1}	12.65***	13.17***	12.60***	13.15***	14.35***	4.63**	0.015
	(0.853)	(1.592)	(0.858)	(1.558)	(2.158)	(1.449)	
Rep_t	**17.59*** **	**18.70*** **	**19.53*** **	**19.79*** **	**18.84*** **	**2.41***	**0.000**
	(1.137)	**(1.451)**	**(1.504)**	**(1.876)**	**(1.416)**	**(1.074)**	
Rep_t*INST	**−6.09*** **	**−6.95*** **	**−2.38*** **	**−1.62***			
	(1.377)	**(1.169)**	**(0.800)**	**(0.798)**			
$dRep_t$	−3.63***	−4.16***	−3.83***	−4.39***	−4.34***	−1.04	0.130
	(0.975)	(0.970)	(0.974)	(0.910)	(1.045)	(0.973)	
$dRep_{t+1}$	6.58***	7.30***	6.74***	7.47***	7.73***	2.35**	0.008
	(0.728)	(0.632)	(0.725)	(0.606)	(0.789)	(0.776)	
PS_t	0.09***	0.13***	-0.08	0.28***	0.15***	0.14***	0.765
	(0.037)	(0.028)	(0.091)	(0.062)	(0.029)	(0.036)	
PS_t*INST	−0.21***	−0.16***	−0.07*	−0.14**			
	(0.059)	(0.047)	(0.042)	(0.039)			
dC_t*INST	−0.18	−0.22	0.22	0.17			
	(0.347)	(0.304)	(0.163)	(0.124)			
PS_t*dC_t	**2.19*** **	**1.48**	**2.92*** **	**2.01***	**3.66***	**−5.36** **	**0.008**
	(0.595)	**(0.923)**	**(0.817)**	**(0.937)**	**(1.989)**	**(1.988)**	
PS_t*dC_t*INST	**−4.10*** **	**−3.62*** **	**−1.56*** **	**−1.21** **			
	(1.151)	**(0.990)**	**(0.627)**	**(0.472)**			
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	
Year dummies	Yes	No	Yes	No	No	No	
Adj. R^2	0.334	0.388	0.333	0.387	0.405	0.432	
No. of obs.	59,011	7	59,011	7	7	7	
Tests for H2: $D + D$*$INST = Rep + Rep$*$INST$ (or $D = Rep$ for the split-sample analysis)							
p-value	0.000	0.006	NA	NA	0.742	0.001	

4.2. Regression results using the main index of the country-level investor protection environment

Table 3 reports our main regression results for the relations among firm value, corporate payouts, and cash value conditional on the country-level anti-self-dealing index, which is our main measure of investor protection. Column 1 reports the regression results of the pooled sample analysis using the binary version of the anti-self-dealing index. The coefficient for repurchase (*Rep*) is significantly positive (17.59, $p<1\%$), suggesting that stock repurchases enhance firm value in countries with strong investor protection against self-dealing transactions. However, the coefficient on *Rep*INST* is significantly negative (−6.09, $p<1\%$), indicating that the contribution of stock repurchases to firm value is lower in countries with weak investor protection. To put this result in perspective, a repurchase payout rate corresponding to 1% of the firm's total assets increases firm value by 17.59% in countries with a high anti-self-dealing index, but by only 11.5% in economies with a low anti-self-dealing index. These findings support our first hypothesis and are in line with the view that repurchases are less effective in mitigating agency conflicts in a weak investor protection environment.

In the test of the relative contributions of dividends and repurchases to firm value in weak protection countries, the coefficient on repurchases is 11.5 (= 17.59 − 6.09), while that on dividends is 18.39 (= 16.49 + 1.90). The difference between the coefficients of the two alternative forms of payout is statistically significant for low-protection countries (reported in the last row of Table 3), but not for economies with a high level of investor protection. Economically, dividends contribute about 60% more to firm value than repurchases in countries with weak investor protection. These results are consistent with our argument for the second hypothesis that discretionary repurchases are less effective than committed dividends in mitigating the free cash flow problem in the presence of weak country-level investor protection.

Turning to the third hypothesis concerning cash value, the coefficient on the interaction between the proportion of repurchases in total payouts and the change in cash holdings (*PS*dC*) is significantly positive (2.19, $p<1\%$), indicating that repurchases increase the marginal value of cash relative to dividends in a strong investor protection environment. This is consistent with the finding of Faulkender and Wang (2006) for U.S. firms. In contrast, the coefficient on *PS*dC*INST* is −4.10 and statistically significant at the 1% level, indicating that a greater share of repurchases in total distributions reduces the marginal value of cash in countries with weak investor protection.[12] These results are in line with our third hypothesis that dividends and repurchases have differing implications for cash value, contingent on the country-level investor protection environment.

Column 2 of Table 3 reports the mean coefficients of seven yearly cross-sectional regressions based on the Fama and MacBeth (1973) method. The Fama–MacBeth method yields results largely consistent with those derived from the pooled sample analysis. We also conduct both the pooled sample analysis and Fama–MacBeth method using the raw anti-self-dealing index for *INST*.[13] The results shown in columns 3 and 4 are similar to those based on the dummy *INST* measure.

Lastly, we conduct a split-sample analysis that allows the coefficients on the control variables to vary across investor protection regimes (see, for example, Kalcheva and Lins, 2007; Pinkowitz et al., 2006). Specifically, we split the full sample into high and low protection sub-samples based on the cross-country median value of the anti-self-dealing index and then estimate Eq. (1) without the interaction terms separately for the two sub-samples. As shown in columns 5 and 6, the results indicate that the coefficient on repurchases (*Rep*) is 18.84 ($p<1\%$) in countries with a high anti-self-dealing index and is 2.41 ($p<10\%$) in countries with a low anti-self-dealing index. As shown in column 7, the difference between the coefficients for the high and low sub-samples is statistically significant. The last row of Table 3 indicates that in countries with a low anti-self-dealing index, the coefficient of 2.41 on repurchases (*Rep*) is significantly smaller than the coefficient of 10.26 on dividends (*D*) at the 1% level. Moreover, the coefficient on *PS*dC* is significantly positive (3.66) in the high anti-self-dealing sub-sample, indicating that repurchases increase the marginal value of cash relative to dividends, whereas it is significantly negative (−5.36) in the low anti-self-dealing sub-sample, suggesting that repurchases decrease the marginal value of cash relative to dividends. These coefficients are statistically different from each other ($p<1\%$). In sum, the split-sample analysis corroborates the full sample test results.

Taken together, our main results in Table 3 lend support to the notion that the effectiveness of repurchases in mitigating the free cash flow problem hinges on the country-level investor protection environment. In addition, repurchases are a less effective mechanism than dividends in reducing agency costs when strong investor protection institutions are not in place. This implies that the two payout methods may not be perfect substitutes from the agency theory perspective.

Notes to Table 3:
This table reports the main results of the regression of firm value on corporate payouts, investor protection index, cash, their interaction terms, and controls. *INST* is measured by the anti-self-dealing index (our main index). In columns (1) and (2), *INST* is set to 1 if a country's anti-self-dealing index is equal to or lower than the median value across sample countries (i.e., weak investor protection countries) and 0 otherwise. In columns (3)–(6), we convert the raw anti-self-dealing index values into reverse rankings so that a higher score indicates weak investor protection. X_t is the level of variable X in year t. dX_t is the change in the level of X from year $t-1$ to year t. dX_{t+1} is the change in the level of X from year t to year $t+1$. All other variables are as defined in Tables 1 and 2. For the pooled sample analysis, industry and year dummies are included but not reported. The Fama and MacBeth (1973) method is used for the split-sample analysis. Robust standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively, in two-tailed tests.

[12] Faulkender and Wang (2006) test the relative contributions of repurchases and dividends to cash value using a change model. To make a meaningful comparison, we discuss economic interpretation based on the change model results in Section 5.6.

[13] To make the interpretation straightforward and consistent with the dummy *INST*, we convert the raw index into reversed rankings so that a higher score indicates weak investor protection.

Table 4
Alternative country-level investor protection indices.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Anti-director rights	Judicial efficiency	Control of corruption	Rights and responsibilities	WB regulation	WB corruption
D_t	17.07***	17.10***	15.55***	15.38***	6.93***	7.20***
	(0.599)	(0.634)	(0.675)	(0.625)	(0.905)	(0.926)
$D_t{}^*INST$	−0.37	−0.39	1.65**	4.97***	1.07	0.08
	(0.751)	(0.767)	(0.809)	(0.863)	(1.062)	(0.965)
Rep_t	17.43***	17.33***	17.83***	18.02***	2.61***	2.60***
	(1.147)	(1.150)	(1.164)	(1.155)	(0.952)	(0.957)
$Rep_t{}^*INST$	−6.51***	−7.81***	−9.00***	−11.13***	−6.11***	−5.45***
	(1.329)	(1.113)	(1.467)	(1.277)	(1.109)	(1.065)
$PS_t{}^*INST$	−0.25***	−0.19***	0.15**	0.11*	0.24***	0.25***
	(0.055)	(0.049)	(0.060)	(0.062)	(0.050)	(0.050)
$dC_t{}^*INST$	−0.39	−0.74**	0.51	0.79**	0.57**	0.42*
	(0.330)	(0.35)	(0.369)	(0.355)	(0.248)	(0.249)
$PS_t{}^*dC_t$	1.47***	1.94***	2.41***	2.44***	0.56*	0.48
	(0.484)	(0.62)	(0.680)	(0.642)	(0.349)	(0.354)
$PS_t{}^*dC_t{}^*INST$	−2.31***	−2.09**	−2.07*	−2.21**	−1.49**	−1.23*
	(0.808)	(0.970)	(1.087)	(1.108)	(0.738)	(0.727)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.335	0.335	0.336	0.335	0.224	0.223
No. of obs.	59,011	59,011	59,011	58,876	56,224	56,224
Tests for H2: $D + D^*INST = Rep + Rep^*INST$						
p-value	0.000	0.000	0.000	0.000	0.000	0.000

This table presents the regression results obtained using alternative country-level investor protection indices. *INST* represents country-level investor protection measured by alternative indices, and it is set to 1 if a country's corresponding investor protection index is equal to or lower than the cross-country median (i.e., weak investor protection countries) and 0 otherwise. All the variables are as defined in Tables 1 and 2. All control variables and industry and year dummies are included but not reported. Robust standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively, in two-tailed tests.

5. Robustness tests

We test the robustness of our empirical results using a set of sensitivity checks.

5.1. Alternative measures of investor protection institutions

To investigate whether our results are robust to the choice of the measure of country-level investor protection institutions, we re-estimate Eq. (1) using four alternative indices: anti-director rights, judicial efficiency, control of corruption, and the rights and responsibility of shareholders. For brevity, Table 4 reports the results only for the hypothesized variables, although it includes all other control variables and industry and year dummies specified in Eq. (1). As shown in columns 1 though 4, the results are largely consistent with our main results in Table 3.

5.2. Fixed effect model using yearly investor protection indices

One major concern with the pooled data is time-series dependence among the firm-year observations because corporate payouts are likely to be correlated over time and the country-level investor protection indices used in early analysis are constant across years. To further address this concern, we employ two World Bank indices—the World Bank regulation and World Bank corruption indices—that have *yearly* ratings, and estimate the fixed effects regression.[14] The results in columns 5 and 6 of Table 4 are generally consistent with our main results. In addition, we convert the pooled data into a cross-sectional panel by computing the average value of each variable for each firm and estimating a cross-sectional regression. The analysis (not reported) produces similar results.

5.3. Refined measures of stock repurchases

As discussed previously, the repurchase data estimated using *Worldscope* items may be subject to measurement error. We therefore conduct additional tests using refined measures to filter out any noise. We first exclude repurchase observations in which the number of preferred shares falls. As shown in column 1 of Table 5 (using our main index of anti-self-dealing), the results are qualitatively similar to the main results. Prior studies suggest that firms buy back their own shares for stock option programs. However, data on stock options are not publicly available in most countries outside the U.S. Thus, our second additional test

[14] The fixed effects regression is not applicable to other investor protection indices considered previously because of their time-invariant nature.

Table 5
Refined measures of repurchases and the endogeneity issue.

Variables	(1)	(2)	(3)
	Excluding repurchase obs. with decreasing number of preferred shares	Excluding repurchases less than 0.1% of total assets	2SLS
D_t	16.65***	16.75***	16.63***
	(0.596)	(0.613)	(0.605)
D_t*INST	1.93***	1.70**	2.58***
	(0.804)	(0.810)	(0.952)
Rep_t	17.58***	18.52***	17.83***
	(1.182)	(1.183)	(1.170)
Rep_t*INST	−6.31***	−6.42***	−8.46***
	(1.425)	(1.503)	(1.709)
PS_t*INST	−0.21***	−0.18**	−0.20**
	(0.061)	(0.072)	(0.077)
dC_t*INST	−0.19	−0.04	0.70
	(0.338)	(0.343)	(0.487)
PS_t*dC_t	1.59***	1.28***	2.55***
	(0.481)	(0.483)	(0.637)
PS_t*dC_t*INST	−4.09***	−3.86***	−5.04***
	(1.188)	(1.278)	(1.479)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Adj. R^2	0.302	0.342	0.336
No. of obs.	56,933	54,678	57,141
Tests for H2: $D + D*INST = Rep + Rep*INST$			
p-value	0.000	0.000	0.000

This table presents the regression results obtained using the refined repurchase measures and 2SLS analysis. *INST* is set to 1 if a country's anti-self-dealing index is equal to or lower than the cross-country median (i.e., weak investor protection countries) and 0 otherwise. All variables are as defined in Tables 1 and 2. All control variables and industry and year dummies are included but not reported. Robust standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively, in two-tailed tests.

excludes observations in which the dollar amount spent on repurchases is less than 0.1% of total assets to remove repurchases undertaken for stock options programs, as the amounts repurchased for stock options programs are likely to be small. Column 2 in Table 5 indicates that the main results still hold.[15]

5.4. Endogeneity issue

A crucial concern in our study is that national regulations on repurchases may affect the incidence of stock repurchases. Regulations in some of our sample economies inhibited firms from aggressively repurchasing shares in the early 1990s and have been relaxed since the late 1990s. It is difficult to regard the relaxation of such a restriction as an exogenous shock.[16] More importantly, it is likely that such a restriction prevails in countries with poor investor protection where self-dealing transactions and insider expropriation are prevalent. To address this concern, we first re-estimate our primary tests using the most recent sample period of 2003–2004, which should be a "no restriction" period for most of our sample countries and less subject to the influence of any regulatory change. We document similar results (untabulated) with this short sample period. Second, we perform a two-stage least squares (2SLS) regression analysis to account for the endogeneity of repurchases. In the first-stage equation, we regress repurchase amounts on a country's legal origins and per capita GNP in 1996. We then use the predicted repurchase value to estimate the structural regression. The 2SLS procedures produce results (reported in Table 5, column 3) similar to the main results reported in Table 3. However, we should be cautious in making inferences on the basis of these 2SLS results, as they depend largely on correct identification of the true exogenous instrumental variables.

5.5. Sample issues

Given that the U.S. and Japan account for a much greater number of repurchase firms than other economies in our sample, it is possible that the large weighting on these two countries drives the main results. When we re-estimate the regressions after excluding observations from the U.S. and Japan sequentially, the main results (untabulated) remain unchanged. In addition, because our sample is restricted to firms that make payouts to test the third hypothesis on the cash value of the payout structure, we re-estimate the regressions using a larger sample without such a restriction. We obtain stronger results (untabulated) for the first and second hypotheses, suggesting that our results are not sensitive to the sample selection restriction.

[15] We also re-estimate the model using anti-director rights as a proxy of the investor protection environment; the results (unreported) are similar to our main results.

[16] We thank the reviewer for pointing this out.

5.6. Analysis of cash value using the change model

Faulkender and Wang (2006) developed a change regression model to test the relative contributions of repurchases and dividends to cash value. We estimate the change model in Eq. (2) to examine whether our results are robust to model selection. For brevity, Table 6 reports the coefficients and robust standard errors for the key variables using the main anti-self-dealing index and the six alternative indices. In column 1 (using the anti-self-dealing index), the coefficient on *PS*dC* is significantly positive (0.31, $p<1\%$) and that on *PS*dC*INST* is significantly negative (−0.43, $p<5\%$), consistent with the third hypothesis. Economically, the magnitude of these coefficients suggests that in countries with a low anti-self-dealing index, the equity market values an additional dollar of cash for a firm that carries out 100% of its equity payouts in the form of repurchases 12 cents (0.31–0.43) lower than that for an otherwise equivalent firm that pays out 100% of its equity distributions in the form of dividends. The results reported in columns 2 to 7 are qualitatively similar when we use alternative investor protection proxies. Regarding the first hypothesis, the coefficients on the change in repurchases (*dRep*) are significantly positive in the six out of the seven regressions, but those on *dRep*INST* are statistically insignificant at conventional levels. Thus, the results for the first hypothesis are weaker in the change model than in the level model. The insignificance of the results might be partially due to less frequent repurchase transactions being conducted over the two consecutive periods examined among our sample firms. Regarding the second hypothesis, the difference between the coefficients of the repurchase and dividend payouts is statistically significant in countries with poor investor protection, as hypothesized (the last row of Table 6). In sum, the level and change models produce generally consistent results.

5.7. Impact of firm-level corporate governance

To further ensure that the difference in the market valuations of repurchases reported above is explained by their effectiveness in resolving the free cash flow problem, we perform an analysis of the interactive effect of firm-level corporate governance and the country-level investor protection environment on stock repurchases. To the extent that agency costs and the risk of insider expropriation are greater in firms with poor firm-level corporate governance, minority shareholders may discount firm value even more when the firm undertakes repurchases in a weak firm-level governance and country-level investor protection environment. To test this inquiry, we employ separation of the cash flow rights and voting rights of the ultimate owner(s) as a proxy for firm-level corporate governance, because the literature shows that most publicly traded companies in the majority of countries have a controlling owner who holds control rights in excess of cash flow rights and that the separation of ownership and control provides

Table 6
Analysis of cash value using change model.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Anti-self-dealing	Anti-director rights	Judicial efficiency	Control corruption	Rights and responsibilities	WB regulation	WB corruption
dD_t	2.00***	2.02***	1.81***	1.18***	1.62***	1.61***	1.46***
	(0.147)	(0.153)	(0.150)	(0.162)	(0.146)	(0.150)	(0.166)
dD_t*INST	−0.80***	−0.78***	−0.11	1.07***	0.44*	0.46*	0.66***
	(0.273)	(0.262)	(0.263)	(0.242)	(0.274)	(0.260)	(0.246)
$dRep_t$	0.19*	0.20*	0.23**	0.22**	0.22**	0.22**	0.16
	(0.103)	(0.104)	(0.104)	(0.111)	(0.107)	(0.109)	(0.115)
$dRep_t$*INST	0.20	0.14	−0.01	0.01	−0.04	−0.07	0.16
	(0.237)	(0.232)	(0.234)	(0.204)	(0.219)	(0.211)	(0.193)
PS_t*INST	−0.09***	−0.08***	−0.07***	0.00	−0.02	−0.01	−0.07***
	(0.023)	(0.021)	(0.022)	(0.017)	(0.017)	(0.018)	(0.016)
dC_t*INST	−0.19***	−0.17***	−0.15***	−0.05	−0.13***	−0.16***	−0.14***
	(0.054)	(0.053)	(0.052)	(0.051)	0.051	(0.050)	(0.051)
PS_t*dC_t	0.31***	0.33***	0.32***	0.41***	0.39***	0.38***	0.38***
	(0.082)	(0.083)	(0.083)	(0.097)	0.092	(0.094)	(0.099)
PS_t*dC_t*INST	−0.43**	−0.45***	−0.46***	−0.45***	−0.52***	−0.50***	−0.43***
	(0.179)	(0.170)	(0.172)	(0.146)	(0.149)	(0.147)	(0.145)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.250	0.249	0.249	0.249	0.249	0.248	0.250
No. of obs.	50,371	50,371	50,371	50,371	50,267	50,371	50,371
Tests for H2: $dD + dD*INST = dRep + dRep*INST$							
p-value	0.013	0.003	0.000	0.000	0.000	0.000	0.000

This table reports the regression results obtained using the change model in Eq. (2). *XRet* is the value-weighted excess annual stock return. *Lev* is market leverage, defined as total debt over the sum of total debt and the market value of equity. *NF* is total equity issuance minus repurchases plus debt issuance minus debt redemption, scaled by the market value of equity at the beginning of the fiscal year. *INST* is set to 1 if a country's corresponding investor protection index is equal to or lower than the cross-country median (i.e., weak investor protection countries) and 0 otherwise. All other variables are as defined in Tables 1 and 2, but are scaled by the market value of equity at the beginning of the year. All control variables and industry and year dummies are included as specified in Eq. (2) but not reported. Robust standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively, in two-tailed tests.

controlling owners with both the incentive and the ability to expropriate economic resources at the expense of minority shareholders (e.g., La Porta et al., 1999; Shleifer and Vishny, 1997).

We obtain data on the cash flow rights and voting rights of ultimate owners from Claessens et al. (2000) and Faccio and Lang (2002).[17] Matching our sample with the ultimate ownership data reduces the sample size from 59,011 to 10,562. We construct a dummy variable (*Divergence*) to capture the *greatest* degree of expropriation risk and define it as one if the ultimate owner's voting rights exceed the cash flow rights and the voting rights are greater than 30%, and zero otherwise, which is similar to the rationale employed by Fan and Wong (2005).[18] We expect this group of firms to be associated with more severe agency costs of insider expropriation (e.g., La Porta et al., 2002; Haw et al., 2004; Kalcheva and Lins, 2007). We estimate Eq. (1) by including *Divergence* and an interaction term of *Divergence* INST* Rep* (where *INST* is measured by the anti-self-dealing index). The regression results (untabulated) show that the coefficient on the interaction term is significantly negative (−12.00, $p<1\%$). This suggests that in a weak country-level investor protection environment, the value of stock repurchases is even lower for firms with poor firm-level corporate governance.

6. Conclusion and further research

Previous studies have well established the economic value of a stock repurchase. However, open market stock repurchases have been considered to be of low credibility due to their inherent flexibility (e.g., Vermaelen, 1981). In this study, we investigate the valuation impact of share repurchases in an international setting with substantial variation in country-level investor protection environments. Using a sample of firms from 33 economies over the period 1998 to 2004, we find that stock repurchases contribute more to firm value in countries with strong investor protection than in countries with weak investor protection. We also report that repurchases are valued less than dividends in countries with weak investor protection. Furthermore, we show that the marginal value of cash declines when cash is distributed through repurchases rather than dividends in countries with weak investor protection.

Overall, our robust evidence indicates that market valuation of stock repurchases is strongly contingent on the country-wide investor protection environment, probably due to the inherent flexibility and greater managerial discretion associated with repurchase programs, and that repurchases are a less effective and credible mechanism than dividends in mitigating the free cash flow problem in jurisdictions with weak investor protection. This stresses that the two major payout methods—stock repurchases and dividends—may not be perfect substitutes from the agency theory perspective. Our study also implies that the differing degrees of effectiveness of dividends and repurchases in mitigating agency conflicts might be an important consideration behind managers' choice between the two primary payout methods.

A recent paper by Boudoukh et al. (2007) provides compelling evidence that net payout (dividends plus stock repurchases minus issuance) yields contain more information than dividend yields about the cross section of expected stock returns. Therefore, an interesting research question in this context is whether dividends and repurchases still affect firm value in the extreme case scenario in which the net payout is close to zero. While our sample contains too few observations with a zero net payout to pursue this line of inquiry, a future study based on a larger sample of zero payouts would enrich our understanding of the different motivations and value contributions associated with corporate payouts.

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[17] Claessens et al. (2000) provide information on the cash flow rights and voting rights of 2980 firms in nine East Asian countries as of 1996. The database includes data for firms from Hong Kong, Indonesia, Japan, South Korea, Malaysia, the Philippines, Singapore, Thailand, and Taiwan. Faccio and Lang (2002) supply ownership data on 5232 firms in 13 European countries: Austria, Belgium, France, Finland, Germany, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. Their database consists of information on cash flow rights and voting rights from 1996 to 1999, depending on data availability.

[18] We use 20% instead of 30% as an alternative cutoff point for voting rights and find similar results.

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